
**Road vehicles — Connectors for the
electrical connection of towing and towed
vehicles — 7-pole connector type 12 S
(supplementary) for vehicles with 12 V
nominal supply voltage**

*Véhicules routiers — Connecteurs pour liaisons électriques entre
véhicules tracteurs et véhicules tractés — Connecteur à 7 contacts de
type 12 S (supplémentaire) pour les véhicules à tension nominale
de 12 V*



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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 3732 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This fourth edition cancels and replaces the third edition (ISO 3732:1997), which has been technically revised.

Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage

1 Scope

This International Standard specifies the dimensions of, and requirements for, 7-pole connectors of type 12 S and their contact allocation for the electrical connection of towing (passenger cars or light commercial vehicles) and towed vehicles with 12 V nominal supply voltage, thus ensuring interchangeability. A 12 S connector is intended to be used in addition to a 12 N connector according to ISO 1724 where more than 7 poles are required.

NOTE For new developments and where more than 7 poles are required, as an alternative to the use of the 7-pole connector according to this International Standard and ISO 1724, the use of 13-pole connector in accordance with ISO 11446 ^[1] may be required.

2 Normative references

The following referenced documents are indispensable for 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 1103, *Road vehicles — Coupling balls for caravans and light trailers — Dimensions*

ISO 1724, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 12 N (normal) for vehicles with 12 V nominal supply voltage*

ISO 4091:2003, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Definitions, tests and requirements*

ISO 4141 (all parts), *Road vehicles — Multi-core connecting cables*

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.

Pins in sockets and plugs shall be slotted to allow compression over a minimum length of 8,5 mm when plug and socket are engaged.

4.2 Plug

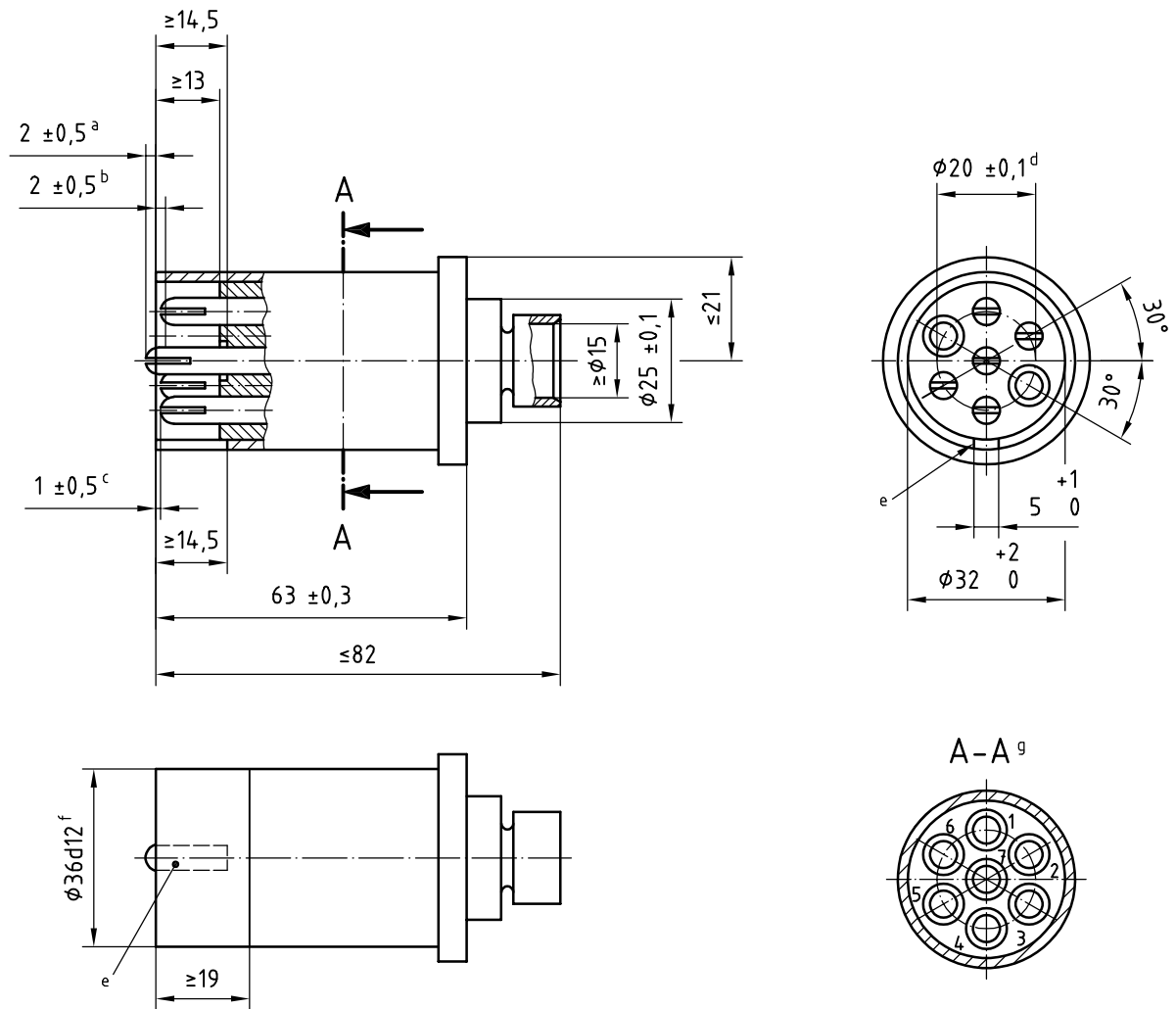
Dimensions of the plug shall be in accordance with Figure 1. The plug shall have five spring pins, numbered 1, 3, 4, 6 and 7, and two tubes, numbered 2 and 5.

4.3 Socket

Dimensions of the socket shall be in accordance with Figure 2. The socket shall have five tubes, numbered 1, 3, 4, 6 and 7, and two spring pins, numbered 2 and 5.

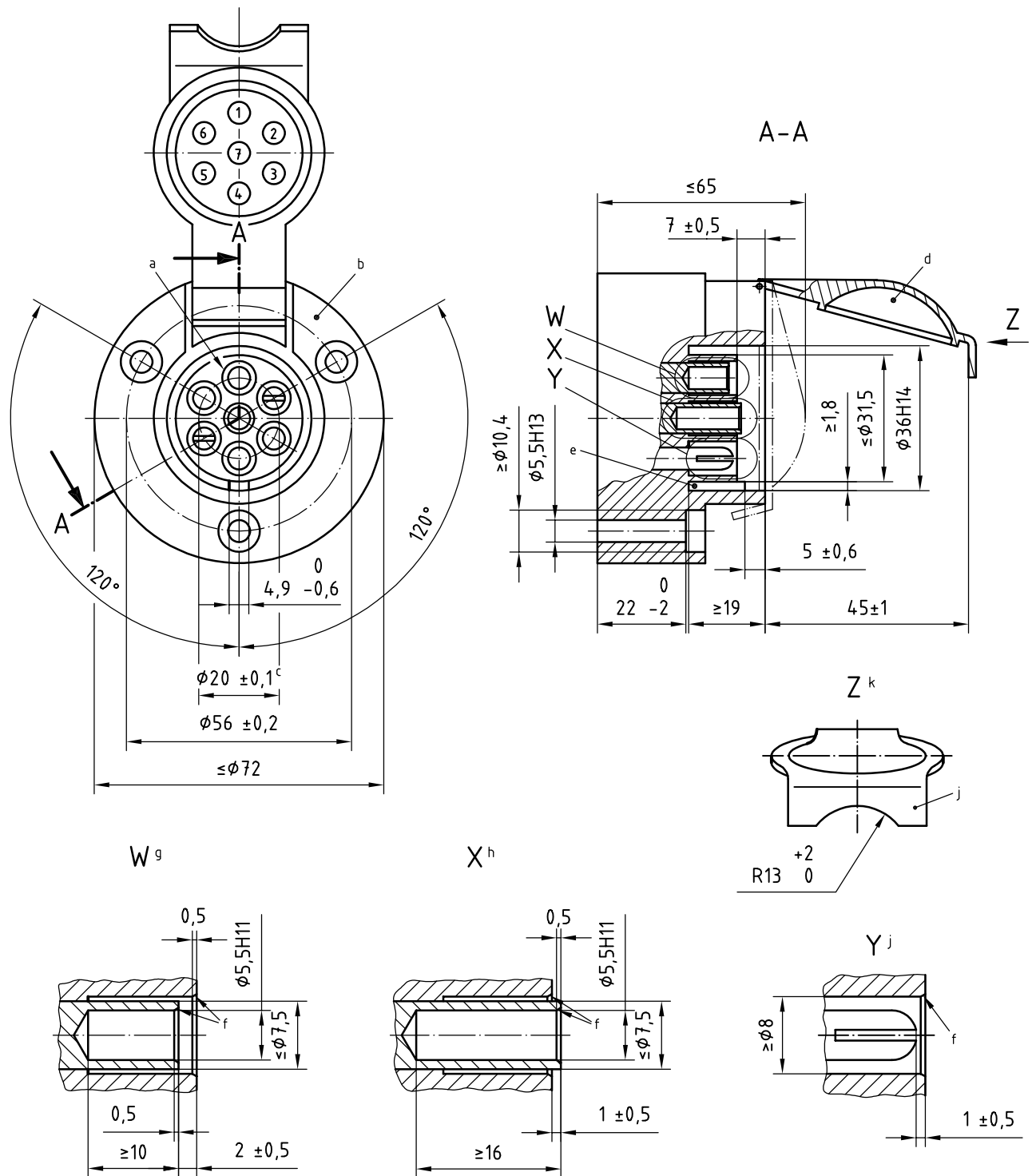
The cover is shown in the open position: it shall close automatically when the plug is disconnected.

Dimensions in millimetres



- a For Pin No. 7.
- b For the tubes.
- c For Pin Nos. 1, 3, 4 and 6.
- d Pitch circle diameter.
- e Slot for key.
- f For 19 min.
- g Rear view of the terminals.

Figure 1 — Plug



- a Contact No. 1.
- b Other housing designs are permitted provided that the dimensions are within the maximum diameter.
- c Pitch circle diameter.
- d Position of the cover with the plug engaged.
- e Key.
- f Chamfer 60° to 90° .
- g Tube Nos. 1, 3, 4 and 6.
- h Tube No. 7.
- i Pins.
- j Plug-retaining lip.
- k Cover view.

Figure 2 — Socket

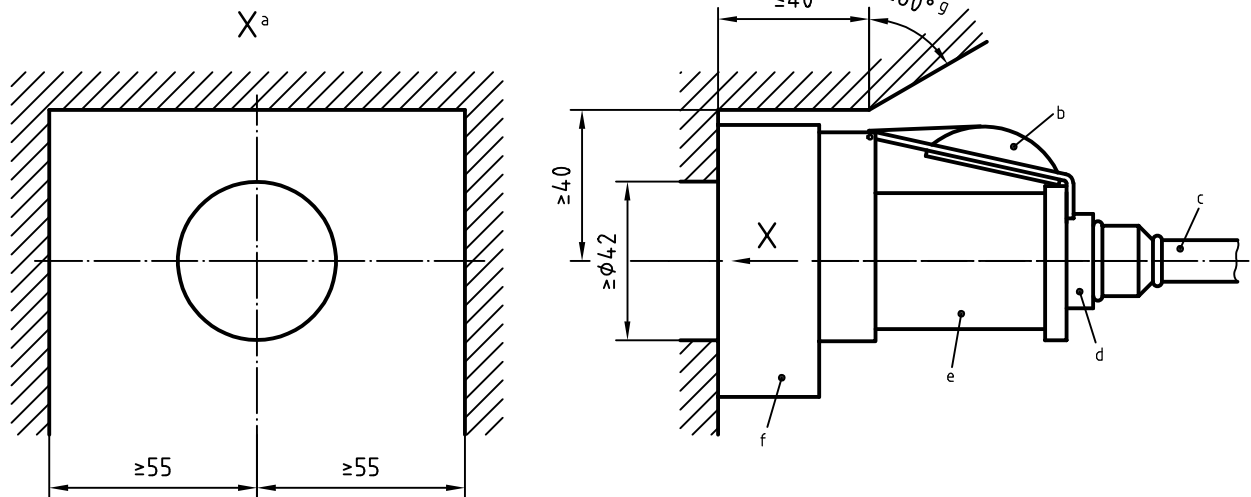
5 Application of the connector

5.1 Connector positions and free space

A socket shall be mounted at the rear of the towing vehicle and the position shall be in accordance with the dimensions necessary for the compatibility of mechanical coupling devices according to ISO 1103.

The minimum free space around the connection shall be in accordance with Figure 3.

Dimensions in millimetres



- a Horizontal free space.
- b Socket cover.
- c Connecting cable.
- d Attachment of the cable in the plug.
- e Plug.
- f Socket.
- g The angle of maximum 60° shall extend across the horizontal free space.

Figure 3 — Free space

5.2 Distinguishing marking

The 12 S connectors shall be distinguished from 12 N connectors (see ISO 1724) by means of a different colouring of at least the insulating parts. A light and permanent colour, preferably white, shall be used for the 12 S connectors.

5.3 Contact allocation

The contact allocation of the connector shall be in accordance with Table 1.

Table 1 — Contact allocation

Contact No.	Function	Core insulation colour (for information)
1	Reversing light ^a	Yellow
2	Reserved for future allocation	Blue
3	Return for Contact No. 4	White
4	Permanent power supply	Green
5	Reserved for future allocation	Brown
6	Power supply controlled by ignition switch	Red
7	Return for Contact No. 6	Black

^a The common return for the circuit of this contact will normally be by contact No. 3 of the 12 N connector according to ISO 1724.

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 at the rear side of the pins and tubes shall be capable of accepting cables with the following nominal cross-sectional areas.

- Contact Nos. 1 and 5: 1,5 mm².
- Contact Nos. 3, 4, 6 and 7: 2,5 mm².

5.6 Connecting cable

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

5.7 Protection of disconnected plug

A means of storing the plug when disconnected shall be provided on the towed vehicle, intended to protect the plug from the ingress of water or foreign bodies and from accidental damage.

6 Tests and specific requirements

6.1 General

Connectors in accordance with this International Standard shall be tested in the sequences given in Table 2. For test procedures, see ISO 4091. They shall meet the requirements of ISO 4091, except where specified differently in the following subclauses.

Table 2 — Test sequences

Test	Sample group				
	A	B	C	D	E
Visual examination	1, 8	1, 11	1, 8	1, 10	1, 11
Dimensional check	2				
Connection	3	2	2	2	2
Disconnection	7	10	7	9	9
Locking device and cable retention strength	4	3, 9		3, 8	3, 8
Lateral strength at low temperature	6				
Current carrying capacity			4		
Connection resistance		4, 7	3, 6	4, 7	4, 7
Current cycling			5		
Withstand voltage		5, 8		6	5, 10
Static load	5				
Endurance					6
Temperature/humidity cycling		6			
Salt spray				5	

6.2 Locking device and cable retention strength

Perform the locking device and cable retention strength test according to ISO 4091. Apply the specified force to the cable retention only of a disengaged plug. Apply a force of (250 ± 5) N.

6.3 Connection and disconnection

Perform the connection and disconnection tests according to ISO 4091.

The connection forces shall be ≤ 200 N, and the disconnection force shall be between 50 N and 200 N.

6.4 Salt spray

Perform the salt spray test according to ISO 4091:2003, except that arrangements b) and c) shall not apply.

6.5 Temperature/humidity cycling

Perform the temperature/humidity cycling test according to ISO 4091:2003, but with Steps d) to g) modified as follows:

...

d) Lower t_c to (-25 ± 2) °C within 2,5 h.

e) Hold t_c at (-25 ± 2) °C for 2 h.

f) Raise t_c to (75 ± 2) °C within 1,5 h.

g) Hold t_c at (75 ± 2) °C for 2 h.

6.6 Endurance

Perform the endurance test according to ISO 4091, but for 1 000 cycles only.

Bibliography

- [1] ISO 11446¹⁾, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 13-pole connectors for vehicles with 12 V nominal supply voltage*

1) To be published. (Revision of ISO 11446:1995)

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