



SLOVENSKI STANDARD
oSIST prEN ISO 15118-10:2024

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**Cestna vozila - Komunikacijski vmesnik med vozilom in omrežjem - 10. del:
Zahteve za fizične in podatkovne povezovalne plasti za enoparni Ethernet (ISO/DIS
15118-10:2024)**

Road vehicles - Vehicle to grid communication interface - Part 10: Physical layer and data link layer requirements for single-pair Ethernet (ISO/DIS 15118-10:2024)

Straßenfahrzeuge - Kommunikationsschnittstelle zwischen Fahrzeug und Ladestation - Teil 10: Anforderungen an die physikalische Schicht und Sicherungsschicht für Zweidraht Ethernet (ISO/DIS 15118-10:2024)

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 (ISO/DIS 15118-10:2024)

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Road vehicles — Vehicle to grid communication interface —

Part 10:

Physical layer and data link layer requirements for single-pair Ethernet

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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.

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This document was prepared by Technical Committee ISO/TC TC22, SC31, JWG1 .

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.

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Introduction

The pending energy crisis and necessity to reduce greenhouse gas emissions has led the vehicle manufacturers to 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 the 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, a specific charging infrastructure is required.

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 EV and the EVSE has not been treated sufficiently.

Such communication is necessary for the optimization of energy resources and energy production systems so that vehicles can recharge in the most economic or most energy efficient way. It is also required to develop efficient and convenient billing systems in order to cover the resulting micro-payments. The necessary communication channel may serve in the future to contribute to the stabilization of the electrical grid, as well as to support additional information services required to operate electric vehicles efficiently and economically.

In this document, the messages are exchanged between the vehicle and the infrastructure over single pair ethernet in the cable used for power transfer.

The relevant information on use-case definitions and network and application protocol requirements can be found in ISO 15118-1:2019 and ISO 15118-20:2022, respectively.

EDITORS NOTE check for involved patents (none currently known)

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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 a single pair ethernet High Level Communication (HLC) between Electric Vehicles (EV) and the Electric Vehicle Supply Equipment (EVSE) based on single pair ethernet. The single pair ethernet communication will use dedicated balanced differential twisted pair wires. Further, this document will be limited to only 10BASE-T1S.

It covers the overall information exchange between all actors involved in the electrical energy exchange. ISO 15118 (all parts) are applicable for conductive charging.

Note that this document applies to MCS (and later Chaoji) systems.

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.

IEEE 802.3:2022, *IEEE Standard for Ethernet*

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

ISO 15118-20:2022, *Road vehicles - Vehicle to grid communication interface - Part 20: Network and application protocol requirements*

ISO/IEC 10731:1994, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*

ISO/IEC 7498-1:1994, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

ISO/IEC 8802-2:1998, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 2: Logical link control*

3 Terms and definitions

For the purposes of this document, the *following terms and definitions / terms and definitions given in , as well as the following [delete what doesn't apply]* 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>

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3.1

Basic signalling

Analog communication signal loop between the EV and the EVSE to ensure a reliable hardware-based information exchange during the energy transfer session.

Note 1 to entry: The basic communication interface is defined in [\[1\]](#).

3.2

Charge Enable function

Electronic function using an analog signal loop between EV and EVSE to ensure the safety during energy transfer and to transmit information about the operational modes of EV and EVSE, compliant with [\[1\]](#).

Note 1 to entry:

3.3

communication media

physical media carrying the low-layer communication signal is given by the cable assembly, which connects the charging infrastructure and the EV.

Note 1 to entry:

3.4

data link control SAP

service access point which defines the interface between the connection coordination module and the low-layer communication technology for managing the link status.

Note 1 to entry:

3.5

DATA SAP

service access point that defines the interface between layer 2 and layer 3 for exchange of v2g-related payload.

Note 1 to entry:

3.6

ETH SAP

Ethernet II-class SAP supports applications using Ethernet II class packets, including IEEE 802.3:2022 with or without IEEE 802.2 (LLC), IEEE 802.1H (SNAP) extensions, and/or VLAN tagging.

Note 1 to entry:

3.7

Insertion Detection function

Electronic function using an analog signal loop between EV and EVSE to ensure the detection of an EV coupler inserted in the EV inlet (e.g. to lock the connector in the inlet and allow for the immobilization of the EV), compliant with [\[1\]](#)

Note 1 to entry:

3.8

low-layer communication

functions managed by the OSI layer 1 and layer 2 of the modem

Note 1 to entry: