
**Road vehicles — Connectors for the
electrical connection of towing and towed
vehicles — Connectors for electronically
monitored charging systems with 12 V or
24 V nominal supply voltage**

*Véhicules routiers — Raccords pour les connexions électriques des
véhicules tracteurs et des véhicules tractés — Raccords pour systèmes
de charge contrôlés électroniquement à tension d'alimentation nominale
de 12 V ou 24 V*



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Foreword

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Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Connectors for electronically monitored charging systems with 12 V or 24 V nominal supply voltage

1 Scope

This International Standard specifies dimensional characteristics, contact allocation, tests and requirements of 7-pole connectors for electrical connections of electronically monitored charging systems of towing and towed vehicles. The electronic monitoring system is designed to detect 12 V and 24 V nominal supply voltage and to limit the current to 50 A. This is a connector without breaking capacity.

This electrical connection is intended for use with separable truck-trailer combinations in order to connect an additional battery pack of the trailer with the generator of the truck using an electronically monitored charging system. Additional battery packs in trailers are basically used with tailgate lifts, electrical forklifts or other technical equipment with high current consumption.

This International Standard further specifies a park socket used to receive and store the plug when it is disconnected.

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 1185, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage*

ISO 3731, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage*

ISO 4009, *Commercial vehicles — Location of electrical and pneumatic connections between towing vehicles and trailers*

ISO 4091, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Definitions, tests and requirements*

ISO 4141-3, *Road vehicles — Multi-core connecting cables — Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables*

ISO 7638-1, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 1: Connectors for braking systems and running gear of vehicles with 24 V nominal supply voltage*

ISO 7638-2, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage*

ISO 12098, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 15-pole connector for vehicles with 24 V nominal supply voltage*

IEC 60512-13-5, *Connectors for electronic equipment — Tests and measurements — Part 13-5: Mechanical operation tests — Test 13e: Polarizing and keying method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4091 apply.

4 Dimensions

4.1 General

Details not specified are at the manufacturer's discretion.

The contacts shall be floating and shall align to the datum position when plug and socket are engaged.

4.2 Plug

Dimensions of the plug shall be as in Figure 1.

The locking lever design shall take into consideration the space required for screws used to fasten the socket (see section B-B in Figure 2).

4.3 Socket

Dimensions of the socket shall be as in Figure 2.

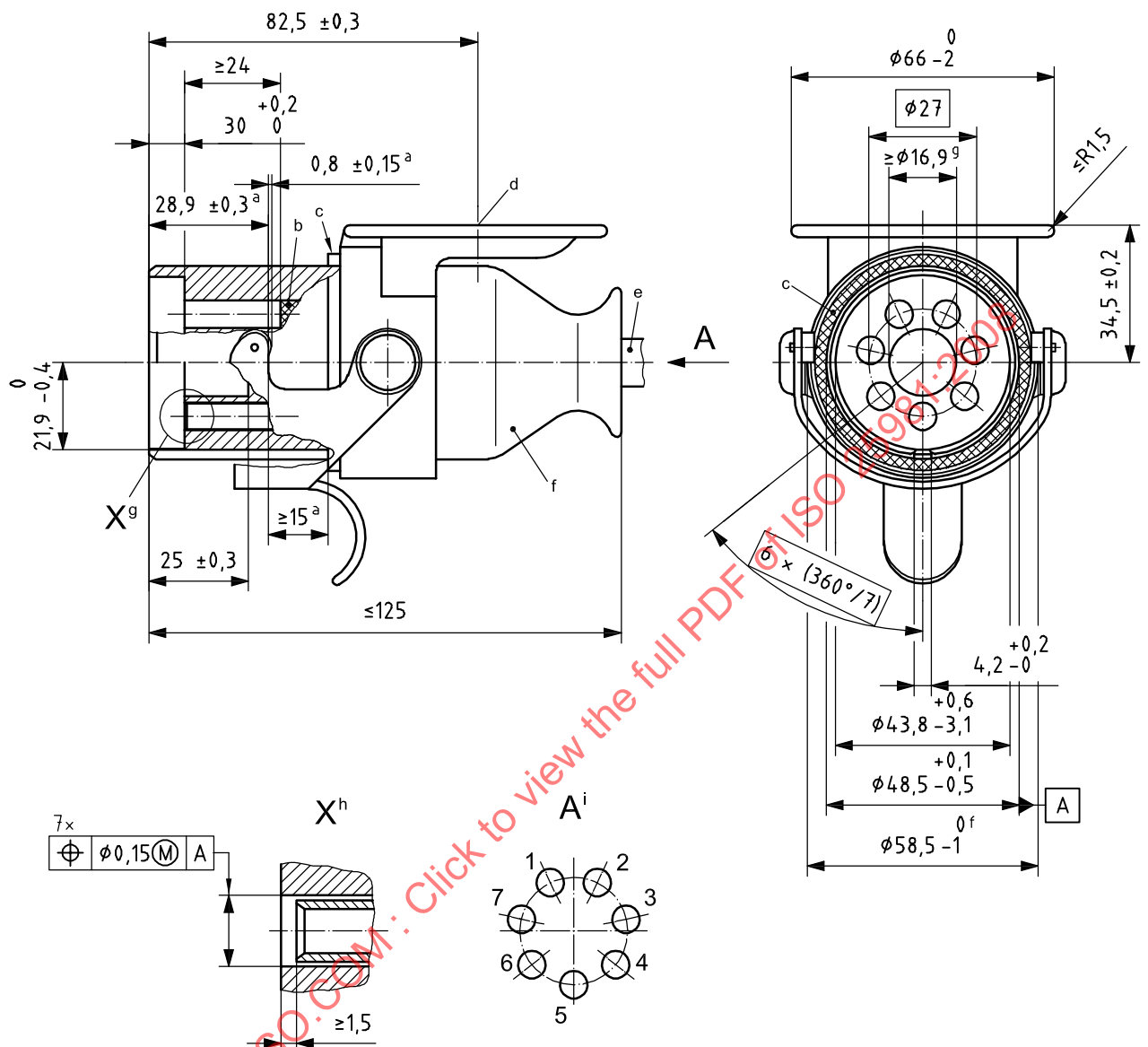
The cover is shown in opened position. It shall close automatically when the plug is disconnected.

4.4 Park socket

Dimensions of the park socket shall be as in Figure 3.

The cover is shown in closed position. It shall close automatically when the plug is disconnected.

Dimensions in millimetres



- a Dimension refers to the locking lever in its locked position.
- b Plug housing with 7 bushings and coding.
- c The sealing ring shall be mounted such that it cannot become detached under normal use.
- d Centre of cover rest.
- e See ISO 4141-3 for correct sealing.
- f Other housing designs are permitted in compliance with the maximum distance of 58 mm for the locking lever.
- g Contact bushing with 6,0 mm² terminal for contacts 1 to 4 and 1,0 mm² terminal for contacts 5 to 7.
- h Spring tube.
- i Contact numbers.

Figure 1 — Plug

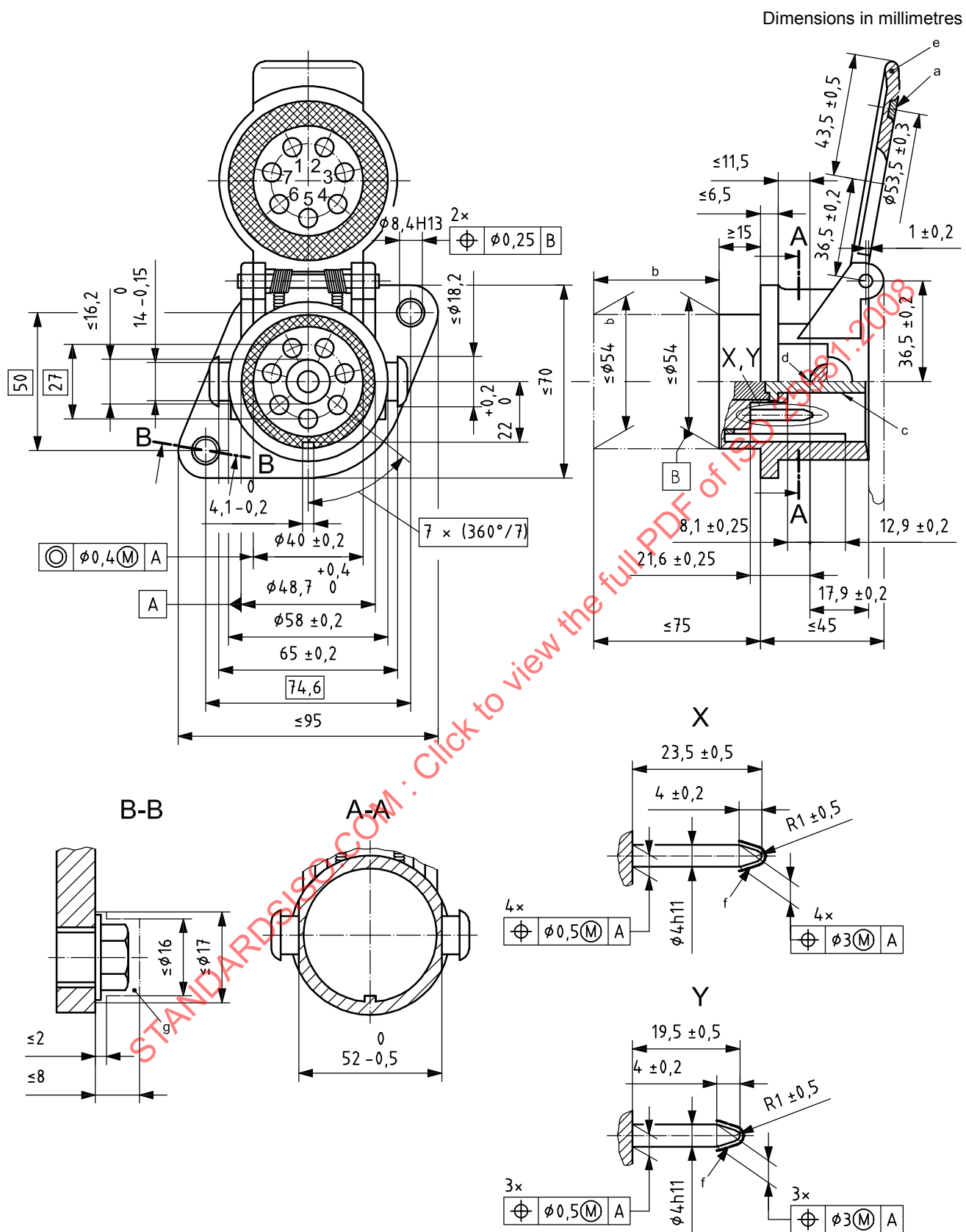


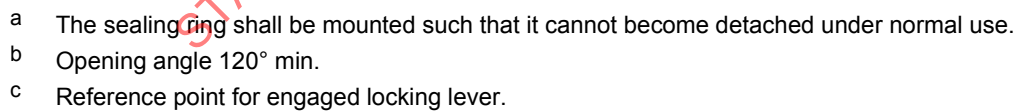
Figure 2 (continued)

Key

- X contacts 1 to 4 with 6,0 mm² terminal and 23,5 mm length
- Y contacts 5 to 7 with 1,0 mm² terminal and 19,5 mm length
- a The sealing ring shall be mounted such that it cannot become detached under normal use.
- b For existing products for which the cable outlet is mounted from the rear, the outside diameter of the outlet may be larger with the vehicle manufacturer's agreement. However, to ensure socket exchangeability, it is recommended to allow for future applications that the maximum outside diameter be 54 mm over a maximum length of 75 mm. See ISO 4141-3 for correct sealing.
- c Spring loaded ejector optional.
- d Reference point for engaged locking lever.
- e Opening angle of cover 120° min.
- f This area shall be smooth and burr free.
- g Minimum space required for screws used to fasten the socket.

Figure 2 — Socket

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5 Application of the connector

5.1 General

The connection shall be used only for those road vehicles that are equipped with an electronic monitoring device which recognises the system voltage, and which is able to prevent damages caused by wrong system voltage.

NOTE Annex A specifies the minimum functionality of the electronic monitoring device.

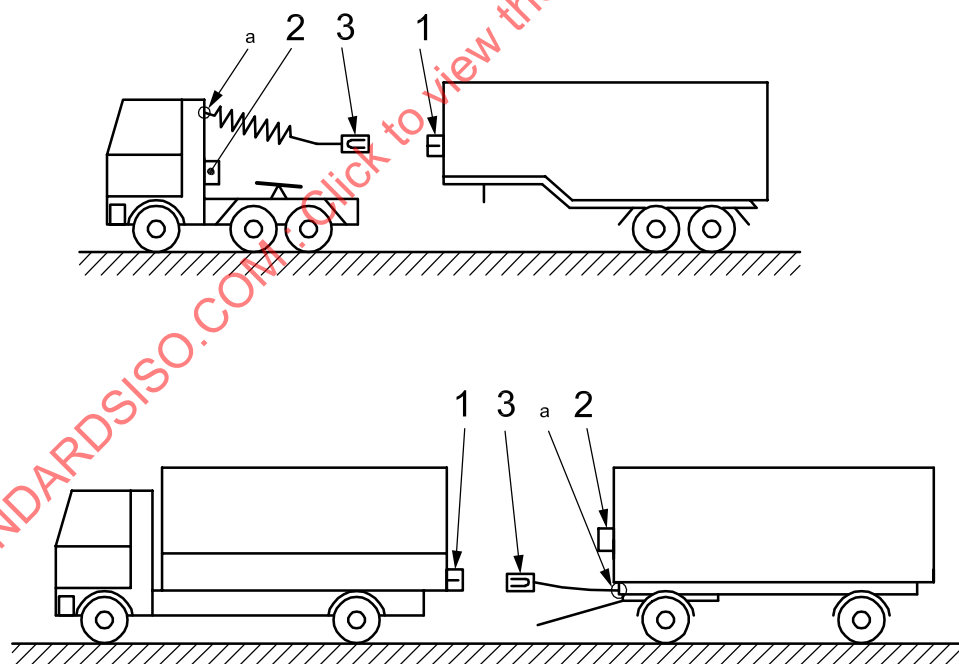
Coiled cable assemblies shall be fitted to:

- the tractor, in the case of an articulated vehicle (the coiled cable may be connected to the electrical on-board network of the towing vehicle, with or without the connection; see Figure 4);
- the trailer, in the case of a drawbar-trailer combination [therefore, the trailer towing vehicle (drawbar tractor) shall be fitted with a socket mounted at the rear of the vehicle; see Figure 4].

5.2 Connector positions and free space

The positions of the connectors shall comply with those specified for a 7-pin S connector (see ISO 3731) in accordance with ISO 4009. Free space around the connector shall comply with ISO 4009.

If this connector is used, the optional 7-pin N connector (see ISO 1185) shall be replaced by the 15-pin connector conforming to ISO 12098.



Key

- 1 socket
- 2 park socket
- 3 plug
- a See 5.1.

Figure 4 — Electrical connection positions

5.3 Contact allocation

The contact allocation shall be in accordance with Table 1.

Table 1 — Contact allocation

Contact No.	Function
1	Plus charging current; switched on electronically
2	Plus charging current; switched on electronically
3	Minus charging current
4	Minus charging current
5	Switched on minus, if platform is closed (control pin for switching on charging current and feedback signal for systems following quiescent current principle)
6	Switched on minus, if platform is opened (control pin for switching on charging current and feedback signal for systems following operating current principle)
7	Switched on minus for feedback signal, if tailgate lift of trailer is opened

5.4 Contact designation

The contact designation numbers shall be permanently marked on the inside of the socket cover and on the terminal faces of both plug and socket.

The character size shall not be less than 2 mm. However, where limited space is available, a smaller size may be used on the terminal face.

5.5 Terminals

The terminals on the rear side of the pins and tubes shall be capable of accepting cables with the following nominal cross-sectional areas:

- contacts 1, 2, 3 and 4: 6 mm²;
- contacts 5, 6 and 7: 1 mm².

Terminals accepting cables with different cross-sectional area shall be as agreed between manufacturer and user.

5.6 Connecting cable

The connecting cable shall meet the requirements of the applicable parts of ISO 4141.

5.7 Colouring of plug and socket

As a minimum requirement, the cover of the socket and the insert of the plug shall be coloured light grey.

6 Tests and specific requirements

6.1 General

Connectors conforming to this International Standard shall be tested as specified in ISO 4091 and shall fulfil the requirements of ISO 4091 unless otherwise specified in subclauses 6.2 to 6.5.