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Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 1: Allgemeine Informationen und Festlegungen der Anwendungsfälle (ISO 15118-1:2019)

Véhicules routiers - Interface de communication entre véhicule et réseau électrique - Partie 1: Informations générales et définition de cas d'utilisation (ISO 15118-1:2019)

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Road vehicles - Vehicle to grid communication interface - Part 1: General information and use-case definition (ISO 15118-1:2019)

Véhicules routiers - Interface de communication entre véhicule et réseau électrique - Partie 1: Informations générales et définition de cas d'utilisation (ISO 15118-1:2019)

Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 1: Allgemeine Informationen und Festlegungen der Anwendungsfälle (ISO 15118-1:2019)

This European Standard was approved by CEN on 16 March 2019.

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Contents	Page
European foreword.....	3

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European foreword

This document (EN ISO 15118-1:2019) has been prepared by Technical Committee ISO/TC 22 "Road vehicles" in collaboration with Technical Committee CEN/TC 301 "Road vehicles" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.

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

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ISO
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Second edition
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**Road vehicles — Vehicle to grid
communication interface —**

**Part 1:
General information and use-case
definition**

iTeh STANDARD PREVIEW
*Véhicules routiers — Interface de communication entre véhicule et
réseau électrique —
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Partie 1: Informations générales et définition de cas d'utilisation*

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Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
3.1 General terms.....	2
3.2 Control modes.....	13
3.3 Architecture channel.....	13
3.4 Forward and reverse power transfer.....	13
3.5 Minimum and maximum energy request limits.....	13
3.6 Source generator modes.....	14
4 Abbreviated terms	14
5 Requirements	15
5.1 List of requirements.....	15
5.2 General communication requirements.....	15
5.3 User-specific requirements.....	16
5.3.1 Reliability, availability, error handling and error reporting.....	16
5.3.2 Private data protection.....	17
5.3.3 Ease of use.....	17
5.4 OEM-specific requirements.....	17
5.5 Utility-specific requirements.....	18
5.5.1 Power limiting for grid control or local energy control.....	18
5.5.2 Current and voltage limits for EV supply equipment protection.....	19
5.5.3 Current and voltage limits for EV protection.....	19
5.5.4 Authorization of charging services.....	19
5.5.5 Authorization of energy transfer from the EV to the EV supply equipment.....	20
5.5.6 Retrofitting.....	20
5.6 Wireless communication requirements.....	20
5.6.1 General.....	20
5.6.2 Communication infrastructure requirements.....	20
5.7 RPT description.....	21
5.7.1 General.....	21
5.7.2 General information and requirements.....	22
5.8 Traceability requirements.....	22
6 Actors	23
7 Use case elements	24
7.1 General.....	24
7.2 Task groups.....	25
7.3 Task groups description.....	26
7.3.1 Start of communication process [A].....	26
7.3.2 Plug-in and forced HLC.....	28
7.3.3 WA1: discovery with reservation.....	29
7.3.4 Plug-in with concurrent IEC 61851-1 and HLC.....	29
7.3.5 WA2: discovery without reservation.....	30
7.4 Communication set-up [B].....	31
7.4.1 EVCC/SECC conductive communication set-up.....	31
7.4.2 WB1: EVCC/SECC wireless communication set-up.....	32
7.5 Certificate handling [C].....	32
7.5.1 Certificate update.....	32
7.5.2 Certificate installation.....	33
7.6 Identification and authorization [D].....	35
7.6.1 Overview.....	35

ISO 15118-1:2019(E)

7.6.2	Authorization using contract certificates performed at the EV supply equipment.....	36
7.6.3	Authorization using contract certificates performed with the help of an SA.....	37
7.6.4	Authorization at the EV supply equipment using external credentials performed at the EV supply equipment.....	39
7.6.5	Authorization at the EV supply equipment using external credentials performed with the help of an SA.....	40
7.6.6	WD1: Authentication with prior reservation.....	41
7.7	Pairing and fine positioning.....	42
7.7.1	WP1: WPT fine positioning.....	42
7.7.2	WP2: WPT fine positioning without communication support.....	42
7.7.3	WP3: Conductive energy transfer pairing.....	43
7.7.4	WP4: WPT pairing.....	44
7.8	Target setting and energy transfer scheduling [E].....	45
7.8.1	AC charging with load levelling based on HLC.....	45
7.8.2	WE1: WPT target setting and charge scheduling.....	46
7.8.3	Optimized charging with scheduling from secondary actors.....	46
7.8.4	DC charging with load levelling based on HLC.....	48
7.8.5	Resume to authorized charging schedule.....	49
7.8.6	Reverse power transfer with load levelling based on HLC.....	50
7.8.7	Reverse power transfer on stand-alone operation.....	51
7.8.8	Fast responding energy transfer services based on dynamic control mode.....	52
7.8.9	Managed bidirectional power transfer into the grid and/or into the home.....	54
7.9	Energy transfer controlling and re-scheduling [F].....	56
7.9.1	Energy transfer loop.....	56
7.9.2	Energy transfer loop with metering information exchange.....	57
7.9.3	WF1: WPT charging loop.....	58
7.9.4	Energy transfer loop with interrupt from the SECC.....	59
7.9.5	Energy transfer loop with interrupt from the EVCC or USER.....	59
7.9.6	Energy transfer control based on dynamic control mode.....	60
7.10	Value-added services [G].....	62
7.10.1	Value-added services.....	62
7.10.2	WG1: ACD system status check.....	63
7.10.3	Energy transfer details.....	64
7.11	End of energy transfer process [H].....	64
7.11.1	General.....	64
7.11.2	End of energy transfer process.....	65
7.12	WPT end of charge WH1.....	66
7.12.1	General.....	66
7.12.2	WPT end of charge WH1.....	66
7.13	ACD connect/disconnect WI.....	68
7.13.1	ACD connect/disconnect WI.....	68
	Annex A (informative) Conductive charging infrastructure architecture.....	69
	Annex B (informative) Security.....	82
	Annex C (informative) Examples of charging scenarios derived from the use case elements.....	88
	Annex D (informative) Typical RPT system.....	106
	Annex E (normative) Requirement list.....	108
	Bibliography.....	116

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*, and Technical Committee IEC/TC 69, *Electric road vehicles and electric industrial trucks*. The draft was circulated for voting to the national bodies of both ISO and IEC.

This second edition cancels and replaces the first edition (ISO 15118-1:2013) which has been technically revised. The main changes compared to the previous edition are as follows:

- new use cases and requirements for wireless communication, wireless power transfer, automatic connection devices and bidirectional power transfer have been added; and
- as usage of private data and cyber security are becoming an important concern for users, requirements for more traceability and data privacy have also been added.

A list of all parts in the ISO 15118 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

ISO 15118-1:2019(E)

Introduction

The pending energy crisis and the necessity to reduce greenhouse gas emissions have led vehicle manufacturers to make a very significant effort to reduce the energy consumption of their vehicles. They are presently developing vehicles partly or completely propelled by electric energy. Those vehicles will reduce the dependency on oil, improve global energy efficiency and reduce the total CO₂ emissions for road transportation if the electricity is produced from renewable sources. To charge the batteries of such vehicles, specific charging infrastructure is required.

Much of the standardisation work on dimensional and electrical specifications of the charging infrastructure and the vehicle interface is already treated in the relevant ISO or IEC groups. However, the question of the interoperability of information transfer between the vehicle, the local installation and the grid is also of the utmost importance.

Such communication is beneficial for the optimisation of energy resources and energy production systems as vehicles can charge or discharge at the most economic or most energy-efficient instants. It is also required to develop efficient and convenient payment systems in order to cover the resulting micro-payments. The necessary communication channel can serve in the future to contribute to the stabilisation of the electrical grid as well as to support additional information services required to operate electric vehicles efficiently.

The requirements of this document form the basic framework for all use cases descriptions and related documents in the ISO 15118 series. This document is the result of a large consensus among all the actors of the electro mobility and is a guideline for implementers of the ISO 15118 series.

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Road vehicles — Vehicle to grid communication interface —

Part 1: General information and use-case definition

1 Scope

This document, as a basis for the other parts of the ISO 15118 series, specifies terms and definitions, general requirements and use cases for conductive and wireless HLC between the EVCC and the SECC.

This document is applicable to HLC involved in conductive and wireless power transfer technologies in the context of manual or automatic connection devices.

This document is also applicable to energy transfer either from EV supply equipment to charge the EV battery or from EV battery to EV supply equipment in order to supply energy to home, to loads or to the grid.

This document provides a general overview and a common understanding of aspects influencing identification, association, charge or discharge control and optimisation, payment, load levelling, cybersecurity and privacy. It offers an interoperable EV-EV supply equipment interface to all e-mobility actors beyond SECC.

The ISO 15118 series does not specify the vehicle internal communication between battery and other internal equipment (beside some dedicated message elements related to the energy transfer).

NOTE 1 Electric road vehicles specifically are vehicles in categories M (used for carriage of passengers) and N (used for carriage of goods) (compare ECE/TR ANS/WP.29/78 ev.2). This does not prevent vehicles in other categories from adopting the ISO 15118 series as well.

NOTE 2 This document is destined to orientate the message set of ISO 15118-2 and ISO 15118-20¹⁾. The absence of any particular use case in this document does not imply that it will not be put into practice, with the required messages.

NOTE 3 This document, ISO 15118-2 and ISO 15118-20 are designed to work independent of data transfer medium used. However, the ISO 15118 series is made for fitting the specified data link layers in the corresponding documents in this series.

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.

ISO/TR 8713, *Electrically propelled road vehicles — Vocabulary*

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

ISO 15118-3, *Road vehicles — Vehicle to grid communication interface — Part 3: Physical and data link layer requirements*

1) Under preparation. Stage at the time on publication: ISO/DIS 15118-20:2019.

ISO 15118-1:2019(E)

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

ISO 15118-20²⁾, *Road vehicles — Vehicle to grid communication interface — Part 20: 2nd generation network and application protocol requirements*

EN 50549-1, *Requirements for generating plants to be connected in parallel with distribution networks — Part 1: Connection to a LV distribution network — Generating plants up to and including Type B*

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

IEC 61980-2, *Electric vehicle wireless power transfer (WPT) systems — Part 2 specific requirements for communication between electric road vehicle (EV) and infrastructure with respect to wireless power transfer (WPT) systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 8713 and the following apply.

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

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

3.1 General terms

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3.1.1 actor

entity which characterizes a role played by a user or any other system that interacts with the subject

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3.1.2 ancillary services

services necessary for the operation of an electric power system provided by the system operator and/or by power system users

[SOURCE: IEC IEV Electropedia, 617-3-9, modified — The Note has been removed.]

3.1.3 association

procedure to establish the wireless communication between the SECC (3.1.68) controlling the charging infrastructure [e.g. coils for WPT (3.1.76)] and the EVCC (3.1.31)

3.1.4 authentication

procedure between the EVCC (3.1.31) and the SECC (3.1.68) or between the USER and the EV (3.1.30) supply equipment or the SA, to prove that the provided information [see *identification* (3.1.49)] is either correct, valid, or it belongs to the EVCC, the USER or the SECC

3.1.5 authorization

procedure to verify if an EV (3.1.30) is allowed to charge (3.1.12) or discharge (3.1.22)

**3.1.6 automatic connection device
ACD**

components supporting the automatic connection and disconnection process for conductive energy transfer between an EV (3.1.30) and the EV supply equipment (3.1.33 and 3.1.34)

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

3.1.7**basic signalling**

physical signalling according to the *pilot function* ([3.1.55](#))

Note 1 to entry: This definition is provided by IEC 61851-1:2017, Annex A.

3.1.8**battery management system****BMS**

electronic device that controls or manages the electric and thermal functions of the battery system and that provides communication between the battery system and other vehicle controllers

3.1.9**bidirectional power converter****BPC**

stabilized power supply device which delivers *BPT* ([3.1.10](#)) functions

3.1.10**bidirectional power transfer****BPT**

combination of forward or reverse power transfer sequences

3.1.11**certificate**

electronic document which uses a digital signature to bind a public key with an identity

Note 1 to entry: The ISO 15118 series describes several certificates covering different purposes, e.g. the contract certificate including the EMAID and *OEM* ([3.1.52](#)) provisioning certificates.

3.1.12**charge**

store electrical energy in the vehicle battery

SIST EN ISO 15118-1:2019

standards/sist/bc468970-926d-48a3-bb25-

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Note 1 to entry: In the first edition of this document, the words “charge” or “charging” were used intensively as a generic term. In this edition, in order to be more precise and to cover with one word *forward* ([3.4.1](#)) and *Reverse Power Transfer* ([3.4.2](#)) the terms “charge” and its declinations have been replaced by “energy transfer” when appropriate. When energy transfer is used in a sentence, this means that both directions of power flow are possible.

Note 2 to entry: The term “charge” (and the associated verb) has in this text a precise definition in relation to the amount of energy stored in the *EV* ([3.1.30](#)) battery which can be different than the total energy transferred to the EV.

Note 3 to entry: In some sentences, the word “charging” is still used. For example, the words “charging site” are still used.

3.1.13**charger**

power converter that performs the necessary functions for charging a battery

3.1.14**charging station operator****CSO**

EV supply equipment operator

secondary actor ([3.1.64](#)) responsible for the installation and operation of a charging infrastructure (including charging sites) and the management of electricity to provide the requested energy transfer services

Note 1 to entry: The term CPO (Charge Point Operator) is also used in the ISO 15118 series. This term is not recommended for trademark reasons.