
**Road vehicles — Communication
between vehicle and external
equipment for emissions-related
diagnostics —**

**Part 7:
Data link security**

*Véhicules routiers — Communications entre un véhicule et un
équipement externe pour le diagnostic relatif aux émissions —*

Partie 7: Sécurité de la liaison de données

ISO 15031-7:2013

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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.

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. 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.

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

This second edition cancels and replaces the first edition (ISO 15031-7:2001) of which has been technically revised.

ISO 15031 consists of the following parts, under the general title *Road vehicles — Communication between vehicle and external equipment for emissions-related diagnostics*:

- *Part 1: General information and use case definition*
- *Part 2: Guidance on terms, definitions, abbreviations and acronyms*
- *Part 3: Diagnostic connector and related electrical circuits, specification and use*
- *Part 4: External test equipment*
- *Part 5: Emissions-related diagnostic services*
- *Part 6: Diagnostic trouble code definitions*
- *Part 7: Data link security*

Introduction

0.1 Overview

ISO 15031 consists of a number of parts which, taken together, provide a coherent self-consistent set of specifications to facilitate emissions-related diagnostics. ISO 15031-1 provides an introduction to the series of International Standards. ISO 15031-2 through ISO 15031-7 are based on Society of Automotive Engineers (SAE) recommended practices. This part of ISO 15031 is based on SAE J2186:1996, *E/E Data Link Security*.

The ISO 15031 document set includes the communication between the vehicle's On-Board Diagnostics (OBD) systems and test equipment implemented across vehicles within the scope of the legislated emissions-related OBD.

To achieve this, it is based on the Open Systems Interconnection (OSI) Basic Reference Model in accordance with 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 15031 are broken into the following:

- Diagnostic services (layer 7), specified in:
 - ISO 15031-5 (emissions-related OBD);
 - ISO 27145-3 (WWH-OBD);
- Presentation layer (layer 6), specified in:
 - ISO 15031-2, SAE J1930-DA;
 - ISO 15031-5, SAE J1979-DA;
 - ISO 15031-6, SAE J2012-DA;
 - ISO 27145-2, SAE J2012-DA;
- Session layer services (layer 5), specified in:
 - ISO 14229-2 supports ISO 15765-4 DoCAN and ISO 14230-4 DoK-Line protocols;
 - ISO 14229-2 is not applicable to the SAE J1850 and ISO 9141-2 protocols;
- Transport layer services (layer 4), specified in:
 - DoCAN: ISO 15765-2 Transport protocol and network layer services;
 - SAE J1850: ISO 15031-5 Emissions-related diagnostic services;
 - ISO 9141-2: ISO 15031-5 Emissions-related diagnostic services;
 - DoK-Line: ISO 14230-4, ISO 15031-5 Emissions-related diagnostic services;
- Network layer services (layer 3), specified in:
 - DoCAN: ISO 15765-2 Transport protocol and network layer services;
 - SAE J1850: ISO 15031-5 Emissions-related diagnostic services;
 - ISO 9141-2: ISO 15031-5 Emissions-related diagnostic services;
 - DoK-Line: ISO 14230-4, ISO 15031-5 Emissions-related diagnostic services;
- Data link layer (layer 2), specified in:
 - DoCAN: ISO 15765-4, ISO 11898-1, ISO 11898-2;

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- SAE J1850;
- ISO 9141-2;
- DoK-Line: ISO 14230-2;
- Physical layer (layer 1), specified in:
 - DoCAN: ISO 15765-4, ISO 11898-1, ISO 11898-2;
 - SAE J1850;
 - ISO 9141-2;
 - DoK-Line: ISO 14230-1;

in accordance with [Table 1](#).

Table 1 — Legislated emissions-related OBD/WWH-OBD diagnostic specifications applicable to the OSI layers

Applicability	OSI 7 layers	Emissions-related OBD communication requirements					Emissions-related WWH-OBD communication requirements		
Seven layer according to ISO/IEC 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO 15031-5					ISO 27145-3		
	Presentation (layer 6)	ISO 15031-2, ISO 15031-5, ISO 15031-6					ISO 27145-2		
		SAE J1930-DA / SAE J1979-DA					SAE J1930-DA / SAE J1979-DA		
		SAE J2012-DA					SAE J2012-DA		
	Session (layer 5)	Not Applicable					ISO 14229-2		
	Transport (layer 4)	ISO 15031-5					ISO 15765-2		ISO 13400-2
	Network (layer 3)								
	Data link (layer 2)	SAE J1850	ISO 9141-2	ISO 14230-2	ISO 11898-1, ISO 11898-2	ISO 15765-4	ISO 11898-1, ISO 11898-2	ISO 27145-4	ISO 13400-3
	Physical (layer 1)			ISO 14230-1					

0.2 SAE document reference concept

ISO 15031 references several SAE documents which contain all terms, data, and diagnostic trouble code (DTC) definitions.

See [Figure 1](#) with the following definition of content in ISO 15031-2, ISO 15031-5, and ISO 15031-6:

- SAE J1930: this document is concerned with a procedure for naming objects and systems and with the set of words from which names are built. It references SAE J1930-DA which contains all standardized naming objects, terms, and abbreviations.
- SAE J1979: this document is concerned with the definition of emissions-related diagnostic services (diagnostic test modes). It references SAE J1979-DA which contains all standardized data items like Parameter IDs, Test IDs, Monitor IDs, and InfoType IDs.
- SAE J2012: this document is concerned with the procedure for defining emissions-related diagnostic trouble codes. It references SAE J2012-DA which contains all standardized data items like DTCs and failure type bytes (FTBs).