
**Road vehicles — Tachograph
systems —**

**Part 6:
Diagnostic communication interfaces**

Véhicules routiers — Systèmes tachygraphes —

Partie 6: Interfaces de communication de diagnostic

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 16844-6:2022

<https://standards.iteh.ai/catalog/standards/sist/827aaddf-6568-4295-9277-06dc5ded6b5a/iso-16844-6-2022>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 16844-6:2022

<https://standards.iteh.ai/catalog/standards/sist/827aaddf-6568-4295-9277-06dc5ded6b5a/iso-16844-6-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Overview and conventions	2
5.1 General	2
5.2 Service description conventions	3
5.3 Addresses	3
5.3.1 Functional addresses	3
5.3.2 Physical addresses	3
5.4 Parameters	3
6 Diagnostic services implementation	3
6.1 General and overview	3
6.2 Diagnostic and communication management functional unit	5
6.2.1 DiagnosticSessionControl service	5
6.2.2 ECUReset service	5
6.2.3 SecurityAccess service	5
6.2.4 CommunicationControl service	5
6.2.5 ResponseOnEvent service	6
6.2.6 LinkControl service	6
6.3 Data transmission functional unit	7
6.3.1 ReadDataByIdentifier service	7
6.3.2 ReadDataByPeriodicIdentifier service	7
6.3.3 DynamicallyDefineDataIdentifier service	7
6.3.4 WriteDataByIdentifier service	8
6.4 Stored data transmission functional unit	8
6.4.1 ClearDiagnosticInformation service	8
6.4.2 ReadDTCInformation service	8
6.5 Input/Output control functional unit	9
6.5.1 InputOutputControlByIdentifier service	9
6.6 Remote activation of routine functional unit	9
6.6.1 RoutineControl service	9
7 Application layer requirements	10
7.1 General	10
7.2 Application layer protocol	10
7.2.1 General	10
7.2.2 Application layer timing	10
8 Presentation layer requirements	10
9 Session layer requirements	11
10 CAN-based communication interface	11
10.1 General	11
10.2 Application layer	11
10.3 Transport layer	11
10.4 Network layer	11
10.5 Data link layer	11
10.6 Physical layer	11
11 K-Line based communication interface	11
11.1 General	11

11.2	Data link layer	11
11.3	Physical layer	12
Bibliography		13

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 16844-6:2022

<https://standards.iteh.ai/catalog/standards/sist/827aaddf-6568-4295-9277-06dc5ded6b5a/iso-16844-6-2022>

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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

This third edition cancels and replaces the second edition (ISO 16844-6:2015), which has been technically revised.

The main changes are as follows:

- part 5 of this series (ISO 16844-5) has been removed due to its technical irrelevance,
- correction of the typos and mistakes in the text,
- adoption of the content according to the new version of the ISO guidelines,
- adoption of the content according to the new technical requirements,
- alignment of the content regarding to the referred standards.

A list of all parts in the ISO 16844 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.

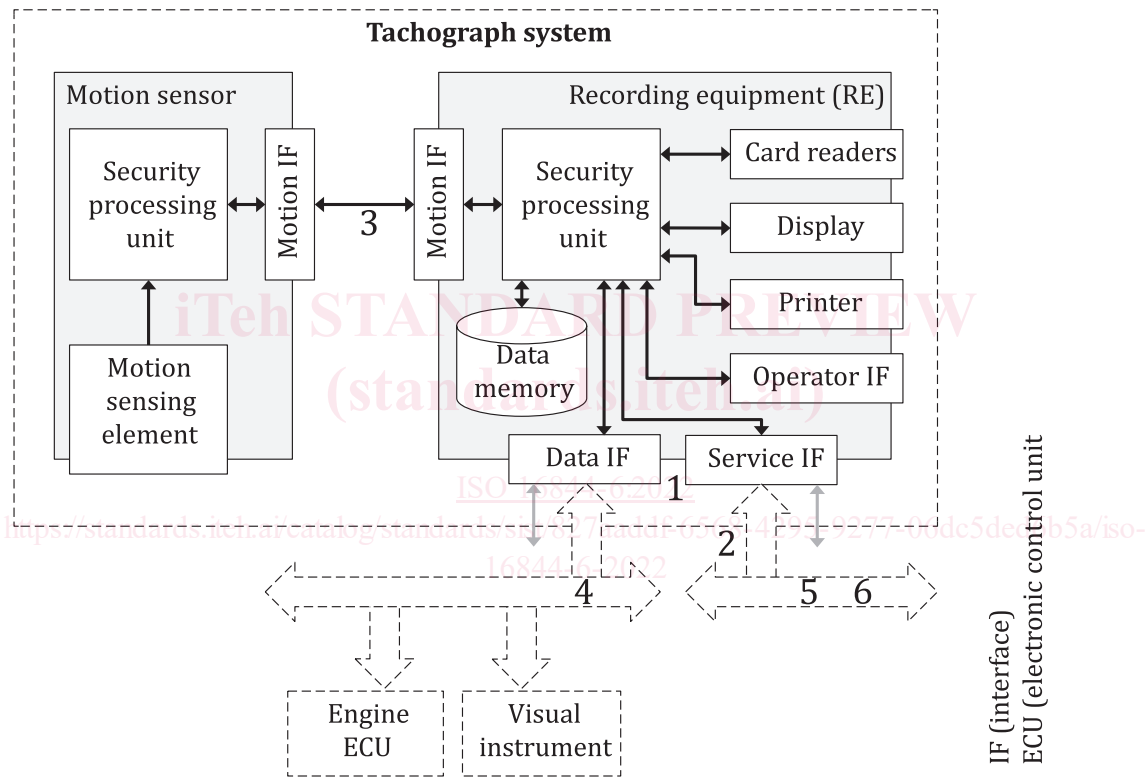
Introduction

This document supports and facilitates the communication between electronic control units (ECUs) and a digital tachograph.

The digital tachograph concept is based upon a recording equipment storing data, related to the activities of the various drivers driving the vehicle, on which it is installed.

During the normal operational status of the recording equipment, data stored in its memory are accessible to different entities (drivers, authorities, workshops, transport companies) in different ways (displayed on a screen, printed by a printing device, downloaded to an external device). Access to stored data is controlled by a smart card inserted in the tachograph.

A typical tachograph system is shown in [Figure 1](#).



- Key**
- | | |
|--|---|
| 1 data and service IF connector standardized in ISO 16844-1 | 4 CAN-based data IF including parameter groups standardized in ISO 16844-4 |
| 2 electrical data and service IF requirements standardized in ISO 16844-2 | 5 optional CAN-based service IF standardized in ISO 16884-6 |
| 3 communication interface between motion sensor and RE standardized in ISO 16844-3 | 6 data identifier (DID) specification for the optional service IF standardized in ISO 16844-7 |

Figure 1 — Typical ISO 16844 conformant tachograph system

Road vehicles — Tachograph systems —

Part 6: Diagnostic communication interfaces

1 Scope

This document specifies the CAN-based and the K-Line communication between the recording equipment and service tools for software download and calibrating purposes. The provided requirements and recommendations cover physical, data link, network, session, and application layers according to the OSI reference model as well as the unified diagnostics services.

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 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Application layer*

ISO 14229-2, *Road vehicles — Unified diagnostic services (UDS) — Part 2: Session layer services*

ISO 14229-3, *Road vehicles — Unified diagnostic services (UDS) — Part 3: Unified diagnostic services on CAN implementation (UDSonCAN)*

ISO 14229-6, *Road vehicles — Unified diagnostic services (UDS) — Part 6: Unified diagnostic services on K-Line implementation (UDSonK-Line)*

ISO 14230-1, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 1: Physical layer*

ISO 14230-2, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 2: Data link layer*

ISO 15765-2, *Road vehicles — Diagnostic communication over Controller Area Network (DoCAN) — Part 2: Transport protocol and network layer services*

ISO 16844-1, *Road vehicles — Tachograph systems — Part 1: Recording equipment data and service connector*

ISO 16844-4, *Road vehicles — Tachograph systems — Part 4: Display unit communication interface*

ISO 16844-7, *Road vehicles — Tachograph systems — Part 7: Data identifier for the CAN-based service interface*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16844-1 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Abbreviated terms

For the purposes of this document, the following the following abbreviated terms apply.

C	conditional
Cvt.	convention
DID	data identifier
DS	default session
DSRC	dedicated short range communication
ECU	electronic control unit
EXTDS	extended diagnostic session
M	mandatory
N	not allowed
O	optional
RS	remote session
SID	service identifier
SSS	system supplier specific session
VMS	vehicle manufacturer specific session

5 Overview and conventions

5.1 General

To enable the implementation of unified diagnostic services on CAN and on K-Line this document is based on the Open Systems Interconnection (OSI) Basic Reference Model specified in ISO/IEC 7498-1^[1] and ISO/IEC 10731^[2], which structures communication systems into seven layers. When mapped on this model, the services specified by the ISO 16844 series are divided as given in [Table 1](#).

Table 1 — Diagnostics implementation reference applicable to the OSI layers

Applicability	OSI seven layer	Diagnostics according to document	
		On CAN	On K-Line
Seven layer according to ISO/IEC 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO 14229-1/ISO 16844-6	
		ISO 14229-3	ISO 14229-6
	Presentation (layer 6)	Vehicle manufacturer specific	
	Session (layer 5)	ISO 14229-2	
	Transport (layer 4)	ISO 15765-2	—
	Network (layer 3)		
	Data link (layer 2)	ISO 16844-4	ISO 14230-2/ ISO 14230-1
	Physical (layer 1)		

5.2 Service description conventions

The service description conventions according to ISO 14229-1 are used.

5.3 Addresses

5.3.1 Functional addresses

The recording equipment shall respond to the functional address 238_{10} as the recording equipment address and the functional address 255_{10} for broadcasting purposes.

5.3.2 Physical addresses

The recording equipment shall have a physical address of 238_{10} .

5.4 Parameters

If a parameter value or a record value consists of more than one byte, the most significant byte shall always be transmitted first, followed by bytes of decreasing significance.

6 Diagnostic services implementation

6.1 General and overview

The diagnostic services shall be implemented in accordance with ISO 14229-1 and the restrictions given [Clause 6](#). [Table 2](#) specifies tachograph diagnostic services.

Table 2 — Diagnostic service usage and identifier value summary and overview

Diagnostic service name (according to ISO 14229-1)	SID value ^a	Diagnostic session						Subclause
		DS ^b	DPRS ^c	EXTDS ^d	VMS ^e	SSS ^f	RS ^g	
Diagnostic and communication management functional unit								
DiagnosticSessionControl	10 ₁₆	M	M	M	M	M	M	6.2.1
ECUReset	11 ₁₆	O	O	O	O	O	O	6.2.2
SecurityAccess	27 ₁₆	N	M	O	M	M	N	6.2.3
CommunicationControl	28 ₁₆	N	M	O	O	O	N	6.2.4
TesterPresent	3E ₁₆	M	M	M	M	M	M	—
AccessTimingParameters	83 ₁₆	N	O	O	O	O	N	—
SecuredDataTransmission	84 ₁₆	N	O	O	O	O	N	—
ControlDTCSetting	85 ₁₆	N	O	O	O	O	N	—
ResponseOnEvent	86 ₁₆	O	O	O	O	O	U	6.2.5
LinkControl	87 ₁₆	N	O	O	O	O	N	6.2.6
Data transmission functional unit								
ReadDataByIdentifer	22 ₁₆	M	M	M	O	O	M	6.3.1
ReadMemoryByAddress	23 ₁₆	N	N	N	O	O	N	—
ReadScalingDataByIdentifier	24 ₁₆	M	M	M	O	O	M	—
ReadDataByPeriodicIdentifier	2A ₁₆	N	O	O	O	O	N	6.3.2
DynamicallyDefineDataIdentifier	2C ₁₆	O	O	O	O	O	O	6.3.3
WriteDataByIdentifier	2E ₁₆	N	M	O	O	O	N	6.3.4
WriteMemoryByAddress	3D ₁₆	N	N	N	O	O	N	—
Stored data transmission functional unit								
ReadDTCInformation	19 ₁₆	M	M	M	O	O	M	6.4.2
ClearDiagnosticInformation	14 ₁₆	M	M	O	O	O	M	6.4.1
Input/Output control functional unit								
InputOutputControlByIdentifier	2F ₁₆	N	N	M	O	O	N	6.5.1
Remote activation of routine functional unit								
RoutineControl	31 ₁₆	N	O	M	O	O	M	6.6.1
Upload/Download functional unit								
RequestDownload	34 ₁₆	N	O	N	O	O	N	—
RequestUpload	35 ₁₆	N	O	O	O	O	M	—
TransferData	36 ₁₆	N	O	O	O	O	M	—
RequestTransferExit	37 ₁₆	N	O	O	O	O	M	—

^a Assigns the service identifier values for the request message.

^b This session shall be implemented. These services of the defaultSession (DS) may be implemented in each server (ECU), if the electronic system supports the functionality of these services.

^c This session shall be implemented. These services of the ProgrammingSession (PRGS) may be implemented to allow for programming of memory (e.g. flash), variant coding, parameters, etc. in the server (ECU).

^d This session shall be implemented. These services of the ExtendedDiagnosticSession (EXTDS) may be implemented to allow for adjustment of input/output signals of the server (ECU).

^e This session may be implemented. These services of the vehicleManufacturerSpecificSession (VMS) are specified by the vehicle manufacturer.

^f This session may be implemented. These services of the systemSupplierSpecificSession (SSS) are specified by the system supplier.

^g This session may be implemented. These services of the remoteSession (RS) are implemented to allow for remote company card authentication and data download.

6.2 Diagnostic and communication management functional unit

6.2.1 DiagnosticSessionControl service

The convention of the DiagnosticSessionControl subfunction parameter, DiagnosticSessionType, shall be in accordance with [Table 3](#).

Table 3 — DiagnosticSessionControl subfunction parameter DiagnosticSessionType

bit 6–0	Description	Cvt.	Mnemonic
01 ₁₆	defaultSession	M	DS
02 ₁₆	programmingSession	M	PRGS
03 ₁₆	extendedDiagnosticSession	O	EXTDS
YY ^a	remoteSession This diagnostic session enables all diagnostic services required to allow for remote company card authentication and data download.	M	RS
^a The value used for remoteSession shall be determined by using DID F900 ₁₆ (see ISO 16844-7).			

6.2.2 ECUReset service

The convention of the ECUReset subfunction parameter, ResetType, shall be in accordance with [Table 4](#).

Table 4 — ECUReset subfunction parameter ResetType

Value	Description	Cvt.
01 ₁₆	hardReset	O
02 ₁₆	keyOffOnReset	M
03 ₁₆	softReset	O

6.2.3 SecurityAccess service

The convention of the SecurityAccess subfunction parameter, AccessType, shall be in accordance with [Table 5](#). The maximum delay time for the positive response shall be 10 s.

Table 5 — SecurityAccess subfunction parameter AccessType

Value	Description	Cvt.
01 ₁₆	requestSeed	M
02 ₁₆	sendKey	M
03 ₁₆ , 05 ₁₆ , 07 ₁₆ to 41 ₁₆	requestSeed	O
04 ₁₆ , 06 ₁₆ , 08 ₁₆ to 42 ₁₆	sendKey	O
61 ₁₆ to 7E ₁₆	system supplier specific range	O

6.2.4 CommunicationControl service

The convention of the CommunicationControl subfunction parameter, ControlType, shall be in accordance with [Table 6](#). The convention of the CommunicationControl CommunicationType, parameter shall be in accordance with [Table 7](#).

Table 6 — CommunicationControl subfunction parameter ControlType

Value	Description	Cvt.
00 ₁₆	enableRxAndTx	M