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**Road vehicles — Communication  
between vehicle and external equipment  
for emissions-related diagnostics —**

**Part 3:  
Diagnostic connector and related  
electrical circuits, specification and use**

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*Véhicules routiers — Communications entre un véhicule et un  
équipement externe pour le diagnostic relatif aux émissions —*

*Partie 3: Connecteur de diagnostic et circuits électriques associés:  
spécifications et utilisation*

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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15031-3 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 15031 consists of the following parts, under the general title *Road vehicles — Communication between vehicle and external equipment for emissions-related diagnostics*:

- *Part 1: General information*
- *Part 2: Terms, definitions, abbreviations and acronyms*
- *Part 3: Diagnostic connector and related electrical circuits, specification and use*
- *Part 4: External test equipment*
- *Part 5: Emissions-related diagnostic services*
- *Part 6: Diagnostic trouble code definitions*
- *Part 7: Data link security*

## Introduction

The various parts of ISO 15031, when taken together, provide a coherent, consistent set of specifications for facilitating emissions-related diagnostics. ISO 15031-2 to ISO 15031-7 are based on recommended practices of the society of automotive engineers (SAE). This part of ISO 15031 is based on SAE J1962:02/98, *Diagnostic Connector*.

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# Road vehicles — Communication between vehicle and external equipment for emissions-related diagnostics —

## Part 3: Diagnostic connector and related electrical circuits, specification and use

### 1 Scope

This part of ISO 15031 specifies a minimum set of requirements for a diagnostic connector used in communication between vehicle and external equipment for emissions-related diagnostics. Its aim is to promote the use of a common diagnostic connector throughout the motor vehicle industry. The diagnostic connection consists of two mating connectors, the vehicle connector and the external test equipment connector. Applicable to all types of road vehicles, the connector specified has no positive locking feature and is intended for short-term diagnostic connection only.

This part of ISO 15031 specifies functional requirements for

- a) the vehicle connector, separated into the four principal areas of
  - 1) connector location/access,
  - 2) connector design,
  - 3) connector contact allocation, and
  - 4) electrical requirements for connector and related electrical circuits, and
- b) the external test equipment connector, separated into the three principal areas of
  - 1) connector design,
  - 2) connector contact allocation, and
  - 3) electrical requirements for connector and related electrical circuits.

The dimensional requirements of the vehicle connector are given as a minimum specification, to allow design freedom.

### 2 Normative references

The following referenced documents are indispensable for the application 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 8092-2:2000, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 2: Definitions, test methods and general performance requirements*

## ISO 15031-3:2004(E)

ISO 8092-3, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 3: Tabs for multi-pole connections — Dimensions and specific requirements*

ISO 9141-2, *Road vehicles — Diagnostic systems — Part 2: CARB requirements for interchange of digital information*

ISO 14230-4, *Road vehicles — Diagnostic systems — Keyword Protocol 2000 — Part 4: Requirements for emission-related systems*

ISO 15031-4, *Road vehicles — Communication between vehicle and external test equipment for emissions-related diagnostics — Part 4: External test equipment*

ISO 15765-4, *Road vehicles — Diagnostics on Controller Area Networks (CAN) — Part 4: Requirements for emissions-related systems*

ISO 16750-2, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 2: Electrical loads*

SAE J1850 (all parts), *Class B Data Communication Network Interface*

### 3 Terms and definitions

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

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**3.1 connection**  
two mated connectors or contacts

**3.2 connector**  
assembly of contact and housing which terminates conductors for the purpose of providing connection and disconnection to a suitable mating connector

**3.3 contact**  
conductive element in a connector (including means for cable attachment) which mates with a corresponding element to provide an electrical path

**3.4 female contact**  
electrical contact (including means for cable attachment) intended to make electrical engagement on its inner surface and to accept entry of a male contact, thus forming an electrical connection

EXAMPLE Receptacle, sleeve.

**3.5 male contact**  
electrical contact (including means for cable attachment) intended to make electrical engagement on its outer surface and to enter a female contact, thus forming an electrical connection

EXAMPLE Tab, pin, blade.



## 4 Vehicle connector location/access

### 4.1 General

This clause specifies vehicle connector location variations based upon vehicle weight classification and connector type (Type A or B). It should be recognized that country or regional governments could mandate a connector location which supersedes these provisions.

### 4.2 Consistency of location

#### 4.2.1 Vehicle connectors Type A

##### 4.2.1.1 Passenger cars and light duty vehicles

The connector shall be located in the passenger or driver's compartment in the area bounded by the driver's end of the instrument panel to 300 mm beyond the vehicle centreline, attached to the instrument panel and easy to access from the driver's seat. The preferred location is between the steering column and the vehicle centreline. The vehicle connector shall be mounted to facilitate mating and unmating.

##### 4.2.1.2 Heavy duty vehicles

###### 4.2.1.2.1 Trucks

The connector shall be located in the passenger or driver's compartment in the area bounded by the driver's end and the co-driver's end of the instrument panel, including the outer side. It shall be attached to the instrument panel and easy to access from the driver's seat or from the co-driver's seat or from the outside. The vehicle connector shall be mounted to facilitate mating and unmating.

###### 4.2.1.2.2 Buses <https://standards.iteh.ai/catalog/standards/sist/c0b07844-6d81-4b85-962a-237a6b3a0fd8/iso-15031-3-2004>

For left-hand-driven and right-hand-driven buses and coaches *without* co-driver's seat, the connector shall be located in the area bounded by the driver's end and front passenger door-sided end of the instrument panel, including the outer side or behind the driver in the partition wall, in an area bounded by the driver's compartment, with access from the driver's seat.

For left-hand-driven and right-hand-driven buses and coaches *with* co-driver's seat, the connector shall be located in the area bounded by the driver's end and the co-driver's end of the instrument panel, including the outer side or behind the driver in the partition wall, in an area bounded by the driver's compartment, with access from the driver's seat.

#### 4.2.2 Vehicle connectors Type B

##### 4.2.2.1 Light duty vehicles

The connector shall be located in the passenger or driver's compartment in the area bounded by the driver's end and the co-driver's end of the instrument panel, including the outer side, and an imagined line 750 mm beyond the vehicle centreline. It shall be attached to the instrument panel and shall be easily accessed from the driver's seat or from the co-driver's seat or from the outside. The vehicle connector shall be mounted to facilitate mating and unmating.

##### 4.2.2.2 Heavy duty vehicles

###### 4.2.2.2.1 Trucks

The connector shall be located in the passenger or driver's compartment in the area bounded by the driver's end and the co-driver's end of the instrument panel, including the outer side. It shall be attached to the

instrument panel and easy to access from the driver's seat or from the co-driver's seat or from the outside. The vehicle connector shall be mounted to facilitate mating and unmating.

4.2.2.2.2 Buses

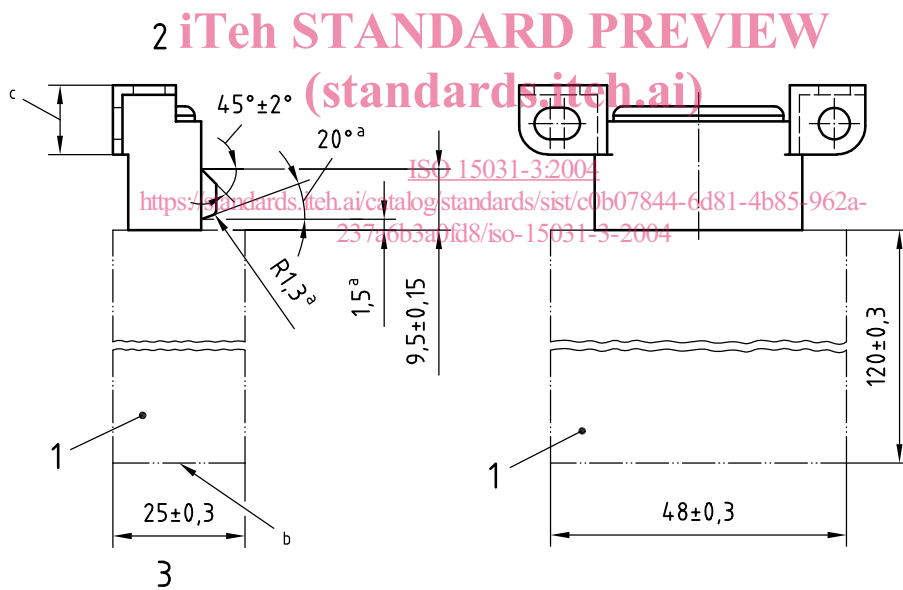
For left-hand-driven and right-hand-driven buses and coaches *without* co-driver's seat, the connector shall be located in the area bounded by the driver's end and front-passenger-door side end of the instrument panel, including the outer side or behind the driver in the partition wall, in an area bounded by the driver's compartment, with access from the driver's seat.

For left-hand-driven and right-hand-driven buses and coaches *with* co-driver's seat the connector shall be located in the area bounded by the driver's end and the co-driver's end of the instrument panel, including the outer side or behind the driver in the partition wall, in an area bounded by the driver's compartment, with access from the driver's seat.

4.3 Ease of access

Access to the vehicle connector shall not require a tool for the removal of an instrument panel cover, connector cover, or any barriers. The vehicle connector shall be fastened and located so as to permit a one-handed/blind insertion of the mating external test equipment connector. Figure 1 illustrates the diagnostic connector access area for mated connection in the vehicle.

Dimensions in millimetres



Key

- 1 access area
  - 2 cable end
  - 3 mating end
- a Nominal values.  
 b Access to mating end to be clear in this area for the connecting external test equipment connector.  
 c Mounting features shown are for guidance only.

Figure 1 — Vehicle diagnostic connector access area

#### 4.4 Visibility

The vehicle connector shall be out of the occupant's (front and rear seat) normal line of sight, but easily visible to a crouching technician.

#### 4.5 Vehicle operation

Attachment of any external test equipment to the vehicle connector shall not preclude normal physical and electrical operation of the vehicle.

### 5 Vehicle and external test equipment connector design

#### 5.1 Dimensions

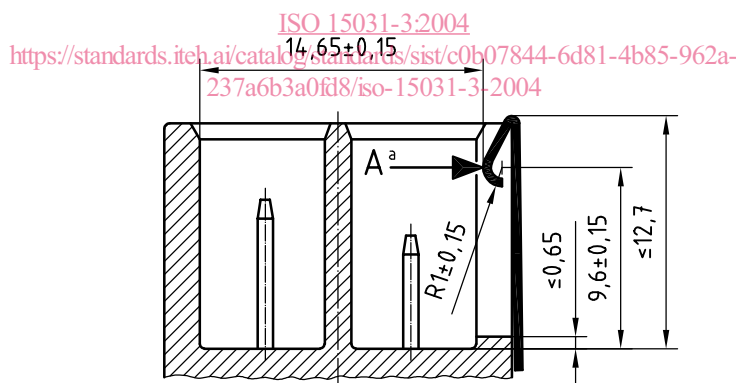
For the basic dimensions of the vehicle connector and the external test equipment connector, see Figures 2 and 3. For the physical dimensions of both Type A connectors, see Annex A; for both Type B connectors, see Annex B.

The Type A external test equipment connector shall be mateable with the Type A vehicle connector: compliance of the electrical, mechanical and climatic performances of the connection shall be guaranteed.

The Type B external test equipment connector shall be mateable with both the Type A vehicle connector and the Type B vehicle connectors: compliance of the electrical, mechanical and climatic performances of the connection shall be guaranteed.

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Dimensions in millimetres



<sup>a</sup> A force applied as shown by the arrow "A" shall deflect the clip outward for a distance of  $2,5 \pm 0,15$ ; the clip shall recover to its original position. The connector shall be in accordance with 5.10.4 c) with the spring clip in place.

Figure 2 — Spring clip detail (optional)