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Road vehicles — Unified diagnostic services (UDS) —

Part 6: Unified diagnostic services on K-Line implementation (UDSonK-Line)

Véhicules routiers — Services de diagnostic unifiés (SDU) — Partie 6: SDU sur l'implémentation de la ligne-K (SDUsurLigne-K)

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 14229 consists of the following parts, under the general title *Road vehicles — Unified diagnostic services (UDS)*:

— *Part 1: Specification and requirements*

— *Part 2: Session layer services*

— *Part 3: Unified diagnostic services on CAN implementation (UDSonCAN)*

— *Part 4: Unified diagnostic services on FlexRay implementation (UDSonFR)*

— *Part 5: Unified diagnostic services on Internet Protocol implementation (UDSonIP)*

— *Part 6: Unified diagnostic services on K-Line implementation (UDSonK-Line)*

The following part is under preparation:

— *Part 7: Unified diagnostic services on Local Interconnet Network implementation (UDSonLIN)*

The titles of future parts will be drafted as follows:

— *Part n: Unified diagnostic services on ... implementation (UDSon...)*

Introduction

This part of ISO 14229 has been established in order to enable the implementation of unified diagnostic services, as specified in ISO 14229-1, on K-Line (UART based) networks (UDSonK-Line).

To achieve this, it is based on the Open Systems Interconnection (OSI) Basic Reference Model specified in ISO/IEC 7498-1 and ISO/IEC 10731, which structures communication systems into seven layers. When mapped on this model, the services specified by ISO 14229 are divided into:

— Application layer (layer 7), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14229-1 / ISO 14229-6,

  — Legislated OBD: ISO°15031-5,

  — Legislated WWH-OBD: ISO 14229-1, ISO 27145-3;

— Presentation layer (layer 6), specified in:

  — Vehicle manufacturer enhanced diagnostics: not applicable,

  — Legislated OBD: SAE J1930-DA, SAE J1979-DA, SAE J2012-DA,

  — Legislated WWH-OBD: ISO 27145-2 with reference to SAE J1930-DA, SAE J1939 Companion Spreadsheet (SPNs), SAE J1939-73:2010, Appendix A (FMIs), SAE J1979-DA and SAE J2012-DA;

— Session layer services (layer 5), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14229-2,

  — Legislated OBD: ISO 14229-2,

  — Legislated WWH-OBD: ISO 14229-2;

— Transport layer services (layer 4), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14230-2,

  — Legislated OBD: ISO 15765-2, ISO 15765-4,

  — Legislated WWH-OBD: ISO 27145-4;

— Network layer services (layer 3), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14230-2,

  — Legislated OBD: ISO 15765-2, ISO 15765-4,

  — Legislated WWH-OBD: ISO 27145-4;

— Data link layer (layer 2), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14230-2,

  — Legislated OBD: ISO 11898-1, ISO 11898-2, ISO 15765-4,

  — Legislated WWH-OBD: ISO 27145-4;

— Physical layer (layer 1), specified in:

  — Vehicle manufacturer enhanced diagnostics: ISO 14230-1,

  — Legislated OBD: ISO 11898-1, ISO 11898-2, ISO 15765-4,

— Legislated WWH-OBD: ISO 27145-4;

in accordance with Table 1.

Table 1 — DoK-Line enhanced diagnostics, legislated OBD and WWH-OBD specification reference applicable to the OSI layers

<table>
<tr><th>Applicability</th><th>OSI 7 layers</th><th>Vehicle manufacturer enhanced diagnostics</th><th>Legislated OBD</th><th colspan="3">Legislated WWH-OBD</th></tr>
<tr><td rowspan="8">Seven layer according to ISO/IEC 7498-1
and
ISO/IEC 10731</td><td>Application (layer 7)</td><td>ISO 14229-1 / ISO 14229-6</td><td>ISO 15031-5</td><td colspan="3">ISO 14229-1 / ISO 27145-3</td></tr>
<tr><td>Presentation (layer 6)</td><td>Vehicle manufacturer specific</td><td>SAE J1930-DA / SAE J1979-DA / SAE J2012-DA</td><td colspan="3">ISO 27145-2, SAE J1930-DA, SAE J1939 Companion Spreadsheet (SPNs), SAE J1939-73:2010, Appendix A (FMIs), SAE J1979-DA, SAE J2012-DA</td></tr>
<tr><td>Session (layer 5)</td><td colspan="5">ISO 14229-2</td></tr>
<tr><td>Transport (layer 4)</td><td rowspan="2">ISO 14230-2</td><td rowspan="2">ISO 15765-2, ISO 15765-4</td><td rowspan="2">ISO 15765-2, ISO 15765-4</td><td rowspan="3">ISO 27145-4</td><td>ISO 13400-2</td></tr>
<tr><td>Network (layer 3)</td><td rowspan="2">ISO 13400-3, IEEE 802.3</td></tr>
<tr><td>Data link (layer 2)</td><td rowspan="2">ISO 14230-1</td><td rowspan="2">ISO 11898-1, ISO 11898-2, ISO 15765-4</td><td rowspan="2">ISO 11898-1, ISO 11898-2, ISO 15765-4</td></tr>
<tr><td>Physical (layer 1)</td></tr>
</table>

Road vehicles — Unified diagnostic services (UDS) —

Part 6: Unified diagnostic services on K-Line implementation (UDSonK-Line)

1 Scope

This part of ISO 14229 specifies the implementation of a common set of unified diagnostic services (UDS) on K-Line (UART based) in road vehicles (UDSonK-Line).

UDSonK-Line references ISO 14229-1 and ISO 14229-2, and specifies implementation requirements of

— the diagnostic services to be used for diagnostic communication over K-Line,

— the server memory programming for all in-vehicle servers connected to a K-Line network with external test equipment.

NOTE UDSonK-Line does not specify any requirement for the in-vehicle K-Line bus architecture.

This part of ISO°14229 makes reference to information contained in ISO 14229-1, ISO 14229-2, ISO 14230-1, and ISO 14230-2.

This part of ISO 14229 does not include any redundant information of the above-mentioned documents. It focuses on

— additional requirements specific to the implementation of UDSonK-Line network, and

— specific restrictions in the implementation of UDSonK-Line network.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Specification and requirements*

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

ISO 14230-1, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 1: Physical layer*

ISO 14230-2, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 2: Data link layer*

ISO 14230-4, *Road vehicles — Diagnostic systems — Keyword Protocol 2000 — Part 4: Requirements for emission-related systems*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14229-1, ISO 14229-2, ISO 14230-1 and ISO 14230-2 apply.

3.2 Abbreviated terms

Mtype	message type
AE	address extension
DA	destination address
ID	identifier
FB	first byte
SA	source address
TA	target address
SFID	subfunction identifier

4 Conventions

This part of ISO 14229 is based on the conventions discussed in the OSI Service Conventions (ISO/IEC 10731:1994) as they apply for diagnostic services.

5 Document overview

Figure 1 illustrates the document references from ISO 14229-1, ISO 14229-2, ISO 14230-1 and ISO 14230-2. This part of ISO 14229 uses only a subset of the diagnostic services defined in ISO 14229-1 (see Table 2).

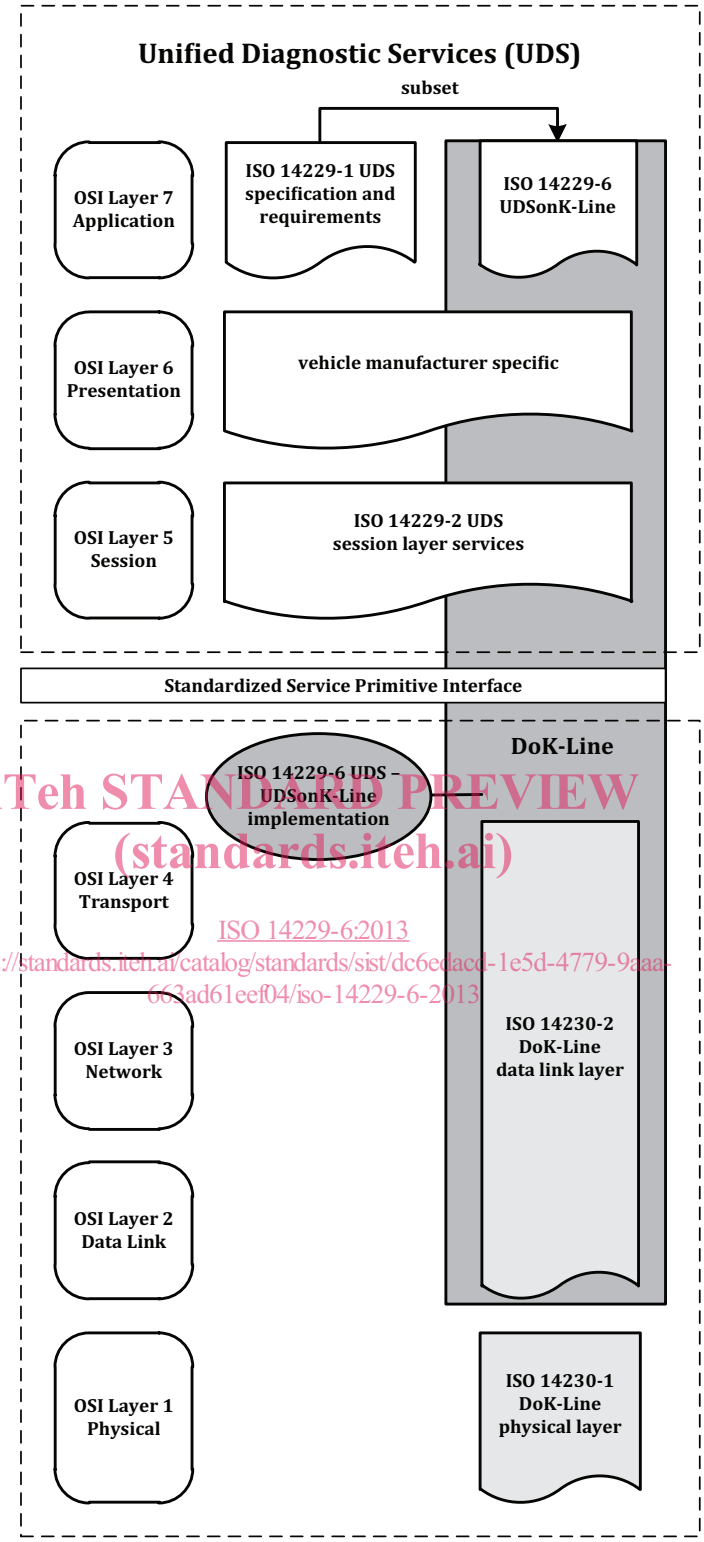

Figure 1 — UDSonK-Line document reference according to OSI model