INTERNATIONAL STANDARD

ISO 11992-4

Third edition
2023-04

Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles —

Part 4: Diagnostic communication

Véhicules routiers — Échange d'informations numériques sur les connexions électriques entre véhicules tracteurs et véhicules tractés —

Partie 4: Communication de diagnostic

Reference number
ISO 11992-4:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Symbols and abbreviated terms **2**
4.1 Symbols 2
4.2 Abbreviated terms 2
5 Conventions **2**
6 Vehicle network architecture **3**
7 Non OSI-layer-related technical requirements overview **4**
8 Abstract service primitive interface (ASP) definition **5**
8.1 ASP – A_Data.req, A_Data.ind, and A_Data.con service primitive interface 5
8.2 ASP – Service interface parameters 6
8.2.1 General 6
8.2.2 ASP – Data type definitions 7
8.2.3 ASP – Mtype, message type 7
8.2.4 ASP – TAtype, target address type 7
8.2.5 ASP – AE, address extension 7
8.2.6 ASP – TA, target address 7
8.2.7 ASP – SA, source address 7
8.2.8 ASP – Length, length of PDU 8
8.2.9 ASP – PDU, protocol data unit 8
8.2.10 ASP – Result, result 8
9 Application **8**
9.1 APP – Addressing of requested information 8
9.2 APP – Data identifier (DID) definition 8
9.3 APP – DTC field definition 9
9.4 APP – DTC functional unit definition 9
9.5 APP – Negative response code (NRC) 10
9.6 APP – Communication profile (ComProfile) 10
10 OSI-layers-related technical requirements overview **11**
11 Application layer **12**
11.1 AL – Diagnostic services overview 12
11.2 AL – CommunicationControl 13
11.3 AL – ReadDataByIdentifier 13
11.4 AL – ReadDtcInformation 14
11.4.1 AL – General 14
11.4.2 AL – Applicable ReadDtcInformation service subFunctions 14
11.5 AL – Application layer communication profile (ComProfile) 14
12 Presentation layer **14**
13 Session layer **14**
13.1 SL – Service primitive interface parameter definition 14
13.2 SL – S_Data.req, S_Data.ind, and S_Data.con service interface 14
13.3 SL – Service primitive interface AL to SL parameter mapping 15
13.4 SL – Session layer communication profile (ComProfile) 15
14 Transport layer **15**
14.1 TL – USDT service primitive interface parameter definition 15

© ISO 2023 – All rights reserved

14.2 TL – T_Data.req, T_Data.ind, and T_Data.con service interface 15
14.3 TL – Service primitive interface SL to TL parameter mapping 16
14.4 TL – Transport protocol 16
14.5 TL – Transport layer communication profile (ComProfile) 16

15 Network layer 16
15.1 NL – Service primitive interface parameter definition 16
15.2 NL – N_Data.req, N_Data.ind, and N_Data.con service interface 17
15.3 NL – Service primitive interface TL to NL parameter mapping 17
15.4 NL – Network layer services 17
15.5 NL – Network layer communication profile (ComProfile) 17
15.6 NL – Diagnostic CAN identifier configuration 18
15.7 NL – Dynamic network address assignment 19
15.7.1 NL – General 19
15.7.2 NL – Address assignment of TTN_1 and TTN_3 19
15.7.3 NL – Address assignment of TTN_2 and TTN_4 20
15.8 NL – Static network address assignment 20
15.8.1 NL – General 20
15.8.2 NL – Address assignment of gateway application, IVN_1, and IVN_2 20
15.8.3 NL – Server address assignment of IVN_1 and IVN_2 20
15.9 NL – Gateway N_PDU routing 20
15.9.1 NL – General 20
15.9.2 NL – Network address translation 21
15.10 NL – Diagnostic communication port (DCP) 25

16 Data link layer 25
16.1 DL – Service primitive interface parameter definition 25
16.2 DL – L_Data.req, L_Data.ind, and L_Data.con service interface 25
16.3 DL – Service primitive interface NL to DL parameter mapping 26
16.4 DL – CAN data frame 26
16.5 DL – Data link layer communication profile (ComProfile) 26

17 Physical layer 26

Annex A (normative) **Network address assignment 28**

Bibliography 30

© ISO 2023 – All rights reserved

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 ww.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 by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This third edition cancels and replaces the second edition (ISO 11992-4:2014), which has been technically revised.

The main changes are as follows:

— introduction of requirement structure with numbering and name;

— introduction of application requirements;

— introduction of OSI layers related requirements;

— clarification on gateway network address translation (deleted subnet addressing subclause).

A list of all parts in the ISO 11992 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 2023 – All rights reserved

Introduction

The ISO 11992 series specifies the interchange of digital information between road vehicles with a maximum authorised total mass greater than 3 500 kg, and towed vehicles, including communication between towed vehicles in terms of parameters and requirements of the lower OSI layers (physical and data link layer) of the electrical connection used to connect the electrical and electronic systems.

This document is structured according to the Open Systems Interconnection (OSI) Basic Reference Model, in accordance with ISO/IEC 7498-1 and ISO/IEC 10731, which structures communication systems into seven layers. When mapped on this model, the application layer protocol and data link layer framework requirements specified/referenced in the ISO 11992 series are structured according to Figure 1.

Figure 1 illustrates a simplified communication framework:

— vehicle normal communication framework,

— vehicle diagnostic communication framework,

— vehicle-specific use case framework, and

— vehicle lower-layers framework.

The vehicle normal communication framework is composed of ISO 11992-2 and ISO 11992-3.

The vehicle diagnostic communication framework is composed of ISO 14229-1, ISO 14229-2, ISO 14229-3 and this document.

The vehicle-specific use case framework is composed of this document, ISO 22901-1 or vehicle manufacturer-specific diagnostic data definition.

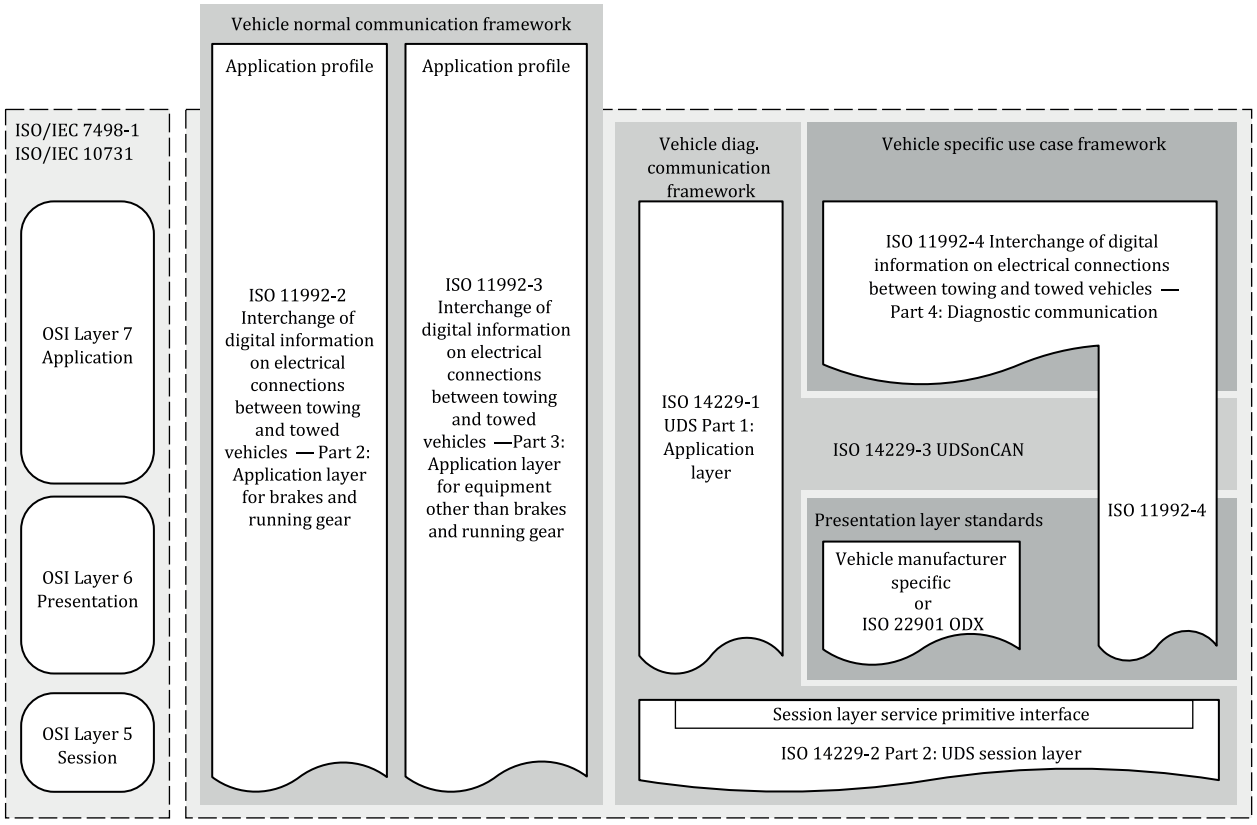


Figure 1 — ISO documents reference according to the OSI model

© ISO 2023 – All rights reserved

Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles —

Part 4: Diagnostic communication

1 Scope

This document specifies diagnostic application requirements and OSI-layer related communication profiles to ensure the interchange of digital information between towing and towed vehicles with a maximum authorized total mass greater than 3 500 kg.

The conformance and interoperability test plans are not part of this document.

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 11992-1, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 1: Physical and data-link layers*

ISO 11992-2:2023, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 2: Application layer for brakes and running gear*

ISO 11992-3:2021, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 3: Application layer for equipment other than brakes and running gear*

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Application layer*

ISO 14229-2, *Road vehicles — Unified diagnostic services (UDS) — Part 2: Session layer services*

ISO 14229-3, *Road vehicles — Unified diagnostic services (UDS) — Part 3: Unified diagnostic services on CAN implementation (UDSonCAN)*

ISO 15765-2, *Road vehicles — Diagnostic communication over Controller Area Network (DoCAN) — Part 2: Transport protocol and network layer services*

ISO 15765-5, *Road vehicles — Diagnostic communication over Controller Area Network (DoCAN) — Part 5: Specification for an in-vehicle network connected to the diagnostic link connector*

SAE J1939-21, *Data Link Layer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11992-1, ISO 14229-1, ISO 14229-2, ISO 14229-3 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

© ISO 2023 – All rights reserved

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

3.1
mandatory
M
keyword indicating an item that is required to be implemented as defined in this document to claim compliance with this document

[SOURCE: ISO/IEC 14776-113:2002, 3.3.3, modified — The word "standard" has been replaced by "document".]

4 Symbols and abbreviated terms

4.1 Symbols

— empty table cell or feature undefined

4.2 Abbreviated terms

CEFF classical extended frame format

ComProfile communication profile

Cvt convention

DA destination address (see SAE J1939-21)

DP data page (see SAE J1939-21)

ECU electronic control unit

EDP extended data page (see SAE J1939-21)

GW gateway

M mandatory

NAT network address translation

P priority (see SAE J1939-21)

PDU protocol data unit

PF PDU format (see SAE J1939-21)

PGN parameter group number (see SAE J1939-21)

PS PDU specific: destination address or group extension (see SAE J1939-21)

USDT unacknowledged segmented data transfer

VIN vehicle identification number

5 Conventions

This document is based on the conventions used in ISO 14229-1 and the underlying OSI Service Conventions (ISO/IEC 10731) as they apply for diagnostic services.

© ISO 2023 – All rights reserved