BS EN ISO 15118-20:2022

BSI Standards Publication

Road vehicles — Vehicle to grid communication interface

Part 20: 2nd generation network layer and application layer requirements

National foreword

This British Standard is the UK implementation of EN ISO 15118-20:2022. It is identical to ISO 15118-20:2022. It supersedes BS EN ISO 15118-2:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/69, Electric vehicles.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2022

ISBN 978 0 539 03900 9

ICS 43.120

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2022.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15118-20

May 2022

ICS 43.120

Supersedes EN ISO 15118-2:2016

English Version

Road vehicles - Vehicle to grid communication interface - Part 20: 2nd generation network layer and application layer requirements (ISO 15118-20:2022)

Véhicules routiers - Interface de communication entre véhicule et réseau électrique - Partie 20: Exigences des couches réseau et application de 2ème génération (ISO 15118-20:2022)

Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 20: 2. Generation Anforderungen an das Netzwerk- und Anwendungsprotokoll (ISO 15118-20:2022)

This European Standard was approved by CEN on 12 April 2022.

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Ref. No. EN ISO 15118-20:2022 E

European foreword

This document (EN ISO 15118-20:2022) 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of an identical text or by endorsement, at the latest by November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

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.

This document supersedes EN ISO 15118-2:2016.

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Endorsement notice

The text of ISO 15118-20:2022 has been approved by CEN as EN ISO 15118-20:2022 without any modification.

Contents

Page

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 document 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 or www.iec.ch/members_experts/refdocs).

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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. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*, Technical Committee IEC/TC 69, *Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 301, *Electrically propelled road vehicles,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 15118 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

Introduction

The pending energy crisis and necessity to reduce greenhouse gas emissions started in the former century has led the vehicle manufacturers to a very significant effort to reduce the energy consumption of their vehicles up to the present. As countermeasures to this continuous problem, they developed vehicles partly or completely propelled by electric power and launched them into the market. Those vehicles will reduce the dependency on oil, improve the global energy efficiency and reduce the total CO_2 emissions for road transportation if the electricity is produced from renewable sources. To charge electricity to the batteries of such vehicles, a specific charging infrastructure is required.

Much of the standardization work on dimensional and electrical specifications of the charging infrastructure for electric vehicles and the vehicle interface were treated in the relevant ISO or IEC groups. However, the standardization work about direct information transfer between the electric vehicle and the charging infrastructure was not enough, and it was assigned to the ISO 15118 series to treat the subject sufficiently.

Such communication is necessary for the optimization of energy resources and energy production systems. With it electric vehicles can be connected to the supply network and communicate the most economic or most energy efficient way for charging/discharging. It is also required to develop efficient and convenient billing systems in order to cover the resulting payments. The necessary communication channel can serve in the future to contribute to the stabilization of the supply network as well as to support additional information services required to operate electric vehicles efficiently and economically.

After the standardization work of the first basic smart charging was completed, more standardization work for further evolved functions and high energy efficiency was continuously requested again.

It includes:

— improved charge methods that reduces efforts and agonies of the charging operation;

— extended functions for the electric vehicles to be utilized as distributed energy resources, which enable smoothing of the electricity load of the supply network for higher energy efficiency and also provide power back to the grid;

— information services for the user with higher added value and new convenience.

As for the communication system, the next evolution will be expected to realize these new applications.

INTERNATIONAL STANDARD **ISO 15118-20:2022(E)**

Road vehicles — Vehicle to grid communication interface —

Part 20: Network and application protocol requirements

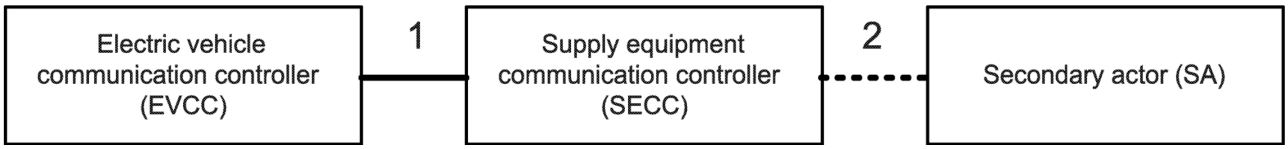
1 Scope

This document specifies the communication between the electric vehicle (EV), including battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV), and the electric vehicle supply equipment (EVSE). The application layer messages defined in this document are designed to support the electricity power transfer between an EV and an EVSE.

This document defines the communication messages and sequence requirements for bidirectional power transfer.

This document furthermore defines requirements of wireless communication for both conductive charging and wireless charging as well as communication requirements for automatic connection device and information services about charging and control status.

The purpose of this document is to detail the communication between an electric vehicle communication controller (EVCC) and a supply equipment communication controller (SECC). Aspects are specified to detect a vehicle in a communication network and enable an Internet Protocol (IP) based communication between the EVCC and the SECC (see Figure 1).



Key

1 scope of this document
2 message definition considers use cases defined for communication between SECC to SA

Figure 1 — Communication relationship among the EVCC, SECC and SA

This document defines messages, data model, XML/EXI-based data representation format, usage of V2GTP, TLS, TCP and IPv6. These requirements belong to the 3rd until the 7th OSI layer model. In addition, the document describes main service sequences of conductive charging, wireless power transfer and bidirectional power transfer, and how data link layer services can be accessed from an OSI layer 3 perspective.

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 3780, *Road vehicles – World Manufacturer Indentifier (WMI) code*

ISO 4217, *Codes for the representation of currencies*

ISO 15118-2:2014, *Road vehicles — Vehicle to grid communication interface — Part 2: Network and application protocol requirements*

ISO 15118-3:2015*, Road Vehicles — Vehicle to grid communication interface — Part 3: Physical and data link layer requirements*

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

ISO 19363:2020, *Electrically propelled vehicles—Magnetic field wireless power transfer—Safety and interoperability requirements*

ISO/IEC 11889-1:2015, *Information technology — Trusted platform module library — Part 1: Architecture*

IEC 61851-1:2017, *Electric vehicle conductive charging system — Part 1: General requirements*

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IEC 63119-2[1], *Information exchange for Electric Vehicle charging roaming service — Part 2: Use cases*

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IETF RFC 768, *User Datagram Protocol* (August 1980)

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IETF RFC 2866, *RADIUS Accounting* (June 2000)

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[1] Under preparation. Stage at the time of publication: IEC/CCDV 63119-2:2022.

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IETF RFC 4861, *Neighbor Discovery for IP version 6 (IPv6)* (September 2007)

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IETF RFC 5216, *The EAP-TLS Authentication Protocol* (March 2008)

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IETF RFC 6066, *Transport Layer Security (TLS) Extensions: Extension Definitions* (January 2011)

IETF RFC 6724, *Default Address Selection for Internet Protocol version 6 (IPv6)* (September 2012)

IETF RFC 6818, *Updates to the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile* (January 2013)

IETF RFC 6874, *Representing IPv6 Zone Identifiers in Address Literals and Uniform Resource Identifiers* (February 2013)

IETF RFC 6960, X.*509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP* (June 2013)

IETF RFC 7405, *Case-Sensitive String Support in ABNF* (December 2014)

IETF RFC 7748, *Elliptic Curves for Security* (January 2016)

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IETF RFC 8399, *Internationalization Updates to RFC 5280* (May 2018)

IETF RFC 8415, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)* (November 2018)

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