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Road vehicles — Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements —

Part 6: External test equipment

Véhicules routiers — Mise en application des exigences de communication pour le diagnostic embarqué harmonisé à l'échelle mondiale (WWH-OBD) —

Partie 6: Équipement d'essai externe

Reference number
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Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms, definitions, symbols, and abbreviated terms **2**
3.1 Terms and definitions 2
3.2 Abbreviated terms 2

4 Conventions **3**

5 Document overview **3**

6 Requirements overview and principles **5**
6.1 Basic principles for the graphical notation 5
6.2 Requirements clustering 5
6.2.1 Overview 5
6.2.2 Main requirements clusters 5

7 External test equipment requirements **7**
7.1 General 7
7.2 Applicability of requirements according to local legislation 8
7.3 User instructions and guidelines 8
7.4 Cluster “Mechanical requirements” 8
7.5 Cluster “Electrical requirements” 9
7.6 Cluster “Communication setup” and connections 9
7.6.1 Connections 9
7.6.2 Communication setup 10
7.7 Cluster “Diagnostic messages” 12
7.7.1 Overview 12
7.7.2 Timing 12
7.7.3 Negative response handling 12
7.7.4 Error handling of no response from the vehicle 14
7.7.5 Setup of ECU list 15
7.7.6 Setting up ECU communication list 16
7.7.7 Setting up data information list 16
7.7.8 Reading DTCs 17
7.7.9 Setting up DTC information list 17
7.7.10 Clear diagnostic information 22
7.7.11 Continuously reading ECU data 22

8 Roadside inspection test equipment **23**
8.1 Definition 23
8.2 Related use cases 23
8.3 Implementation requirements 24
8.3.1 Overview 24
8.3.2 Application layer 24

9 Inspection and maintenance (I/M) test equipment **25**
9.1 Definition 25
9.2 Related use cases 25
9.3 Implementation requirements 25
9.3.1 General 25
9.3.2 Application layer 25

10 Repair shop test equipment **27**
10.1 Definition 27
10.2 Related use cases 27

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10.3 Implementation requirements 27
10.3.1 Overview 27
10.3.2 Application layer 28

11 Multiple test equipment communication 31
11.1 General 31
11.2 Behaviour of external test equipment 31

Bibliography 32

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 27145 consists of the following parts, under the general title *Road vehicles — Implementation of Word-Wide Harmonized On-Board Diagnostics (WWH-OBD) communication requirements*:

— *Part 1: General information and use case definition*

— *Part 2: Common data dictionary*

— *Part 3: Common message dictionary*

— *Part 4: Connection between vehicle and test equipment*

— *Part 6: External test equipment*

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Introduction

Overview

This International Standard includes the communication between the vehicle's on-board diagnostics (OBD) systems and external test equipment within the scope of the World-Wide Harmonized On-Board Diagnostics Global Technical Regulations (WWH-OBD GTR).

This International Standard has been established in order to apply the unified diagnostic services (specified in ISO 14229-1) to WWH-OBD systems.

This International Standard includes the communication between the vehicle's WWH-OBD systems and external (off-board) "generic" test equipment within the scope of the country-specific regulatory requirements.

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 this International Standard are broken into:

— diagnostic services (layer 7), specified in ISO 27145-3 with reference to ISO 14229-1,

— presentation layer (layer 6), specified in ISO 27145-2 with reference to SAE J1930-DA, SAE J1939-DA, SAE J1939-73, Appendix A (FMIs), SAE J1979-DA, and SAE J2012-DA,

— session layer services (layer 5), specified in ISO 14229-2,

— transport layer services (layer 4), specified in ISO 27145-4 with reference to ISO 13400-2, ISO 15765-2, and ISO 15765-4,

— network layer services (layer 3), specified in ISO 27145-4 with reference to ISO 13400-2, ISO 15765-2, and ISO 15765-4,

— data link layer (layer 2), specified in ISO 27145-4 with reference to ISO 11898-1, ISO 11898-2, ISO 13400-3, ISO 15765-4, and IEEE 802.3, and

— physical layer (layer 1), specified in ISO 27145-4 with reference to ISO 11898-1, ISO 11898-2, ISO 13400-3, ISO 15765-4, and IEEE 802.3,

in accordance with Table 1.

Table 1 — WWH-OBD specification reference applicable to the OSI layers

<table>
<tr><th>Applicability</th><th>OSI seven layer</th><th colspan="4">WWH-OBD document reference</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="3">ISO 14229-1, 3</td><td rowspan="2">ISO 27145-6</td></tr>
<tr><td>Presentation (layer 6)</td><td colspan="3">ISO 27145-2,
SAE J1930-DA, SAE J1939-DA, SAE J1939-73, Appendix A (FMIs),
SAE J1979-DA, SAE J2012-DA</td></tr>
<tr><td>Session (layer 5)</td><td colspan="3">ISO 14229-2</td><td rowspan="5">—</td></tr>
<tr><td>Transport (layer 4)</td><td rowspan="2">ISO 15765-2 DoCAN,
ISO 15765-4 DoCAN</td><td rowspan="4">ISO 27145-4</td><td rowspan="2">ISO 13400-2 DoIP
TCP and IP</td></tr>
<tr><td>Network (layer 3)</td></tr>
<tr><td>Data link (layer 2)</td><td rowspan="2">ISO 11898-1 CAN DLL,
ISO 11898-2 CAN HS,
ISO 15765-4 DoCAN</td><td rowspan="2">ISO 13400-3 DoIP,
IEEE 802.3</td></tr>
<tr><td>Physical (layer 1)</td></tr>
</table>

SAE document reference concept

This International Standard references several SAE documents which contain all terms, data and diagnostic trouble code (DTC) definitions.

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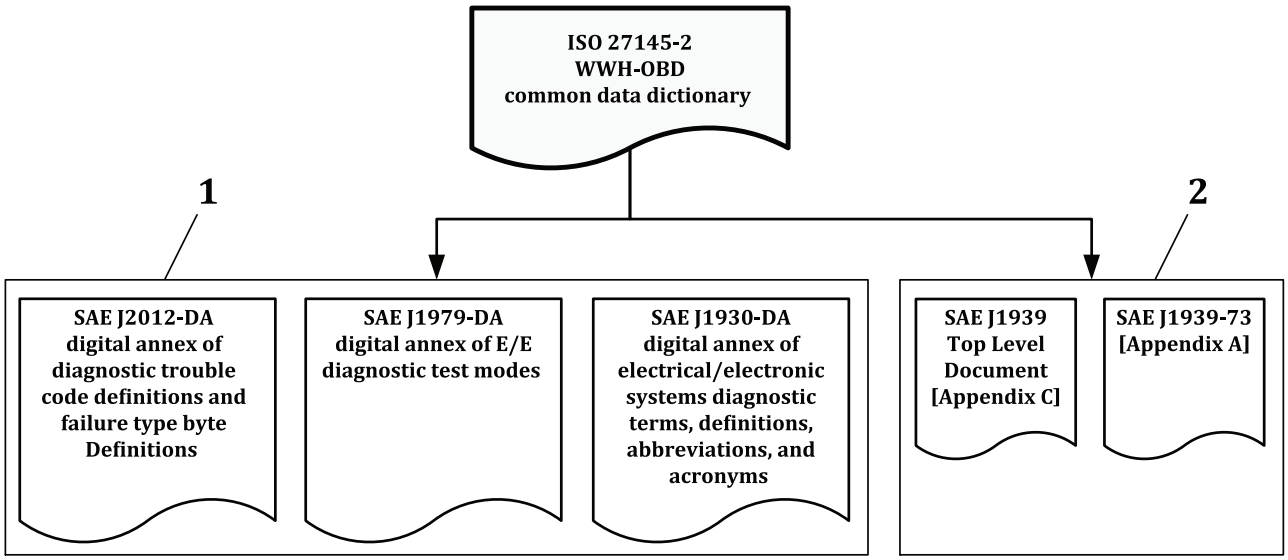
ISO 27145-2 defines a common data dictionary for this International Standard, according to the definitions in the following documents (Figure 1):

— SAE J1930-DA: this digital annex contains all standardized naming objects, terms, and abbreviated terms;

— SAE J1939-DA and SAE J1939-73: The Digital Annex indexes names for suspect parameter numbers (SPNs) that provide an alternative presentation format for SAE J2012-DA DTCs. SPNs are combined with failure mode indicators (FMIs) to form the full alternative presentation. These FMIs are described in SAE J1939-73, Appendix A;

— SAE J1979-DA: this digital annex contains all standardized data items such as data identifiers (DIDs), test identifiers (TIDs), monitor identifiers (MIDs), and infotype identifiers (ITIDs);

— SAE J2012-DA: this digital annex contains all standardized data items such as DTC definitions and FTB (failure type byte) definitions.



Key

1 SAE digital annexes: data definitions

2 SAE J1939 series of documents: DTC definitions

Figure 1 — SAE digital annex document reference

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