INTERNATIONAL STANDARD

ISO 16844-2

Third edition
2022-04

Road vehicles — Tachograph systems —

Part 2: Recording unit communication interface

Véhicules routiers — Systèmes tachygraphes —

Partie 2: Interface de communication de l'unité d'enregistrement

Reference number
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Contents

Page

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 16844-2:2011), 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.

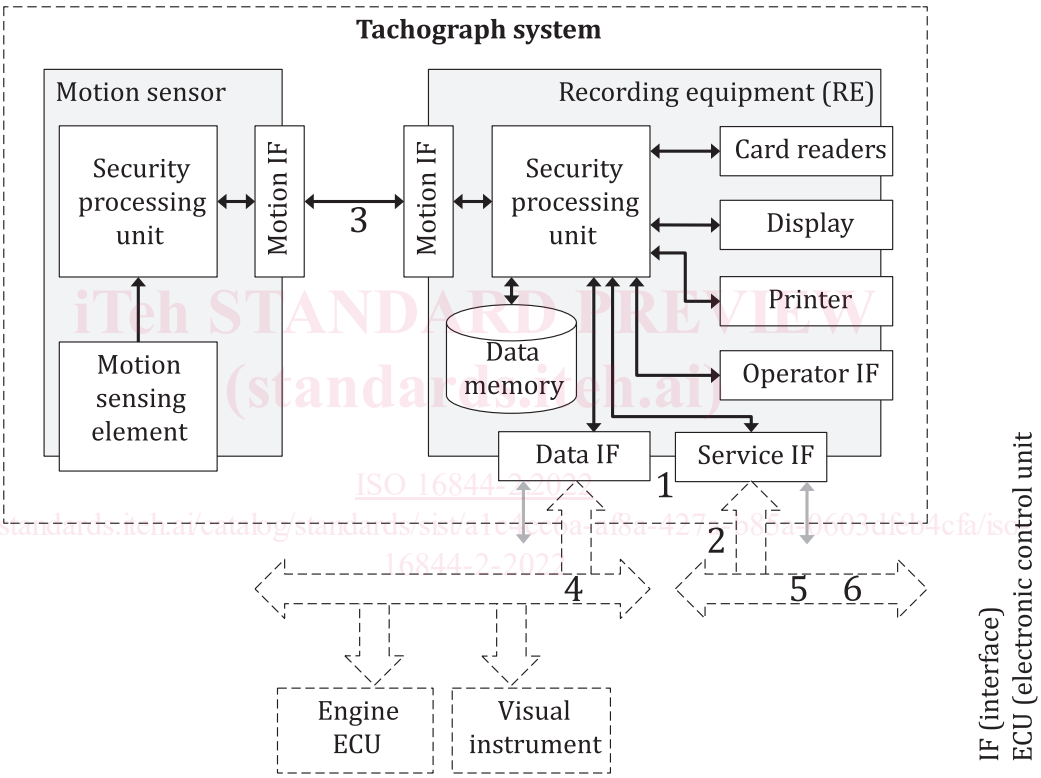
Introduction

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

2 electrical data and service IF requirements standardized in ISO 16844-2

3 communication interface between motion sensor and RE standardized in ISO 16844-3

4 CAN-based data IF including parameter groups standardized in ISO 16844-4

5 optional CAN-based service IF standardized in ISO 16884-6

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 2: Recording unit communication interface

1 Scope

This document specifies the electrical interfaces of the data and the service interfaces. The electrical interfaces to the CAN-based in-vehicle networks are not in the scope of this document.

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

ISO 16844-3, *Road vehicles — Tachograph systems — Part 3: Communication interface between motion sensor and recording equipment*

ISO 16844-4, *Road vehicles — Tachograph systems — Part 4: CAN-based data interface including parameter groups*

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 Symbols and abbreviated terms

f	speed pulse frequency in hertz (Hz)
I	current
k	tachograph constant in pulses per kilometre (pulses/km)
U_{high}	voltage, high level
U_{low}	voltage, low level
T	complete speed pulse duration in second (s)
t	positive speed pulse duration in millisecond (ms)
CAN	controller area network

ECU electronic control unit

IF interface

5 Requirements

5.1 Connector

The connector used for the recording equipment shall be according to ISO 16844-1.

5.2 Electrical connection

5.2.1 Connector — Part A

The electrical requirements of module A of the connector shall be used for power supply and CAN connection, as specified in ISO 16844-4. Pin A2 shall be used for illumination with a typical value of 100 mA.

5.2.2 Connector — Part B

5.2.2.1 Electrical requirements

The electrical requirements of module B of the connector, used for tachograph to motion sensor connection, shall be in accordance with Table 1.

Table 1 — Electrical requirements of connector, part B

Connector contact no.	Name	Parameter	Electrical requirement		Remarks
			Minimum	Maximum	
B1	Positive supply	According to ISO 16844-3			
B2	Battery minus				
B3	Speed signal, real time				
B4	Data signal				
B5	—	—	—	—	Manufacturer-specific
B6	Speed pulse output	—	—	—	Manufacturer-specific
B7	Speed pulse output see 5.2.2.2	U_{low}	—	1,5 V	I = 1 mA
		U_{high}	5,5 V	—	I = −1 mA
		Frequency (1/T)	—	< 1,6 kHz	—
		Pulse duration (t)	0,64 ms	4 ms	—
		Pulse duration accuracy	—	1 %	—
		Tachograph constant (k)	2 400 pulses/km	25 000 pulses/km	—
B8	Distance signal, 4 pulses/m (optional) see 5.2.2.3	U_{low}	—	1,5 V	I = 1 mA
		U_{high}	5,5 V	—	I = −1 mA
		Frequency	—	244 Hz	v = 220 km/h
		Pulse duration [t_1]	1,6 ms	—	—

5.2.2.2 Speed pulse output and distance signal 4 pulses/m — Circuitry

The circuitry of the speed pulse output and distance signal 4 pulses/m shall be according to Figure 2.

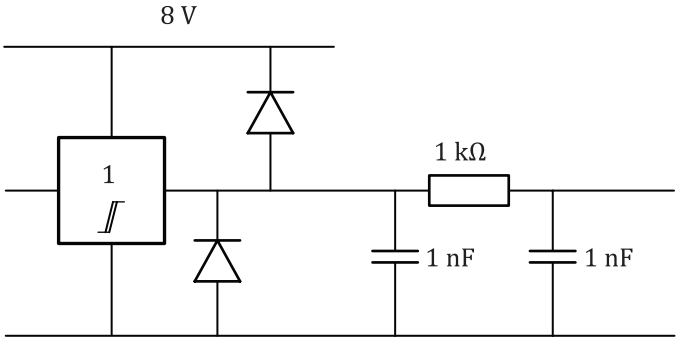


Figure 2 — Circuitry

5.2.2.3 Speed pulse output — Timing diagram

The timing diagram of speed pulse output (connector contact B7) versus the motion sensor speed signal (connector contact B3) shall be according to Figure 3.

a) Motion sensor speed signal (contact B3) **b) Speed pulse output (contact B7)**

Key

[a] Max. 40 µs delay, ±10 µs jitter.

Figure 3 — Timing diagram for speed pulse output

Formulae (1) to (4) specify the relationship between speed (v), tachograph constant (k) and speed pulse output (T and t).

$$T = \frac{1}{f_{MS}} \tag{1}$$

where

T is the period of speed pulse output on contact B7 in seconds (s);

f_{MS} is the frequency of the speed pulse signal on contact B3 in hertz (Hz).

$$f_{MS} = v * k \tag{2}$$

where

v is the speed of the vehicle in meters per seconds (m/s).

k is the tachograph constant in pulses per meter (pulse/m).

$$t = \frac{1}{f_{MS,L}} = \frac{1}{v_L * k} = \frac{1}{62{,}5\frac{m}{s} * k} \quad (3)$$

where

t is positive pulse duration (high) in seconds (s) of the speed pulse output on contact B7;

$f_{MS,L}$ is the frequency of the speed pulse signal on contact B3 in hertz (Hz) at speed measurement upper limit;

v_L is the speed measurement upper limit of 62,5 m/s (= 225 km/h);

k is the tachograph constant in pulses per meter (pulse/meter).

$$v = \frac{1}{T * k} = \frac{1}{T * \frac{1}{v_L * t}} = v_L * \frac{t}{T} = 62{,}5\frac{m}{s} * \frac{t}{T} \quad (4)$$

where

v is the speed of the vehicle in meters per seconds (m/s).

5.2.2.4 Distance signal 4 pulses/m — Timing diagram

Figure 4 specifies the timing diagram of the distance signal 4 pulses/m (connector contact B8), where each positive edge represents a distance of 250 mm, as averaged over 1 km.

Figure 4 — Timing diagram for distance signal