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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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## 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 document 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](http://www.iso.org/directives)).

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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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This second edition cancels and replaces the first edition (ISO 27145-6:2015), which has been technically revised.

The main changes are as follows:

- clarification about cable length;
- rewording for a better clarification of requirements.

A list of all parts in the ISO 27145 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](http://www.iso.org/members.html).

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## Introduction

### Overview

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

This document 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 document 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 J1939-73:2022, 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 layer**

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			this document
	Presentation (layer 6)	ISO 27145-2, SAE J1930-DA, SAE J1939-DA, SAE J1939-73:2022, Appendix A (FMIs), SAE J1979-DA, SAE J2012-DA			
	Session (layer 5)	ISO 14229-2			—
	Transport (layer 4)	ISO 15765-2 DoCAN,	ISO 27145-4	ISO 13400-2 DoIP TCP and IP	
	Network (layer 3)	ISO 15765-4 DoCAN			
	Data link (layer 2)	ISO 11898-1 CAN DLL, ISO 11898-2 CAN HS,		ISO 13400-3 DoIP, IEEE 802.3	
	Physical (layer 1)	ISO 15765-4 DoCAN			

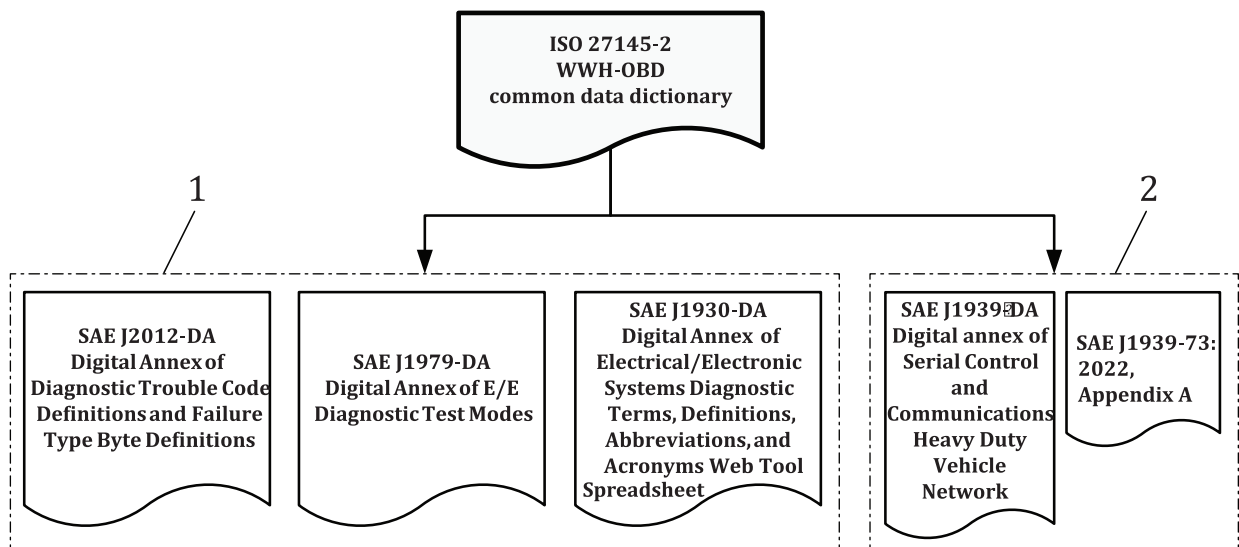
### SAE document reference concept

This document 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 document, 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 J1939-73:2022, 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