

# INTERNATIONAL STANDARD

# ISO 4165

Second edition  
2001-12-01

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## Road vehicles — Electrical connections — Double-pole connection

*Véhicules routiers — Connexions électriques — Connexion bipolaire*



Reference number  
ISO 4165:2001(E)

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4165 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This second edition cancels and replaces the first edition (ISO 4165:1979), of which Figures 1 and 2, and the normative references, have been revised, and to which tests and requirements have been added.



# Road vehicles — Electrical connections — Double-pole connection

## 1 Scope

This International Standard specifies the dimensions and electrical characteristics of the double-pole connection required for the interchangeability of the electrical connections used to supply additional appliances in road vehicles with a nominal supply voltage of 12 V or 24 V d.c.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6722:—<sup>1)</sup>, *Road vehicles — 60 V and 600 V single-core cables — Dimensions, test methods and other requirements*

ISO 8092-2:2000, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 2: Definitions, test methods and general performance requirements*<sup>2)</sup>

## 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 8092-2 apply.

## 4 Dimensions

The dimensions of the plug and socket shall be in accordance with the dimensions shown in Figure 1.

Details not specified are left to the manufacturer's choice.

## 5 Application

The connection is intended for application within protected areas such as the passenger compartment, luggage compartment, or similar areas. In case of outside mounting, additional protection is necessary.

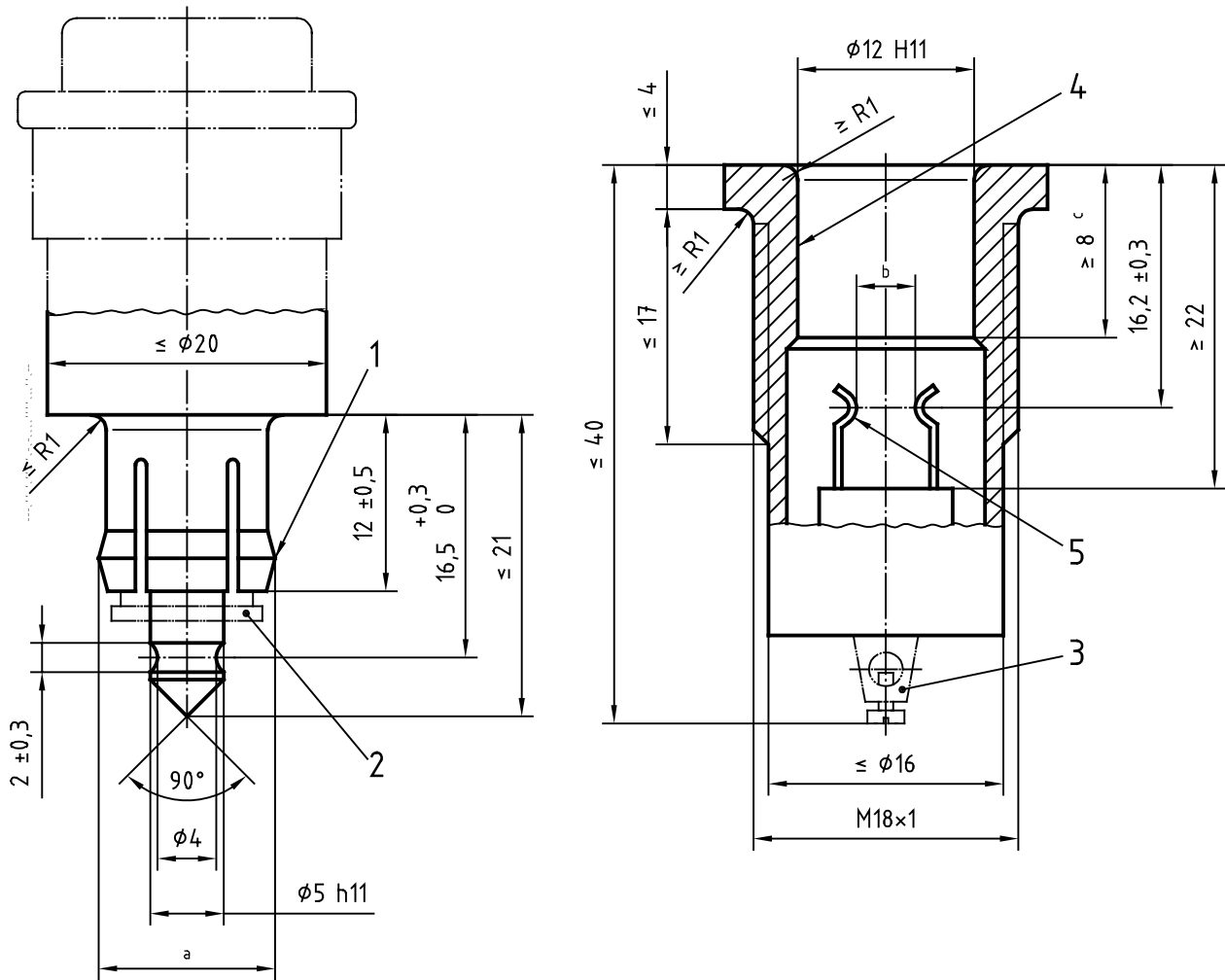
## 6 Tests and requirements

### 6.1 General

Perform the tests at a room temperature of  $(23 \pm 5)$  °C unless otherwise specified.

1) To be published. (Revision of ISO 6722: all parts)

2) Corrected and reprinted 2001.



**Key**

- 1 Spring type contact
- 2 Insulating part (optional)
- 3 Terminal as agreed between manufacturer and user
- 4 Contact area
- 5 Spring-type contact

<sup>a</sup> The resilient part (spring-type contact) of the plug shall be capable of being introduced into the hole with diameter 12 H11 mm of the socket in order that the connection and disconnection forces of 6.2 may be performed.

<sup>b</sup> The internal dimensions of the contact springs of the socket shall be such that the connection and disconnection forces of 6.2 may be performed.

<sup>c</sup> If there is no undercut below the length of 8 mm min. this dimension shall be 12,5 mm min.

**Figure 1 — Dimensions of plug and socket**

## 6.2 Connection and disconnection

### 6.2.1 Test

The contacts shall be dry and clean.

Perform the connection and disconnection in accordance with ISO 8092-2.

### 6.2.2 Requirement

The connection forces measured shall be a maximum of 50 N, and the disconnection forces a maximum of 50 N and a minimum of 16 N.

## 6.3 Temperature rise

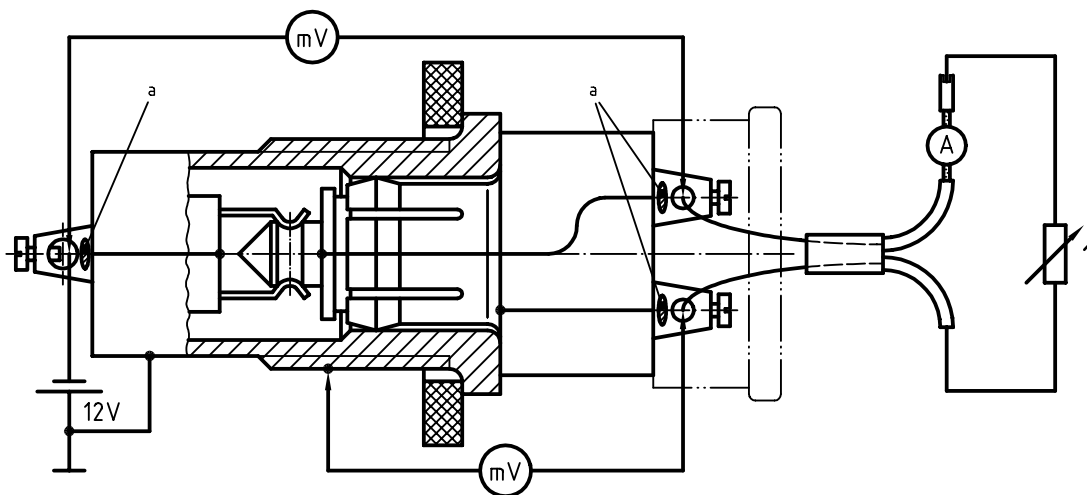
### 6.3.1 Test

Apply the temperature rise test according to ISO 8092-2, using a mated connection.

Connect cables according to ISO 6722 of at least 1 m length to the terminals, with a nominal cross-sectional area of the conductor of 1,5 mm<sup>2</sup>.

Apply a current of 12 A d.c. to the cables and contacts connected in series.

For the test arrangement and areas of temperature measurements, see Figure 2.



#### Key

1 Load

<sup>a</sup> Areas of temperature measurement for temperature rise test (terminals as agreed between manufacturer and user).

**Figure 2 — Test arrangement**

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### 6.3.2 Requirement

The temperature rise measured after 1 h shall not exceed 16 K.

## 6.4 Connection resistance (voltage drop)

### 6.4.1 Test

Measure the voltage drop as shown in the test arrangement of Figure 2, after the tenth insertion of the connectors, with a current of 12 A d.c.

### 6.4.2 Requirement

The voltage drop shall not exceed 50 mV.

## 6.5 Withstand voltage

### 6.5.1 Test

Apply the test in accordance with ISO 8092-2 at a relative humidity of between 45 % and 75 %.

### 6.5.2 Requirement

No flash over or breakdown shall occur when applying the test voltage for 1 min.

## 6.6 Temperature/humidity cycling

### 6.6.1 Test

Apply the temperature/humidity test according to ISO 8092-2:2000, 4.10.1, at the class 1 test temperature [environmental temperature range of  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$ , and test temperature  $(85 \pm 2)\text{ }^{\circ}\text{C}$ ].

### 6.6.2 Requirement

After the test specified in 6.6.1, the sample shall fulfil subsequently performed tests according to 6.4 and 6.5.

## 6.7 Durability

### 6.7.1 Test

Apply a current of 12 A d.c. to a mated plug and socket, and perform 1 000 cycles of insertion and withdrawal at  $(18 \pm 1)$  cycles/min.

Measure the temperature rise at the hottest area of the contacts.

### 6.7.2 Requirement

For the test in 6.7.1, the contact temperature rise shall not exceed 16 K, and the voltage drop as shown in Figure 2 shall not exceed 70 mV.



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