BS ISO 13400-4:2016

BSI Standards Publication

Road vehicles — Diagnostic communication over Internet Protocol (DoIP)

Part 4: Ethernet-based high-speed data link connector

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National foreword

This British Standard is the UK implementation of ISO 13400-4:2016.

The UK participation in its preparation was entrusted to Technical Committee AUE/16, Data Communication (Road Vehicles).

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Published by BSI Standards Limited 2016

ISBN 978 0 580 86922 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 30 April 2016.

Amendments/corrigenda issued since publication

Date	Text affected

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Full document details: BS ISO 13400-4:2016

INTERNATIONAL STANDARD

ISO 13400-4

First edition
2016-03-15

Road vehicles — Diagnostic communication over Internet Protocol (DoIP) —

Part 4: Ethernet-based high-speed data link connector

Véhicules routiers — Communication de diagnostic sur protocole Internet (DoIP) —

Partie 4: Connecteur de lien de données haut débit fondées sur l'éthernet

Reference number
ISO 13400-4:2016(E)

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Foreword

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The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

ISO 13400 consists of the following parts, under the general title *Road vehicles — Diagnostic communication over Internet Protocol (DoIP)*:

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

— *Part 2: Transport protocol and network layer services*

— *Part 4: Ethernet-based high-speed data link connector*

The following parts are under preparation:

— *Part 3: Wired vehicle interface based on IEEE 802.3*

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Introduction

Vehicle diagnostic communication has been developed, starting with the introduction of the first legislated emission-related diagnostics and has evolved over the years, now covering various use cases ranging from emission-related diagnostics to vehicle manufacturer specific applications like calibration or electronic component software updates.

With the introduction of new in-vehicle network communication technologies, the interface between the vehicle's electronic control units and the external test equipment has been adapted several times to address the specific characteristics of each new network communication technology requiring optimized data link layer definitions and transport protocol developments in order to make the new in-vehicle networks usable for diagnostic communication.

With increasing memory size of electronic control units and the demand to update this increasing amount of software and an increasing number of functions provided by these control units, technology of the connecting network and buses has been driven to a level of complexity and speed similar to computer networks. New applications (x-by-wire, infotainment) require high band-width and real time networks (like FlexRay, MOST), which cannot be adapted anymore to be the direct interface to a vehicle. This requires gateways to route and convert messages between the in-vehicle networks and the vehicle interface to external test equipment.

The intent of the ISO 13400 series is to describe a standardized vehicle interface which

— separates in-vehicle network technology from the external test equipment vehicle interface requirements to allow for a long-term stable external vehicle communication interface,

— utilizes existing industry standards to define a long-term stable state-of-the-art communication standard usable for legislated diagnostic communication, as well as for manufacturer specific use cases, and

— can easily be adapted to new physical and data link layers by using existing adaptation layers.

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 14229 series are divided into:

— unified diagnostic services (layer 7), specified in ISO 14229-1, ISO 14229-5, ISO 27145-3;

— presentation (layer 6):

  — for enhanced diagnostics, specified by the vehicle manufacturer;

  — for WWH-OBD, specified in ISO 27145-2, SAE J1930-DA, SAE J1979-DA, SAE J2012-DA;

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

— transport protocol (layer 4), specified in ISO 13400-2;

— network layer (layer 3) services, specified in ISO 13400-2;

— physical and data link services (layers 1 and 2), specified in ISO 13400-3

in accordance with Table 1.

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