BS ISO 27145-3:2012

BSI Standards Publication

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

Part 3: Common message dictionary

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This British Standard is the UK implementation of ISO 27145-3:2012. It supersedes DD ISO/PAS 27145-3:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/16, Electrical and electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2012

ISBN 978 0 580 68524 8

ICS 43.040.10; 43.180

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2012.

Amendments issued since publication

Date	Text affected

BS ISO 27145-3:2012

INTERNATIONAL

ISO

First edition
2012-08-15

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

Part 3:
Common message dictionary

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

Partie 3: Dictionnaire de messages communs

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 27145-3 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This first edition of ISO 27145-3 cancels and replaces ISO/PAS 27145-3:2006, which has been technically revised.

ISO 27145 consists of the following parts, under the general title *Road vehicles — Implementation of World-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*

The following parts are under preparation:

— *Part 6: External test equipment*

0   Introduction

0.1   Overview

The ISO 27145 series 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).

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

The ISO 27145 series 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 ISO 27145 are divided 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 Companion Spreadsheet (SPNs), SAE J1939-73:2010, 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 15765-4, ISO 15765-2 and ISO 13400-2,

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

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

in accordance with Table 1.

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

Applicability	OSI seven layer	WWH-OBD document reference		
Seven layers according to ISO/IEC 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO 14229-1, ISO 27145-3		
	Presentation (layer 6)	ISO 27145-2, SAE J1930-DA, SAE J1939 Companion Spreadsheet (SPNs), SAE J1939-73:2010, Appendix A (FMIs), SAE J1979-DA, SAE J2012-DA		
	Session (layer 5)	ISO 14229-2		
	Transport (layer 4)	ISO 15765-2 DoCAN, ISO 15765-4 DoCAN	ISO 27145-4	ISO 13400-2 DoIP TCP and IP
	Network (layer 3)			
	Data link (layer 2)	ISO 11898-1 CAN DLL, ISO 11898-2 CAN HS, ISO 15765-4 DoCAN		ISO 13400-3 DoIP, IEEE 802.3
	Physical (layer 1)			

0.2   SAE document reference concept

ISO 27145 makes reference to several SAE documents which contain the terms, data and diagnostic trouble code (DTC) definitions.

ISO 27145-2 defines a common data dictionary for the ISO 27145 series, according to the definitions in the following documents (see Figure 1).

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

— SAE J1939 Companion Spreadsheet and SAE J1939-73: SAE J1939 Companion Spreadsheet 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. FMIs are described in SAE J1939-73:2010, Appendix A.

NOTE   The SAE J1939 Companion Spreadsheet is a document which supplements the SAE J1939 family of standards and contains SPNs and parameter group numbers (PGNs).

— 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.
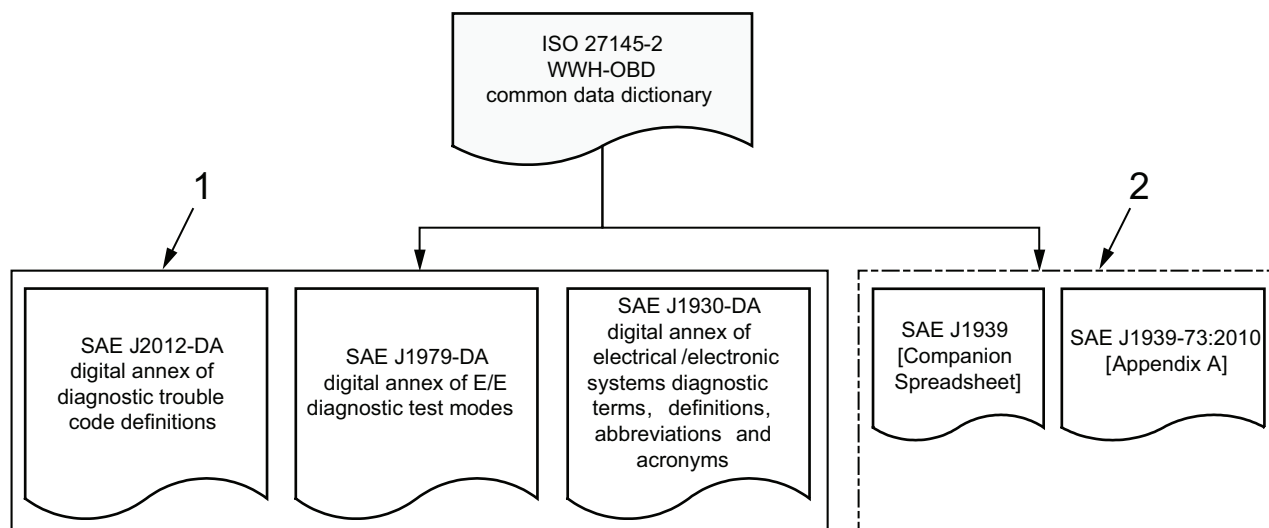
Key

1   SAE digital annexes: data definitions

2   SAE J1939 series of documents: DTC definitions

Figure 1 — SAE digital annex document reference

0.3   SAE digital annex revision procedure

New regulatory requirements drive new in-vehicle technology to lower emissions, improve safety, etc. It is important to standardize new technology-related OBD monitor data and DTCs in order to support the external (off-board) "generic" test equipment. All relevant information is proposed by the automotive industry, represented by members of the appropriate SAE task force.

ISO 27145-2 references a "Change request form" for use with new data items to be defined by the SAE task force for standardization. It is intended that the standardized data items be defined in SAE J1930-DA, SAE J1979-DA, SAE J2012-DA and SAE J1939. It is intended that the documents be published on the SAE store website once the information has been balloted and approved.

The revision request forms and instructions for updating the registers to ISO 27145 can be obtained on the following data registration websites:

— For SAE J1930-DA: http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS7

The column entitled "Resources" shows a document with the title: J1930-DA_Revision_Request_Form. doc. Double click on the name to download the document with the filename: "SAE_J1930-DA_Revision_ Request_Form.doc".

— For SAE J1939: http://www.sae.org/

Search "J1939 Request", select "J1939 Request Processing Group", and select "J1939 Request Processing Form and Guidelines".

— For SAE J1979-DA: http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS14

The column entitled "Resources" shows a document with the title: J1979-DA_Revision_Request_Form. doc. Double click on the name to download the document with the filename: "SAE_J1979-DA_Revision_ Request_Form.doc".

— For SAE J2012-DA: http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDS9

The column entitled "Resources" shows a document with the title: J2012-DA_Revision_Request_Form. doc. Double click on the name to download the document with the filename: "SAE_J2012-DA_Revision_ Request_Form.doc".

It is intended that the revision request form be filled out with the request.

It is intended that e-mails with completed revision request forms as attachments be sent to:

E-mail: saej1930@sae.org

E-mail: saej1979@sae.org

E-mail: saej2012@sae.org

E-mail: saej1939@sae.org

INTERNATIONAL STANDARD

ISO 27145-3:2012(E)

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

Part 3:
Common message dictionary

1 Scope

This part of ISO 27145 defines the implementation of a subset of unified diagnostic services (UDS) specified in ISO 14229-1. The diagnostic services are used to communicate the diagnostic data defined in ISO 27145-2.

The subset of unified diagnostic services derives from the requirements stated in the WWH-OBD GTR (Global technical regulation No. 5; see Reference [17]). The common message set defined in this part of ISO 27145 is independent of the underlying transport, network, data link and physical layer. This part of ISO 27145 does not specify any requirements for the in-vehicle network architecture.

This part of ISO 27145 is compatible with ISO 14229-1 and includes provisions to support the data set of SAE J1979-DA and SAE J2012-DA WWH-OBD.

This part of ISO 27145 is intended for use with ISO 27145-4, which is the entry point for the protocol initialization and is based on two different data links:

— Diagnostic communication over Controller Area Network (DoCAN), ISO 15765-1, ISO 15765-2, ISO 15765-4;

— Diagnostic communication over Internet Protocol (DoIP), ISO 13400 (all parts).

Due to the usage of standard network layer protocols, future extensions to optional physical layers (e.g. wireless) are possible.

Based on the results of the initialization, the external test equipment determines which protocol and diagnostic services are supported by the vehicle's emissions-related system, i.e.

— legislated OBD: ISO 15031 (all parts);

— legislated WWH-OBD: ISO 27145 (all parts).

This part of ISO 27145 includes capabilities required to satisfy OBD regulations for multiple regions, vehicle types, model years, and engine types. Those regulations are not yet final for some regions and are expected to change in the future. This part of ISO 27145 does not attempt to interpret the regulations and does not include applicability of the included diagnostic services and data parameters for various vehicle applications. It is intended that users of this part of ISO 27145 verify the applicability of each of its clauses for a specific vehicle, engine, model year and region.

2 Normative references

The following referenced documents are indispensable for the application 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 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 interfaces*