SLOVENSKI STANDARD
oSIST prEN 50436-4:2021

01-oktober-2021

Alkoholne zapore - Preskusne metode in zahtevane lastnosti - 4. del: Konektor in digitalni vmesnik med alkoholno zaporo in vozilom

Alcohol interlocks - Test methods and performance requirements - Part 4: Connection and digital interface between the alcohol interlock and the vehicle

Alkohol-Interlocks - Prüfverfahren und Anforderungen an das Betriebsverhalten - Teil 4: Verbindung und digitale Schnittstelle zwischen dem Alkohol-Interlock und dem Fahrzeug

Ethylotests antidémarrage - Méthodes d'essais et exigences de performance - Partie 4: Connexion et interface numérique entre l'éthylotest antidémarrage et le véhicule

Ta slovenski standard je istoveten z: **prEN 50436-4**

ICS:

13.200	Preprečevanje nesreč in katastrof	Accident and disaster control
43.040.80	Sistemi za zaščito pri trku in sistemi za zadrževanje potnikov	Crash protection and restraint systems

oSIST prEN 50436-4:2021 **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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prEN 50436-4

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ICS

Will supersede EN 50436-4:2019 and all of its
amendments and corrigenda (if any)

English Version

Alcohol interlocks - Test methods and performance requirements - Part 4: Connection and digital interface between the alcohol interlock and the vehicle

Ethylotests antidémarrage - Méthodes d'essais et
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Alkohol-Interlocks - Prüfverfahren und Anforderungen an
das Betriebsverhalten - Teil 4: Verbindung und digitale
Schnittstelle zwischen dem Alkohol-Interlock und dem
Fahrzeug

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2021-10-29.

It has been drawn up by CLC/BTTF 116-2.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which
stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to
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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to
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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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prEN 50436-4:2021 (E)

Contents

2

prEN 50436-4:2021 (E)

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European foreword

5

This document (prEN 50436-4:2021) has been prepared by CLC/BTTF 116-2 "Alcohol Interlocks".

This document is currently submitted to the enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50436-4:2019 and all of its amendments and corrigenda (if any).

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prEN 50436-4:2021 (E)

Introduction

The purpose of alcohol interlocks is to enhance traffic safety by preventing persons with alcohol concentrations exceeding a set limit value from driving a motor vehicle. The EN 50436 series specifies test methods and essential performance requirements for alcohol interlocks and gives guidance for decision makers, purchasers and users.

There are several areas in which alcohol interlocks may be used:

— installed in a vehicle as a general preventive measure for the promotion of traffic safety, on a voluntary base or required legally in certain vehicles (e.g. vehicles for children transport), or

— in vehicles as ordered by a court or an administrative authority as part of a drink-driving offender programme, or

— for persons subject to a medical or rehabilitation programme.

Alcohol interlocks are often intended for after-market installation. For this purpose they have to be connected to the electrical circuits of the vehicle.

This installation of an alcohol interlock is expected not to interfere with the proper performance of the vehicle, is expected not to impair the safety and security of the vehicle, and is as easy and as fast as possible. Additionally, the installation costs should be low in relation to the total cost of the alcohol interlock.

Therefore, it is desirable to have a standardized interface between alcohol interlocks and vehicles.

The alcohol interlock suppliers are expected to detail all the information that they will use/send. All used data/information is expected to respect the cyber security protocol and rules of the vehicle.

NOTE   A new standard ISO/SAE 21434 to define requirements for cybersecurity engineering is under preparation.

All data required by the alcohol interlock from the vehicle is expected to be defined clearly and not be transferred outside the vehicle if this digital communication is used.

1 Scope

This document specifies the interface between an alcohol interlock for production and aftermarket installation and a vehicle. It details the modes of electrical connections, the assignment of electrical connection lines as well as the information to be exchanged between the vehicle and the alcohol interlock.

This document is applicable to alcohol interlocks for drink-driving-offender programmes (as in EN 50436-1) as well as to alcohol interlocks for general preventive use (as in EN 50436-2).

This document is mainly directed at manufacturers of alcohol interlocks and at vehicle manufacturers.

This document is referenced in EN 50436-7 and provides details of the preferred data bus connection suggested therein.

NOTE   This document describes the information exchange using a LIN or a CAN (J1939) connection.

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.

EN 50436-1:2014, *Alcohol interlocks - Test methods and performance requirements - Part 1: Instruments for drink-driving-offender programs*

EN 50436-2, *Alcohol interlocks - Test methods and performance requirements - Part 2: Instruments having a mouthpiece and measuring breath alcohol for general preventive use*

EN 50436-7:2016, *Alcohol interlocks - Test methods and performance requirements - Part 7: Installation document*

ISO 17987-1:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 1: General information and use case definition*

ISO 17987-2:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 2: Transport protocol and network layer services*

ISO 17987-3:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 3: Protocol specification*

ISO 17987-4:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 4: Electrical physical layer (EPL) specification 12 V/24 V*

ISO/TR 17987-5:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 5: Application programmers interface (API)*

ISO 17987-6:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 6: Protocol conformance test specification*

ISO 17987-7:2016, *Road vehicles — Local Interconnect Network (LIN) — Part 7: Electrical Physical Layer (EPL) conformance test specification*

ISO 17987-8:2019, *Road vehicles — Local Interconnect Network (LIN) — Part 8: Electrical physical layer (EPL) specification: LIN over DC powerline (DC-LIN)*

SAE J1939 (series), *Serial Control and Communications Heavy Duty Vehicle Network*

3   Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50436-1:2014 and EN 50436-7:2016 apply.

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

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

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

3.1
motor
includes combustion engine, electric motor or hybrid power unit

3.2
odometer
instrument that indicates the distance travelled by the vehicle

3.3
passed breath test
breath test for which the user provided an accepted breath sample having a breath alcohol concentration below the breath alcohol concentration limit

3.4
failed breath test
breath test for which the user did not provide an accepted breath sample or has provided an accepted breath sample with an alcohol concentration equal to or above the breath alcohol concentration limit

3.5
lockout
condition in which the alcohol interlock will not accept a breath test and thereby prevents the user from starting the vehicle motor for a predetermined period of time

Note 1 to entry: Lockout could be required by regulatory requirements.

3.6
Local Interconnect Network
LIN
serial network protocol used for digital communication between components in vehicles

3.7
LIN description file
LDF
file that is created in the LIN cluster design and parsed in the LIN cluster generation or by debugging tools

Note 1 to entry: It contains LIN nodes, signals, frames and schedule table and other parameters relevant for LIN communication in a LIN network.

3.8
Controller Area Network
CAN
vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer

3.9
Database Container File
DBC
CAN data description file format

Note 1 to entry: It is a text file that contains information for decoding raw CAN bus data to physical values.

4   Connection between alcohol interlock and vehicle

4.1   Installation document

The installation of an alcohol interlock shall be described in an installation document according to EN 50436-7.

All extra parts that are required for the installation of an alcohol interlock according to prEN 50436-4 shall be specified by at least name and part number in the referring installation document according to EN 50436-7.

4.2   Data bus specification

4.2.1   General

The information exchange between the alcohol interlock and the vehicle shall be performed via a LIN data bus or a CAN Data bus.

4.2.2   LIN Data Bus

The LIN master is on the vehicle side.

The alcohol interlock system shall act as a LIN slave.

The LIN Master and the interlock as a LIN slave shall conform to at least one of the following specifications: LIN Revision 2.0, LIN revision 2.1, LIN revision 2.2, LIN revision 2.2A, LIN according to ISO 17987-1:2016, ISO 17987-2:2016, ISO 17987-3:2016, ISO 17987-4:2016, ISO/TR 17987-5:2016, ISO 17987-6:2016, ISO 17987-7:2016, ISO 17987-8:2019 or later.

4.2.3   CAN Data Bus

The CAN data bus shall conform with the SAE J1939 series network protocol

NOTE   For the information exchange between the alcohol interlock and the vehicle, a gateway can be used to adapt to the requested communication standards (LIN or CAN). Both the alcohol interlock and gateway are handled in the following standard as single units.

4.3   Properties of a connector

4.3.1   Systems using a LIN data bus

If the vehicle provides a connector at the end of cable harnesses or another specific location for the connection to the alcohol interlock, the connector shall have at least 3 connections with the assignments given in Table 1.

The exact type of the connector and pinout shall be specified in the installation document according to EN 50436-7.

Examples of connectors can be Molex minifit 39-01-2060, Molex Duraclick 987650-8742 and Molex Mini50 987652-1632. It is recommended to propose 6-pin connectors.

Table 1 — Minimum pin assignment of a LIN connector

Pin	Purpose	Details
1	Battery feed of the alcohol interlock	+9 V to + 36 V battery feed (terminal +30) as specified in EN 50436-7:2016, Annex C, with the exception that in the low power consumption mode of the alcohol interlock, the vehicle may switch off the power supply to the alcohol interlock.
2	Ground for the voltage supply of the alcohol interlock and data bus ground	0 V ground (terminal −30)
3	Data bus high	LIN High (ISO 17987 series)

NOTE 1   The sequence of pin numbering is arbitrary and for counting reasons only, e.g. lines are not necessarily in adjacent cavities. The exact pin numbering is specified in the installation document according to EN 50436-7:2016, Annex C, 3c.

NOTE 2   Pin 2 can be separated into two independent pins within a 4 pin connector.

4.3.2   Systems using a CAN data bus

If the vehicle provides a connector at the end of cable harnesses or another specific location for the connection to the alcohol interlock, the connector shall have at least 4 connections with the assignments given in Table 2.

The exact type of the connector and pinout shall be specified in the installation document according to EN 50436-7.

Examples of connectors can be Molex minifit 39-01-2060, Molex Duraclik 987650-8742 and Molex Mini50 987652-1632. It is recommended to propose 6-pin connectors.

Table 2 — Minimum pin assignment of a connector for CAN SAE J1939 series

Pin	Purpose	Details
1	Battery (+)	+9 V to + 36 V battery feed (terminal +30) as specified in EN 50436-7:2016, Annex C, with the exception that in the low power consumption mode of the alcohol interlock, the vehicle may switch off the power supply to the alcohol interlock.
2	Battery (-)	0 V ground (terminal −30)
3	CAN_H	
4		unused
5		unused
6	CAN_L	

NOTE   The sequence of pin numbering is arbitrary and for counting reasons only, e.g. lines are not necessarily in adjacent cavities. The exact pin numbering is specified in the installation document according to EN 50436-7:2016, Annex C, 3c.

4.4 Behaviour of the vehicle

4.4.1 General

The vehicle that is equipped with an alcohol interlock which is installed after this document shall not enable the start of the motor or vehicle movement if it receives the information that the interlock is in the blocking state or communication to the interlock is not possible or not plausible/unexpected.

The vehicle shall not cause a running vehicle motor to stop, even in the case of receiving a blocking information from the interlock after a missed or a failed retest.

NOTE   National regulation or special requirements can modify this requirement.

4.4.2 Installation

The vehicle shall conform to the behaviour of 4.4.1 after the first successful communication with the alcohol interlock with a confirmed protocol validation.

The installation could require specified sequence of actions in order to install the alcohol interlock, that shall be documented according to 4.1.

The installation procedure shall include a test that provides evidence for the successful installation of the alcohol interlock.

4.4.3 De-installation

The de-installation could require specified sequence of actions in order to install the alcohol interlock, that shall be documented according to 4.1.

4.5 Activation of the alcohol interlock

The vehicle shall activate the alcohol interlock if the vehicle is activated.

Vehicles that communicate with the alcohol interlock via LIN Bus shall make use of the LIN WAKE UP procedure.

The LIN WAKE UP procedure shall not be performed by the alcohol interlock.

NOTE   This is not a requirement for a breath test with each activation of the vehicle.

4.6 Deactivation of the alcohol interlock following a shutdown request

The alcohol interlock shall go into its low power consumption mode or a state where it can be switched off by the vehicle without error no longer than 10s after the vehicle goes into its shutdown state and the alcohol interlock has acknowledged this.

NOTE   National regulations could require different timings, examples could be vehicles that comply with ADR.

Vehicles that communicate with the alcohol interlock via LIN Bus shall transmit the go to sleep command after receiving the shutdown acknowledgement of the alcohol interlock.

The maximum time period between a not acknowledged shutdown and an acknowledged shutdown shall be 30 min.

4.7 Maintaining power to the alcohol interlock

The vehicle shall maintain uninterrupted power for the alcohol interlock if this is requested by the alcohol interlock.

The alcohol interlock shall only request power maintenance if the vehicle is stationary and in a service environment.

The minimum time period during which power supply to the alcohol interlock shall be maintained after it has entered into a communication state that requests this shall be 10 min.

After the alcohol interlock has communicated that it is in a state where power maintenance is required, the digital connection to the vehicle could be lost e.g. due to a restart of the alcohol interlock. In such cases the alcohol interlock shall restart by entering its initial communication state as described in 6.3.2.

NOTE   Power maintenance is designed e.g. software maintenance and update, where complete resets under power could be needed.

5   Basic connection architecture for the data bus

There are two basic options for the connection architecture between the vehicle and the alcohol interlock.

a)   Direct connection to a LIN bus or a CAN bus of the vehicle or

b)   Indirect connection to a digital bus of the vehicle via a LIN or CAN gateway.

The specifications of 4.2 apply.
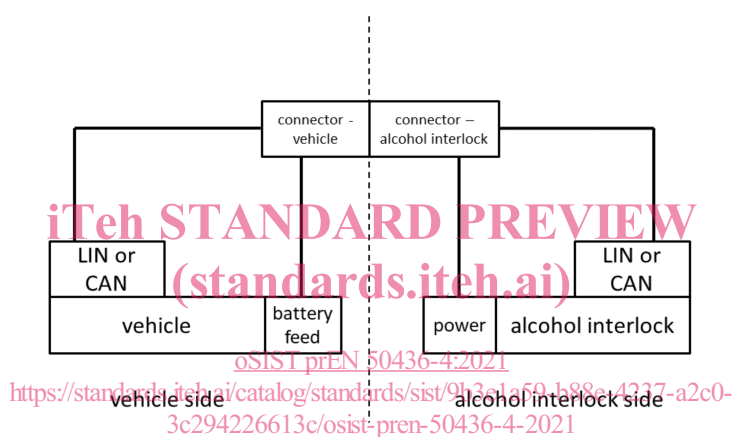
The principle of the connection is shown in Figure 1.

Figure 1 — Direct connection alcohol interlock and vehicle bus

6   Communication

6.1   General

The communication between the vehicle and the alcohol interlock shall use communication states. Respective state transition tables are provided in Annex B.

6.2   The communication states of the vehicle

6.2.1   General

The vehicle shall have the following communication states:

a)   Protocol Validation;

b)   Set Mode;

c)   Unset Mode;

d)   Shutdown.

6.2.2 The vehicle communication state Protocol Validation

The vehicle shall be in the communication state <PROTOCOL_VALIDATION> if it requests the protocol validation from the alcohol interlock. The communication state <PROTOCOL_VALIDATION> shall be the initial communication state of the vehicle.

The additional entry action is:

a) the vehicle requests a protocol validation from the alcohol interlock.

The exit actions are:

b) the alcohol interlock has successfully validated the protocol;

c) the vehicle shuts down.

The vehicle shall not allow the driver to start the motor or enable the motion of the vehicle if the vehicle is in the communication state <PROTOCOL_VALIDATION>.

6.2.3 The vehicle communication state Set Mode

The vehicle shall be in the communication state <SET_MODE> when the vehicle is in a state in which it cannot be driven normally under its own power. This state shall last until the start of the motor or the motion of the vehicle .

The entry actions are:

a) the interlock has authenticated itself and the vehicle cannot be driven normally under its own power;

b) transitions in accordance to 6.2.6.

The exit actions are:

c) the vehicle shuts down;

d) the vehicle goes into the state in which it can be driven normally under its own power;

e) the vehicle goes into bypass mode.

NOTE   The most usual way that the vehicle goes into the state in which it can be driven normally under its own power is that the motor is started.

6.2.4 The vehicle communication state Unset Mode

The vehicle shall be in the communication state <UNSET_MODE> when the vehicle is in the state in which it can be driven normally under its own power.

The entry action is:

a) the vehicle goes into the state in which it can be driven normally under its own power;

The exit actions are:

b) the vehicle shuts down;

c) transitions in accordance to 6.2.6.

6.2.5 The vehicle communication state Shutdown

The vehicle shall feature the communication state <SHUTDOWN>.

The entry action is:

a) the vehicle shuts down.