
**Road vehicles — Open diagnostic data
exchange (ODX) —**

Part 1:
Data model specification

*Véhicules routiers — Échange de données de diagnostic ouvert
(ODX) —*

Partie 1: Spécification de modèle de données



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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 22901-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 22901 consists of the following parts, under the general title *Road vehicles — Open diagnostic data exchange (ODX)*:

— *Part 1: Data model specification*

The following parts are under preparation:

— *Part 2: Emissions-related diagnostic data*

Introduction

The purpose of this part of ISO 22901 is to define the data format for transferring Electronic Control Unit (ECU) diagnostic and programming data between the system supplier, vehicle manufacturer and service dealerships and diagnostic tools of different vendors.

In today's automotive industry, an informal description is generally used to document the diagnostic data stream information of vehicle ECUs. Any user wishing to use the ECU diagnostic data stream documentation to set up development tools or service diagnostic test equipment needs a manual transformation of this documentation into a format readable by these tools. This effort will no longer be required if the diagnostic data stream information is provided in Open Diagnostic Data Exchange (ODX) format and if those tools support the ODX format.

This part of ISO 22901 includes the data model definition of ECU diagnostic and programming data and the related vehicle interface description in Unified Modelling Language (UML). This part of ISO 22901 also includes an implementation by Extensible Mark-up Language (XML) schema in Annex C.

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Road vehicles — Open diagnostic data exchange (ODX) —

Part 1: Data model specification

1 Scope

This part of ISO 22901 specifies the concept of using a new industry standard diagnostic format to make diagnostic data stream information available to diagnostic tool application manufacturers, in order to simplify the support of the aftermarket automotive service industry. The Open Diagnostic Data Exchange (ODX) modelled diagnostic data are compatible with the software requirements of the Modular Vehicle Communication Interface (MVCI) as specified in ISO 22900-2 and ISO 22900-3. The ODX modelled diagnostic data will enable an MVCI device to communicate with the vehicle Electronic Control Unit(s) (ECU) and interpret the diagnostic data contained in the messages exchanged between the external test equipment and the ECU(s). For ODX compliant external test equipment, no software programming is necessary to convert diagnostic data into technician readable information to be displayed by the tester.

The ODX specification contains the data model to describe all diagnostic data of a vehicle and physical ECU, e.g. diagnostic trouble codes, data parameters, identification data, input/output parameters, ECU configuration (variant coding) data and communication parameters. ODX is described in Unified Modelling Language (UML) diagrams and the data exchange format uses Extensible Mark-up Language (XML).

The ODX modelled diagnostic data describe:

- protocol specification for diagnostic communication of ECUs;
- communication parameters for different protocols and data link layers and for ECU software;
- ECU programming data (Flash);
- related vehicle interface description (connectors and pinout);
- functional description of diagnostic capabilities of a network of ECUs;
- ECU configuration data (variant coding).

Figure 1 shows the usage of ODX in the ECU life cycle.

The purpose of this part of ISO 22901 is to ensure that diagnostic data from any vehicle manufacturer is independent of the testing hardware and protocol software supplied by any test equipment manufacturer.

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 22901-1:2008(E)

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 8859-2, *Information technology — 8-bit single-byte coded graphic character sets — Part 2: Latin alphabet No. 2*

ISO/IEC 10646, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

ISO 22900-2, *Road vehicles — Modular vehicle communication interface (MVCi) — Part 2: Diagnostic protocol data unit application programming interface (D-PDU API)*

ISO 22900-3, *Road vehicles — Modular vehicle communication interface (MVCi) — Part 3: Diagnostic server application programming interface (D-Server API)*

IEEE 754, *Binary floating-point arithmetic*

XML Schema — 2, *XML Schema Part 2: Datatypes, 2nd Edition, W3C Recommendation, 2004-10-28*

ASAM MCD 2, *Harmonized Data Objects Version 1.0*

3 Abbreviated terms

API	Application Programming Interface
ASAM	Association for Standardisation of Automation and Measuring Systems
ASCII	American Standard for Character Information Interchange
DOP	Data Object Property
ECU	Electronic Control Unit
GMT	Greenwich Mean Time
MCD	Measurement, Calibration and Diagnosis
ODX	Open Diagnostic Data Exchange
OEM	Original Equipment Manufacturer
PDU	Protocol Data Unit
PDX	Packaged ODX
UML	Unified Modelling Language
UTC	Coordinated Universal Time
VMM	Vehicle Message Matrix
W3C	World Wide Web Consortium
XML	Extensible Mark-up Language