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Road vehicles — Controller area network (CAN) conformance test plan —

Part 1: Data link layer and physical signalling

Véhicules routiers — Plan d'essai de conformité du gestionnaire de réseau de communication (CAN) —

Partie 1: Couche liaison de données et signalisation physique

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 documents 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).

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 (see www.iso.org/patents).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

This first edition of ISO 16845-1 cancels and replaces ISO 16845:2004, which has been technically revised.

A list of all parts in the ISO 16845 series can be found on the ISO website.

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Introduction

ISO 16845 was first published in 2004 to provide the methodology and abstract test suite necessary for checking the conformance of any CAN implementation of the CAN specified in ISO 11898-1.

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Road vehicles — Controller area network (CAN) conformance test plan —

Part 1: Data link layer and physical signalling

1 Scope

This document specifies the conformance test plan for the CAN data link layer and the physical signalling as standardized in ISO 11898-1. This includes the Classical CAN protocols as well as the CAN FD protocols.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 11898-1:2015, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling*

ISO/IEC 9646-1, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 1: General concepts*

ISO/IEC 9646-2, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 2: Abstract Test Suite specification*

ISO/IEC 9646-4, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 4: Test realization*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11898-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

3.1
bit rate prescaler
BRP
minimum time quantum used for a TQ in CAN Bit time configuration

3.2
conformance testing
applying the *test plan* (3.17) to an IUT

3.3
default state
state of the IUT

Note 1 to entry: The default state is characterized by the default value presented in 5.3.2.5.

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3.4
dominant
represents the logical 0

3.5
dominant state
CAN bus is in dominant state when at least one CAN node drives a dominant value on the line

3.6
elementary test
repetitions of the test case for several values of the parameter to test

3.7
end of frame
last field of a data or remote frame before the intermission field

3.8
idle state
CAN bus is in idle state when no frame is started after intermission field

3.9
lower tester
supervises the *test suite* (3.18)

3.10
REC passive state
device is in the passive state because the value of the REC has reached the error passive limit

3.11
recessive
represents the logical 1

3.12
recessive state
CAN bus is in the recessive state when no CAN node drives a dominant value on the line

3.13
TEC passive state
device is in the passive state because the value of the TEC has reached the error passive limit

3.14
test case
each test case is defined by a specific number and a particular name in the *test suite* (3.18)

3.15
test class
each *test type* (3.19) is divided in eight test classes

3.16
test frame
CAN frames containing the test pattern specified in this document

3.17
test plan
specific application of the «OSI conformance testing general concepts» standard

3.18
test suite
checks the behaviour of the IUT for particular parameters of ISO 11898-1

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3.19
test type
defines the direction of the *test frames* (3.16)

EXAMPLE Behaviour of the IUT if receiving and/or transmitting messages.

3.20
upper tester
acts as a user of the IUT

4 Abbreviated terms

All abbreviated terms in this document are written in upper case letters.

CTRL	Control field of CAN frame + SRR/RTR + IDE bit
CBFF: CTRL	= RTR, IDE, FDF, DLC merged together as 7 bit hexadecimal value
FBFF: CTRL	= RRS, IDE, FDF, res, BRS, ESI, DLC merged together as 10 bit hexadecimal value
CEFF: CTRL	= SRR, IDE, RTR, FDF, r0, DLC merged together as 9 bit hexadecimal value
FEFF: CTRL	= SRR, IDE, RRS, FDF, res, BRS, ESI, DLC merged together as 11 bit hexadecimal value
IPT	information processing time
LT	lower tester
NTQ(D)	number of time quantum in data bit rate
NTQ(N)	number of time quantum in nominal bit rate
Phase_Seg1(D)	Phase Segment 1 (Phase_Seg1) for data phase bit rate
Phase_Seg1(N)	Phase Segment 1 (Phase_Seg1) for nominal bit rate
Phase_Seg2(D)	Phase Segment 2 (Phase_Seg2) for data phase bit rate
Phase_Seg2(N)	Phase Segment 2 (Phase_Seg2) for nominal bit rate
Prop_Seg(D)	propagation segment (Prop_Seg) for data phase bit rate
Prop_Seg(N)	propagation segment (Prop_Seg) for nominal bit rate
Sampling_Point(D)	Sync_Seg(D) + Prop_Seg(D) + Phase_Seg1(D)
Sampling_Point(N)	Sync_Seg(N) + Prop_Seg(N) + Phase_Seg1(N)
SJW(D)	synchronization jump width (SJW) for data phase bit rate
SJW(N)	synchronization jump width (SJW) for nominal bit rate
Sync_Seg(D)	synchronization segment (Sync_Seg) for data phase bit rate
Sync_Seg(N)	synchronization segment (Sync_Seg) for nominal bit rate
TP	test plan

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