International Standard

ISO 15118-10

First edition
2025-03

Road vehicles — Vehicle to grid communication interface —

Part 10: Physical layer and data link layer requirements for single-pair Ethernet

Véhicules routiers — Interface de communication entre véhicule et réseau électrique —

Partie 10: Exigences relatives à la couche physique et à la couche liaison de données pour Ethernet à paire unique

Reference number
ISO 15118-10:2025(en)

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, SC 31, *Data communication*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 301, *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 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 atwww.iso.org/members.html.

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Introduction

The looming energy crisis and necessity to reduce greenhouse gas emissions has forced vehicle manufacturers to find ways to scale down how much energy their vehicles consume. The vehicles they are currently developing are propelled either entirely or in part by electric energy. If this energy is generated from renewable sources, this will weaken dependency on oil, improve the global energy efficiency and cut CO_2 emissions. However, a dedicated charging infrastructure is needed to charge the batteries that power these vehicles.

Much of the standardization 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 information transfer between the electric vehicles (EV) and electric vehicle supply equipment (EVSE) has not been treated sufficiently.

This communication is key to optimizing energy resources and energy production systems so vehicles can be charged cheaply and efficiently.

In this document, messages are exchanged between the vehicle and the infrastructure over single-pair Ethernet (which is embedded in the cable assembly).

The relevant information on use-case definitions requirements can be found in ISO 15118-1. Network and application protocol requirements can be found in ISO 15118-20, respectively.

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Road vehicles — Vehicle to grid communication interface —

Part 10:
Physical layer and data link layer requirements for single-pair Ethernet

1 Scope

This document specifies the physical and data link layer of high-level communication (HLC) between electric vehicles (EV) and electric vehicle supply equipment (EVSE) based on single-pair Ethernet communication. Single-pair Ethernet communication uses differential twisted pair wires that are dedicated and balanced. This document applies to 10BASE-T1S only.

This document covers the overall information exchange between all actors involved in electrical energy exchange. The ISO 15118 series applies to charging between EV and EVSE.

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 15118-20:2022, *Road vehicles — Vehicle to grid communication interface — Part 20: 2nd generation network layer and application layer requirements*

IEC 61851-23-3[1)], *Electric vehicle conductive charging system — Part 23-3: DC electric vehicle supply equipment for Megawatt charging systems*

IEEE 802.3:2022, *IEEE Standard for Ethernet*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15118-20 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
basic signalling
analogue communication signal loop between the electric vehicle (EV) and the electric vehicle supply equipment (EVSE) to ensure reliable hardware-based information exchange during energy transfer

Note 1 to entry: The basic communication interface is defined in IEC 61851-23–3.

1) Under preparation. Stage at the time of publication: IEC/CCDV 61851-23-3:2025.

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