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BSI Standards Publication

Alcohol interlocks — Test methods and performance requirements

Part 7: Installation document

bsi.

National foreword

This British Standard is the UK implementation of EN 50436-7:2016.

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

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Alkohol-Interlocks - Prüfverfahren und Anforderungen an das Betriebsverhalten - Teil 7: Einbaudokument

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European foreword

This document (EN 50436-7:2016) has been prepared by CLC/BTTF 116-2 “Alcohol Interlocks”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	[2017-10-31]
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	[2019-10-31]

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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. EN 50436 series specifies test methods and essential performance requirements for alcohol interlocks and gives guidance for authorities, decision makers, purchasers and users.

There are several ways 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 basis 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 aftermarket installation. For this purpose, they are connected to the electric and control circuits of the vehicle.

This installation of an alcohol interlock should not interfere with the proper performance of the vehicle, should not impair the safety and security of the vehicle and should be as straightforward 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 installation document to give the necessary details to the technicians installing an alcohol interlock into a certain vehicle model, even if the responsibility for the safe installation will remain on the alcohol interlock installer.

1 Scope

This European Standard defines the content and the layout of an installation document providing necessary and useful information about the aftermarket installation of an alcohol interlock into a vehicle. It details the type of the vehicle, connection schematics, accessibility instructions and recommendations to avoid safety risks.

The contents and layout ensures that the information document is easy to use for installers in different countries and may be available in paper or electronic format.

This European Standard is applicable to alcohol interlocks according EN 50436-1 and EN 50436-2.

This European Standard is mostly intended for vehicle manufacturers and manufacturers of alcohol interlocks.

This European Standard does not apply to:

– the process of handling the installation documents;

– the installation process;

– information related to education and training for installers;

– general performance requirements for alcohol interlocks (see EN 50436-1 and EN 50436-2);

– the installation of the alcohol interlock during the production of the vehicle.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 50436-2:2014, *Alcohol interlocks - Test methods and performance requirements - Part 2: Instruments having a mouthpiece and measuring breath alcohol for general preventive use*

EN ISO 216, *Writing paper and certain classes of printed matter - Trimmed sizes - A and B series, and indication of machine direction (ISO 216)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
alcohol interlock
device which is normally in the blocking state when installed to prevent the starting of a vehicle engine, and which can be brought into the not-blocking state only after the presentation and analysis of a breath sample with an alcohol concentration below a limit value

NOTE 1 to entry: It normally consists of a handset and a control unit electrically connected to the vehicle.

NOTE 2 to entry: In this European Standard, the expression “starting of the vehicle engine” includes provision of an output signal from the alcohol interlock to the vehicle to enable the starting, operation or movement of the vehicle.

[SOURCE: EN 50436-1:2014, 3.1, modified — 'vehicle motor' is replaced by 'vehicle engine']

3.2
breath alcohol concentration
mass concentration of ethanol, expressed in mg/l (milligram ethanol per litre breath air), in a breath sample delivered into an alcohol interlock

[SOURCE: EN 50436-1:2014, 3.2]

3.3
breath sample
breath air sample taken under forced expiration

[SOURCE: EN 50436-1:2014, 3.3]

3.4
accepted breath sample
breath sample fulfilling set requirements for volume, flow, exhalation time and other human breath sample characteristics

Note 1 to entry The acceptance of a breath sample is independent from the alcohol concentration.

[SOURCE: EN 50436-1:2014, 3.4]

3.5
breath test
test providing a breath sample to an alcohol interlock

[SOURCE: EN 50436-1:2014, 3.5]

3.6
blocking state
state in which the alcohol interlock inhibits the starting of the vehicle motor

[SOURCE: EN 50436-1:2014, 3.7]

3.7
not-blocking state
state in which the vehicle motor can be started

[SOURCE: EN 50436-1:2014, 3.8]

3.8
breath alcohol concentration limit
set value of the breath alcohol concentration at or above which the vehicle motor will be prevented from being started

[SOURCE: EN 50436-1:2014, 3.9]

3.9
supply voltage
voltage obtained from the electric power source of the vehicle for operation of the alcohol interlock

[SOURCE: EN 50436-1:2014, 3.19]

3.10
manufacturer
person or organisation responsible for the design, construction and/or production of the vehicle or the alcohol interlock

[SOURCE: EN 50436-1:2014, 3.23, modified — 'the vehicle or' has been added]

3.11
aftermarket installation
any installation of an alcohol interlock in a vehicle after the original production of a vehicle

[SOURCE: EN 50436-1:2014, 3.24]

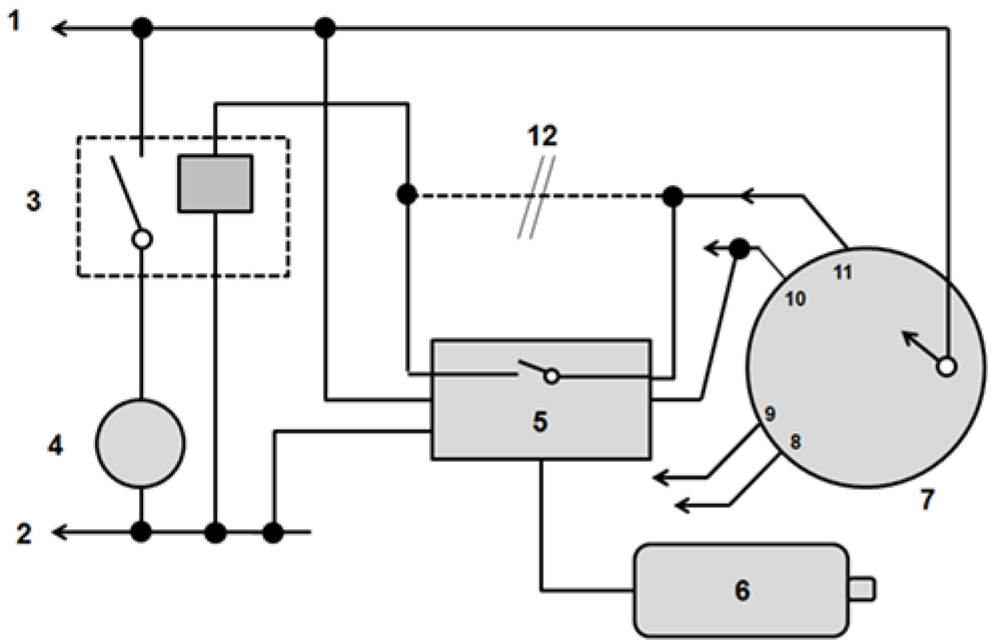
4 Installation of an alcohol interlock

This clause describes the basic (“traditional”) principle for the installation of an alcohol interlock.

The alcohol interlock requires connection to the vehicle: supply voltage, ground, ignition line, interruption of the starter wire and detection of engine run.

The voltage supply between the vehicle's ignition switch (position “Starter relay”) and the starter system is interrupted (Figure 1). The alcohol interlock is fitted with its output relay into the interrupted starter circuit.

NOTE In this European Standard, the expression “starting of the vehicle engine” includes provision of an output signal from the alcohol interlock to the vehicle to enable the starting, operation or movement of the vehicle.



Key

1	battery feed (+30)	7	ignition switch
2	ground (−30)	8	off
3	starter relay	9	accessories
4	starter motor	10	ignition / vehicle ready
5	alcohol interlock control unit	11	starter relay
6	alcohol interlock handset	12	interruption

Figure 1 — Traditional installation schematics for an alcohol interlock

The alcohol interlock is normally in the blocking state (output relay open). The closure of this relay may only occur when an accepted breath sample with an alcohol concentration below the pre-set limit has been delivered.

This installation procedure ensures that an alcohol interlock may only intervene in the engine starting process but may never influence a running engine or a moving vehicle. This is an important condition for the operational safety of an alcohol interlock equipped vehicle.

The expression “starting of the vehicle motor/engine” includes provision of an output signal from the alcohol interlock to the vehicle to enable the starting, operation or movement of the vehicle.

5 Time behaviour

When using a vehicle with an alcohol interlock a certain time behaviour of user activities as well as vehicle and alcohol interlock reactions takes place. A typical example is shown in Annex A.

6 Layout and contents of the installation document

6.1 General

The installation document provides necessary and useful information about the aftermarket installation of an alcohol interlock into a vehicle. It details the type of the vehicle, connection schematics, accessibility instructions and recommendations to avoid safety risks.

The installation document should be prepared by vehicle manufacturers and should be provided to alcohol interlock manufacturers and their installers.

The installation document may be created as one document covering all vehicle variants. However it is recognized that there may be instances where the position of the connections may differ from one vehicle variant to another, and that in these instances it will be necessary to create additional installation documents to cover these differences.

6.2 General content and layout

The general content of the installation document is mandatory. It shall be available in paper or electronic format in at least English language.

Its layout shall follow Annex B. This includes the following:

– header (see 6.3);

– footer (see 6.4);

– connection schematics (see 6.5);

– safety risks at installation and items to be considered (see 6.6);

– assembly instruction (see 6.7);

– modification of vehicle operation (if applicable, see 6.8);

– suggestion for the mounting position of the alcohol interlock handset and the alcohol interlock control unit, (see 6.9).

The installation document normally consists of several pages. The header and the footer shall be repeated on all pages.

The installation document shall be printable on and readable from ISO A4 format paper (according to EN ISO 216).

6.3 Header

The header consists of four parts.

1) The first part of the header shall contain the logo(s) of the vehicle brand.

2) The second part of the header shall contain the name of the vehicle manufacturer.

3) The third part of the header shall contain information for uniquely identifying a specific vehicle model, for example:

   – name of the vehicle model;

   – body type(s) covered by the installation document;

   – specific version (e.g. hybrid, electric, with/without Stop and Start, country specific version);

   – version number(s) of the vehicle model;

   – serial number(s) of the vehicle model;

   – date of production.

The third part of the header shall indicate how the installer can verify that this installation document matches the vehicle. Many vehicles have several parallel versions at the same time depending on where they are produced.

4) The fourth part of the header shall contain the title of the document.

6.4 Footer

6.4.1 General

The footer shall include:

– the document identification number of the installation document (see 6.4.2);

– the version number of the installation document, starting at “01” for the first release;

– the version date (optional);

– the page number (out of the total number of pages).

6.4.2 Document identification number

The document identification number (ID No.) shall be unique for every vehicle model and logically structured allowing the selection of the right installation document. The document identification number can be used as a simple identifier in communication.

To ensure such a unique number, the following components are recommended to be used:

xxx – yyyyy…y

where

“xxx” is a unique manufacturer code (WMI code) as part of the VIN number, defined in ISO 3779 and ISO 3780,

“yyyyy…y” is a reference number used by the vehicle manufacturer to identify its documents. The exact number of digits used depends on the car manufacturer document database system.

It is the responsibility of the creator of the installation document to ensure that this number is unique in its system.

The combination of xxx and yyyyy…y will give a unique identification number.

6.5 Connection schematics

This part shall describe in a technical description the necessary connections.

The description of the mandatory and optional information about function, cable or pin, and position of connection is given along with examples in Annex C.

6.6 Safety risks at installation and items to be considered

This part shall describe any safety critical concerns and other items that shall be considered by the alcohol interlock installer, for example airbags or high voltage components.

NOTE The responsibility for the safe installation will remain on the alcohol interlock installer.

6.7 Assembly instruction

This part shall describe the following, for example with drawings and pictures:

– how to reach the required cables defined in 6.5, including if necessary access to the cables outside the passenger compartment (e.g. through the firewall);

– how to take the vehicle apart with minimal damage to the interior;

– in what position is (are) the specific access point(s) to the vehicle's electrical system;

– whether an update of the vehicle software is necessary;

– how an update of the vehicle software is to be performed (if applicable);

– details of the databus connection (if applicable).

Examples are given in Annex D.

6.8 Modification of vehicle operation

This part shall describe, if applicable, in detail the specific consequences of the installation of an alcohol interlock on the normal operation of the vehicle, i.e. changes which are additional to the normal use of the vehicle when equipped with an alcohol interlock. It shall include the nature and significance of signals, alarms and messages.

For example, this part should describe whether there will be any visual and/or audible indications from the vehicle to the driver when trying to start the vehicle without an accepted breath sample having been provided, i.e. indications that would not occur if the alcohol interlock were not installed (for example "Press clutch to start").

6.9 Mounting position of alcohol interlock handset and alcohol interlock control unit

This part shall describe the locations (and the locations to be avoided) for the installation of the alcohol interlock handset and the alcohol interlock control unit as suggested by the vehicle manufacturer with regard to passive and ergonomic safety.

Annex A
(informative)

Time behaviour

Figure A.1 gives a typical time behaviour when using a vehicle with an alcohol interlock.

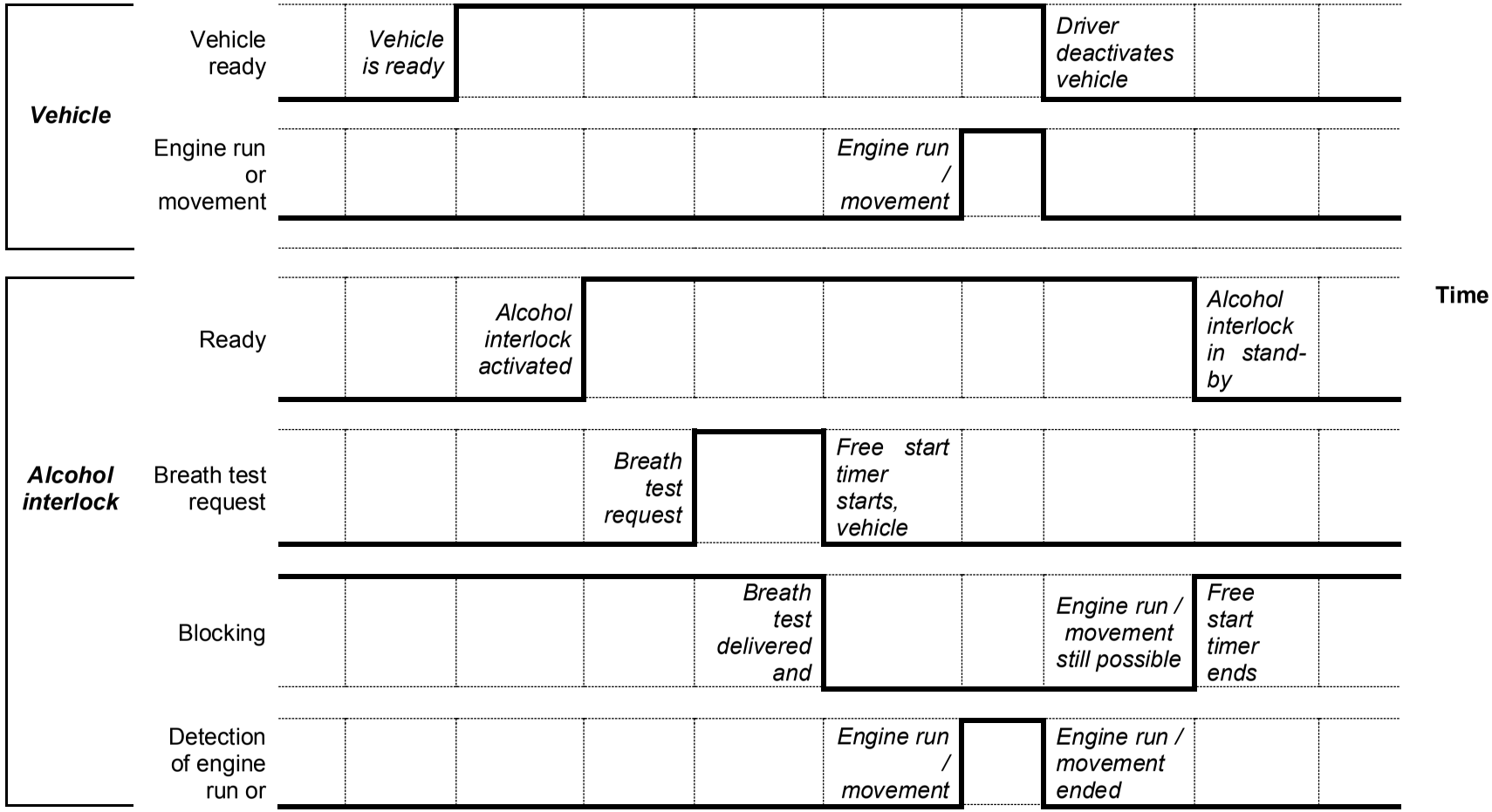


Figure A.1 — Time behaviour diagram

Annex B
(normative)

General layout of the installation document

Table B.1 shows the mandatory content and preferred layout to be used for the pages of the installation document.

The format shall be printable on and readable from ISO A4 format paper (EN ISO 216).

Table B.1 — Layout of the installation document

<table>
<tr><td colspan="2">Logo of brand</td><td colspan="2">Name of vehicle manufacturer</td><td colspan="2">Vehicle model</td></tr>
<tr><td colspan="6">Installation document for alcohol interlocks</td></tr>
<tr><td rowspan="7">(Reserved for holes)</td><td colspan="5"><u>Connection schematics</u></td></tr>
<tr><td></td><td>Function</td><td colspan="2">Cable or pin</td><td>Position of connection</td></tr>
<tr><td>1</td><td>Battery feed (terminal +30)
...</td><td colspan="2">...</td><td>...</td></tr>
<tr><td>2</td><td>Ground (terminal −30)
...</td><td colspan="2">...</td><td>...</td></tr>
<tr><td>...</td><td>...</td><td colspan="2">...</td><td>...</td></tr>
<tr><td colspan="5"><u>Safety risks at installation and items to be considered</u>
...</td></tr>
<tr><td colspan="5"><u>Assembly instruction</u>
...</td></tr>
<tr><td colspan="5"><u>Modification of vehicle operation</u>
...</td></tr>
<tr><td colspan="5"><u>Mounting position of alcohol interlock handset and the alcohol interlock control-unit</u>
...</td></tr>
<tr><td colspan="3" rowspan="2"></td><td>ID No.</td><td>Version No.</td><td>Page No.</td></tr>
<tr><td></td><td></td><td>1 of x</td></tr>
</table>

Annex C
(normative)

Connection schematics

Table C.1 shows the mandatory and optional information for the “function” together with informative examples for “cable or pin” and “position of connection” of the connection schematics.

Items “3a Starter enabler”, “3b Input/Output” and “3c Data bus connection” may be given alternatively or together as part of the connection schematics.

Item “5 Engine run / Vehicle movement” is optional.

The content of column 2 below the header is mandatory for the document. Explanations and mandatory requirements for the designer of the document are provided in footnotes.

The content of columns 3 and 4 below the header provide examples.

Table C.1 — Information of the connection schematics

	Function	***Cable or pin***	***Position of connection***
1	**Battery feed (terminal +30), uninterrupted** [a] For nominal 12 V or nominal 24 V the alcohol interlock requires and accepts 9 V-36 V when the vehicle is off or in stand-by. The interlock in its standby mode does not require a current of more than 5 mA. For short period of time, the current may be higher up to 1 A with transient bursts up to 3 A. For nominal 12 V or nominal 24 V the alcohol interlock requires and accepts 9 V-36 V when the vehicle is in use. The alcohol interlock does not require a current of more than 7 A, when the vehicle is in use.	Red cable Pin 5 2,5 mm^2	Connector X2 in central fuse box in engine compartment
2	**Ground (terminal −30)**	Screw terminal at driver's door at A-pillar 2,5 mm^2	The rear one of three terminals
3a	**Start enabler** [b] 0 V to 36 V on the cable to be interrupted. Shall prohibit vehicle from starting / moving if circuit is open.	Blue-white cable Pin 6 2,5 mm^2	Connector C5 in central electronic module
3b	**Input / Output** Shall prohibit vehicle from starting / moving after signal from alcohol interlock, is GROUND or HIGH or shall allow vehicle to start / move after signal from alcohol interlock, is HIGH or GROUND.	Blue-white cable Pin 6 2,5 mm^2 Signal HIGH: start / move prohibited	Connector C5 in central electronic module

	Function	*Cable or pin*	*Position of connection*
3c	**Data bus connection** [c] Connection to an internal data bus of the vehicle for information exchange between the vehicle and the alcohol interlock. Details of the data bus connection shall be given in the assembly instructions (see 6.7)	LIN GROUND: Green cable Pin 5 2,5 mm^2 LIN HIGH: Yellow cable Pin 6 2,5 mm^2 *or alternatively* Connector according to prEN 50436–4 (Accessory part number 123456)	Connector C6 in central electronic module *or alternatively* Connector behind glove compartment
4	**Vehicle ready (terminal +15/54), uninterrupted** [d] • HIGH: For nominal 12 V or nominal 24 V: 9 V to 36 V. The vehicle signals that it is ready to be used. • LOW: For nominal 12 V or nominal 24 V: GROUND The vehicle signals that it may not be used.	Orange cable Pin 7 0,5 mm^2	Connector X2 in central fuse box in engine compartment
5	**Engine run / Vehicle movement** [e] The vehicle signals that the engine is running or the vehicle is moving.	Blue cable Pin 8 0,5 mm^2 HIGH: 12 V when engine running	Connector X2 in central fuse box in engine compartment

[a] Battery feed not be switched off when vehicle is in stand-by. In cases where it is not possible, proper information shall be given under “Modification of vehicle operation”.

(If not possible, then tampering monitoring in stand-by according to EN 50436–1:2014 and EN 50436–2:2014, 4.7 and 12.9 cannot be ensured).

The current of 5 mA is the maximal allowed current for an alcohol interlock as specified in EN 50436–1:2014 and EN 50436–2:2014.

The high current is used by presently available alcohol interlocks for heating up the instrument during the start-up phase.

The signal shall be at least 6 V also during engine start or run.

The vehicle manufacturer shall indicate if the operation of the vehicle may no longer be possible outside the voltage range given here due to the installation of the alcohol interlock. He shall provide the actual voltage range to which the vehicle is specified. 6.8 applies.

[b] Shall not affect the usage of the vehicle after start or move sequence. Shall not be able to influence a running engine.

Regardless of what the user does or in what order the user tries to start or move the vehicle no error codes or messages are to be stored or shown to the driver. In cases where it is not possible, proper information shall be given under “Modification of vehicle operation”.

[c] It is foreseen that an additional part of this series of European Standards for alcohol interlocks (to be prEN 50436–4) will be developed concerning the details of this data bus connection.

A connection as specified in prEN 50436–4 should be used.

Using alternative “3c Data bus connection” may include the information of items “4 Vehicle ready” and “5 Engine run / Vehicle movement”. Then, items 4 and 5 are not applicable for this connection.

[d] The signal shall be at least 6 V also during engine start or run.

The signal shall be LOW latest 5 s after “Vehicle ready” OFF.

[e] Permanent signal on a given level (preferably HIGH) when engine running or vehicle moving.

Annex D
(informative)

Assembly instruction

Figures D.1 to D.3 show examples for the required information of the assembly instruction.

Figure D.1 — Location of ground installation point

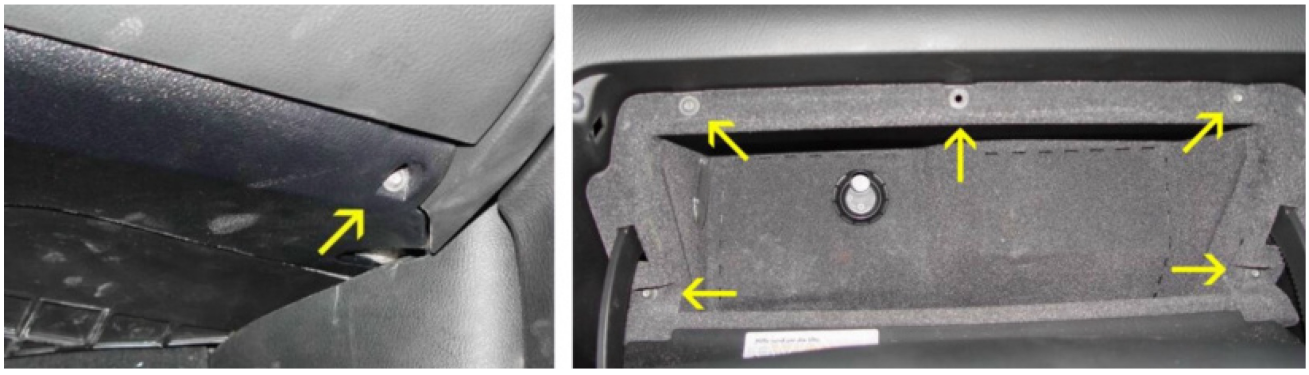
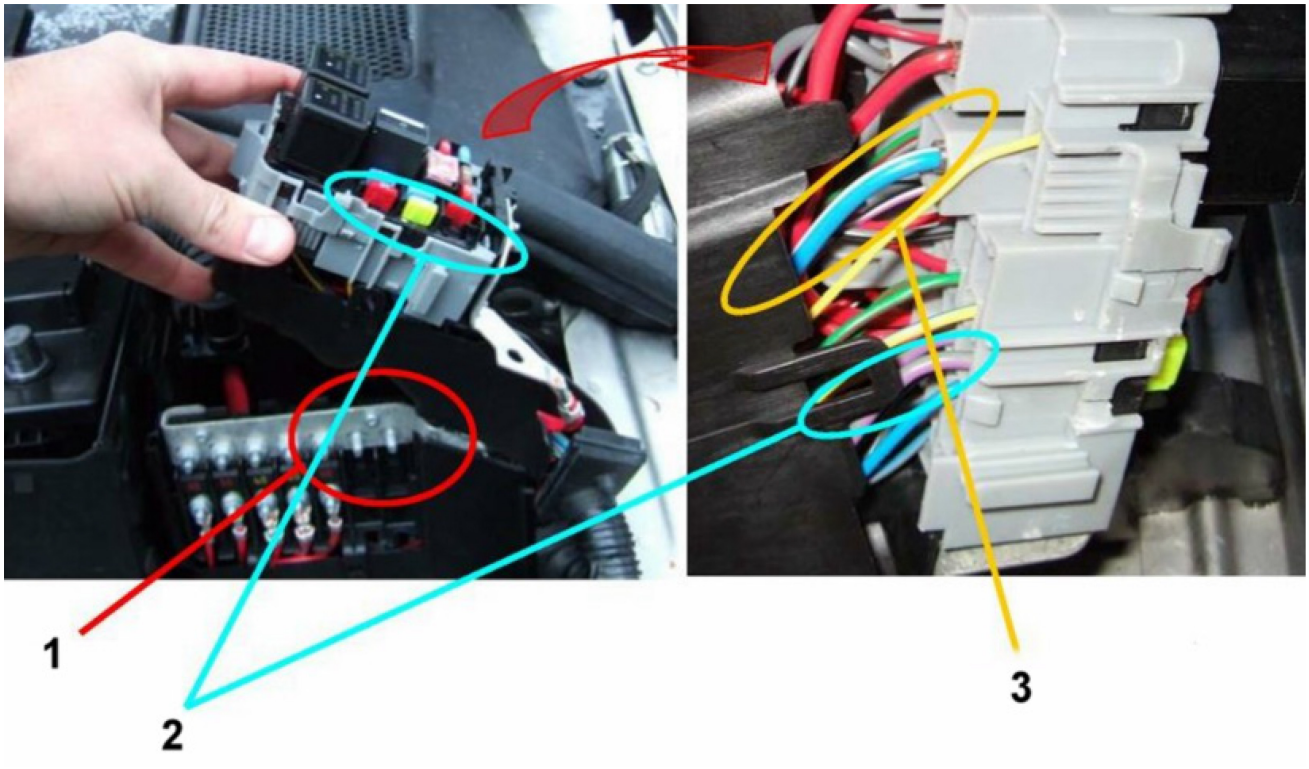


Figure D.2 — Taking apart to reach an installation point by minimizing damages



Key

1 ground
2 vehicle ready
3 battery feed

Figure D.3 — Location of the connector and of the pins in the connector

Bibliography

[1] prEN 50436-4, *Alcohol interlocks - Test methods and performance requirements - Part 4: Connectors for the electrical connection between the alcohol interlock and the vehicle*

[2] ISO 3779, *Road vehicles — Vehicle identification number (VIN) — Content and structure*

[3] ISO 3780, *Road vehicles — World manufacturer identifier (WMI) code*

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