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# SS-ISO 14229-7:2015

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## Vägfordon – Enhetliga diagnostiktjänster (UDS) – Del 7: Enhetliga diagnostiktjänster i LIN (UDSonLIN) (ISO 14229-7:2015, IDT)

## Road vehicles – Unified diagnostic services (UDS) – Part 7: UDS on local interconnect network (UDSonLIN) (ISO 14229-7:2015, IDT)

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Den internationella standarden ISO 14229-7:2015 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 14229-7:2015.

The International Standard ISO 14229-7:2015 has the status of a Swedish Standard. This document contains the official English version of ISO 14229-7:2015.



*Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.*

*Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.*

Denna standard är framtagen av kommittén för Datakommunikation och diagnostik för vägfordon, SIS/TK 240/AG 1.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

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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 (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 www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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)*

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

# 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 UART-based local interconnect networks (UDSonLIN).

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 the following.

— Application layer (layer 7), unified diagnostic services specified in ISO 14229-1, ISO 14229-3 UDSonCAN, ISO 14229-4 UDSonFR, ISO 14229-5 UDSonIP, ISO 14229-6 UDSonK-Line, ISO 14229-7 UDSonLIN, further standards, and ISO 27145-3 WWH-OBD.

— Presentation layer (layer 6), vehicle manufacturer specific, ISO°27145-2 WWH-OBD.

— Session layer services (layer 5) specified in ISO 14229-2.

— Transport layer services (layer 4), specified in ISO 15765-2 DoCAN, ISO 10681-2 Communication on FlexRay, ISO 13400-2 DoIP, ISO 17987-2 LIN, ISO 27145-4 WWH-OBD.

— Network layer services (layer 3), specified in ISO 15765-2 DoCAN, ISO 10681-2 Communication on FlexRay, ISO 13400-2 DoIP, ISO 17987-2 LIN, ISO 27145-4 WWH-OBD.

— Data link layer (layer 2), specified in ISO 11898-1, ISO 11898-2, ISO 17458-2, ISO 13400-3, IEEE 802.3, ISO 14230-2, ISO 17987-3 LIN and further standards, ISO 27145-4 WWH-OBD.

— Physical layer (layer 1), specified in ISO 11898-1, ISO 11898-2, ISO 17458-4, ISO 13400-3, IEEE 802.3, ISO 14230-1, ISO 17987-4 LIN and further standards, ISO 27145-4 WWH-OBD.

These services should be in accordance with Table 1.

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

<table>
<tr><th>Applicability</th><th>OSI seven layer</th><th colspan="7">Enhanced diagnostics services</th><th>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 colspan="7">ISO 14229-1, ISO 14229-3 UDSonCAN, ISO 14229-4 UDSonFR, ISO 14229-5 UDSonIP, ISO 14229-6 UDSonK-Line, ISO 14229-7 UDSonLIN, further standards</td><td>ISO 27145-3</td></tr>
<tr><td>Presentation (layer 6)</td><td colspan="7">Vehicle manufacturer specific</td><td>ISO 27145-2</td></tr>
<tr><td>Session (layer 5)</td><td colspan="8">ISO 14229-2</td></tr>
<tr><td>Transport (layer 4)</td><td rowspan="2">ISO 15765-2</td><td rowspan="2">ISO 10681-2</td><td rowspan="2">ISO 13400-2</td><td rowspan="2">Not applicable</td><td rowspan="2">ISO 17987-2</td><td>Further standards</td><td rowspan="4">ISO 27145-4</td></tr>
<tr><td>Network (layer 3)</td><td>Further standards</td></tr>
<tr><td>Data link (layer 2)</td><td rowspan="2">ISO 11898-1, ISO 11898-2</td><td>ISO 17458-2</td><td rowspan="2">ISO 13400-3, IEEE 802.3</td><td>ISO 14230-2</td><td>ISO 17987-3</td><td>Further standards</td></tr>
<tr><td>Physical (layer 1)</td><td>ISO 17458-4</td><td>ISO 14230-1</td><td>ISO 17987-4</td><td>Further standards</td></tr>
</table>

The titles of future parts will be drafted as follows:

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

# Road vehicles — Unified diagnostic services (UDS) —

# Part 7:
# UDS on local interconnect network (UDSonLIN)

## 1 Scope

This part of ISO 14229 specifies the implementation of a common set of unified diagnostic services (UDS) on UART-based local interconnect networks in road vehicles. The UDSonLIN diagnostics defines methods to implement diagnostic data transfer between a client and the LIN slave nodes through the LIN master node.

LIN slave nodes support three different diagnostic classes as defined in ISO 17987.

UDSonLIN references ISO 14229-1 and ISO 14229-2 and specifies implementation requirements of the following:

— diagnostic services to be used for diagnostic communication over LIN,

— server memory programming for in-vehicle LIN servers with an external test equipment, and

— configuration of a LIN slave node as specified in ISO 17987.

NOTE UDSonLIN does not specify any requirement for the in-vehicle LIN bus architecture.

This part of ISO 14229 makes reference to information contained in the following:

— ISO 14229-1,

— ISO 14229-2, and

— ISO 17987 (all parts).

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

— additional requirements specific to the implementation of UDSonLIN network, and

— specific restrictions in the implementation of UDSonLIN 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 17987-3, *Road vehicles — Local Interconnect Network (LIN) — Part 3: Protocol specification*

# 3 Terms, definitions, symbols, 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, and ISO 17987 (all parts) apply.

## 3.2 Symbols and abbreviated terms

| | |
|---|---|
| AE | address extension |
| CF | consecutive frame |
| DA | destination address |
| FC | flow control |
| FF | first frame |
| ID | identifier |
| Mtype | message type |
| NAD | node address |
| NCF | node configuration file |
| P2 | server response time |
| SA | source address |
| SF | single frame |
| SFID | sub-function identifier |
| $ST_{min}$ | separation time |
| TA | target address |
| UART | universal asynchronous receiver transmitter |

# 4 Conventions

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

# 5 Document overview

Figure 1 illustrates the document references from ISO 14229-1, ISO 14229-2, and ISO 17987 (all parts). ISO 14229-7 uses only a subset of the diagnostic services defined in ISO 14229-1 (see Table 3).

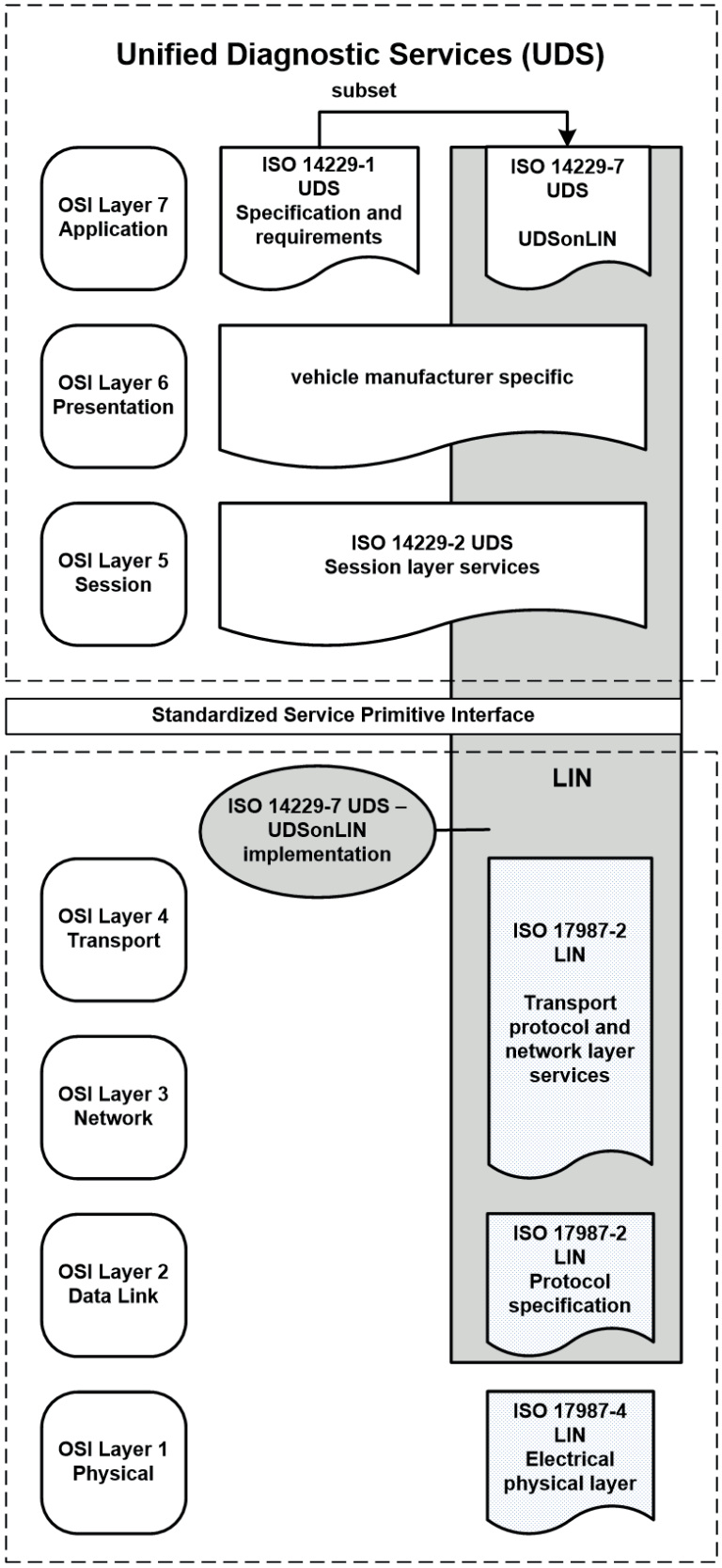


**Figure 1 — UDSonLIN document reference according to OSI model**