INTERNATIONAL STANDARD

ISO 10599-2

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Car radios — Coaxial aerial connectors —

Part 2: Characteristic values, performance requirements and tests

Autoradios — Connecteurs coaxiaux d'antenne —

Partie 2: Valeurs caractéristiques, performances et essais

Reference number
ISO 10599-2:1997(E)

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.

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.

International Standard ISO 10599-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles.*

ISO 10599 consists of the following parts, under the general title *Car radios — Coaxial aerial connectors*:

— *Part 1: Dimensions*

— *Part 2: Characteristic values, performance requirements and test*

Annex A of this part of ISO 10599 is for information only.

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Car radios — Coaxial aerial connectors —

Part 2:
Characteristic values, performance requirements and tests

1 Scope

This part of ISO 10599 specifies characteristic values, performance requirements and test methods for coaxial antenna connectors according to ISO 10599-1 for car radios to be mounted in road vehicles.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10599. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10599 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications.*

ISO 10599-1:1992, *Car radios — Coaxial antenna connectors — Part 1: Dimensions.*

IEC 169-1:1987, *Radio-frequency connectors — Part 1: General requirements and measuring methods.*

3 Characteristic values

3.1 Test class

Coaxial aerial connectors according to ISO 10599-1 shall be in conformance with the test class 40/085/04, as specified in IEC 68-1:1988, annex A, and explicitly presented in table 1.

NOTE — The first two digits of the test class indicate the lowest operating temperature, i.e. – 40 °C, according to IEC 68-2-1. The following three digits indicate the highest environmental temperature, i.e. + 85 °C according to IEC 68-2-2, and the last digit indicates the duration of test in days, i.e. 4 days, according to IEC 68-2-3.

Table 1 — Test class

Limiting temperature		Damp heat, steady state		
lowest	highest	Temperature °C	Relative humidity %	Test duration days
– 40 °C	+ 85 °C	+ 55	96 to 99	4

3.2 Coupling resistance

The coupling resistance (R_k) shall be maximum 10^{-2} Ω/m, or minimum 40 dB. This shall be tested and measured according to figure 1.

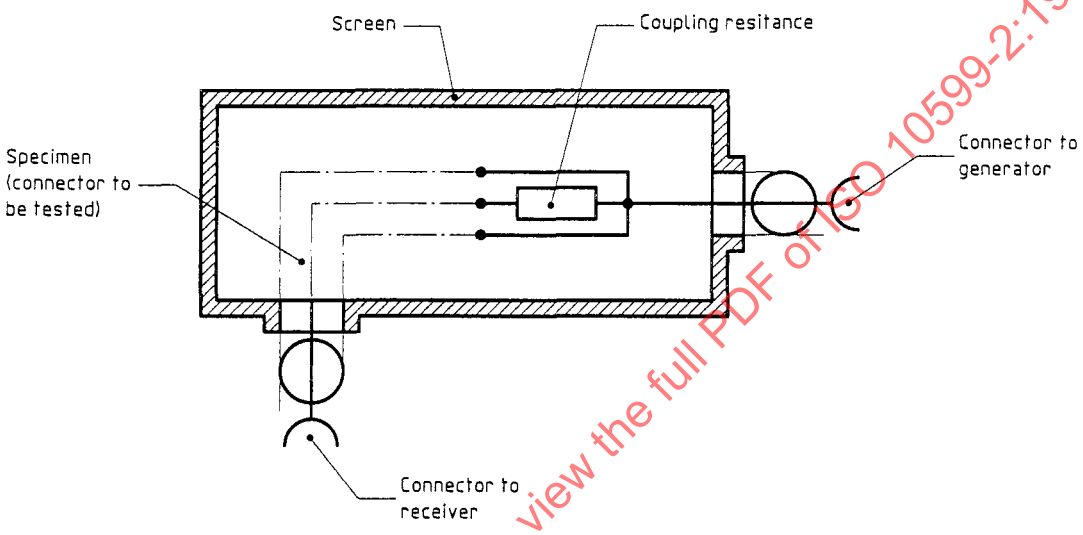


Figure 1 — Test device for measuring the coupling resistance

4 Test equipment

4.1 Gauges

The gauges for testing the outer sleeve of the aerial connector plug shall be in accordance with the dimensions and specifications given in figure 2 and table 2.

The gauges form testing the centre sleeve of the aerial connector socket shall be in accordance with the dimensions and specifications given in figure 3 and table 3.

4.2 Set-up for measuring the contact resistance

The contact resistance shall be measured according to

— figure 4 a) for the centre sleeve of the aerial connector socket,
— figure 4 b) for the outer sleeve of the aerial connector plug, and
— figure 4 c) for the contact of the mated aerial.

Dimensions in millimetres
Surface roughness values in micrometres
General tolerance: ISO 2768-m

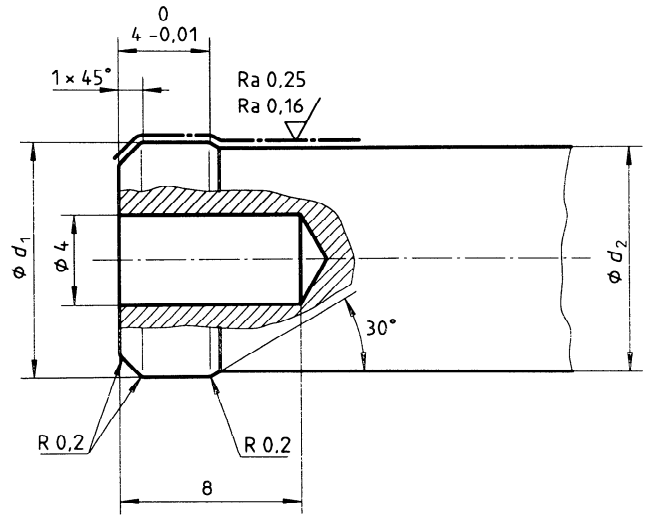


Figure 2 — Gauges for testing the outer sleeve of the plug

Table 2 — Dimensions of the gauges for testing the outer sleeve of the plug

Dimensions in millimetres

Gauge type	Purpose of the gauge	d_1	d_2	Material
P1	Widening of the outer sleeve of the plug	$10{,}6\ ^{+0{,}01}_{0}$	$10{,}1\ ^{+0{,}01}_{0}$	Gauge steel, hardened
P2	Measurement of insertion and withdrawal forces	$10{,}4\ ^{0}_{-0{,}01}$	$10\ ^{0}_{-0{,}01}$	Gauge steel, hardened
P3	Measurement of the contact resistance	$10{,}4\ ^{0}_{-0{,}01}$	$9{,}9\ ^{0}_{-0{,}01}$	Copper-beryl alloy, rhodium coated

Dimensions in millimetres
Surface roughness values in micrometres

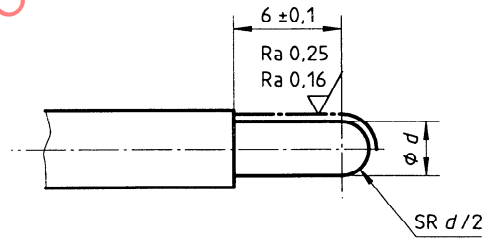


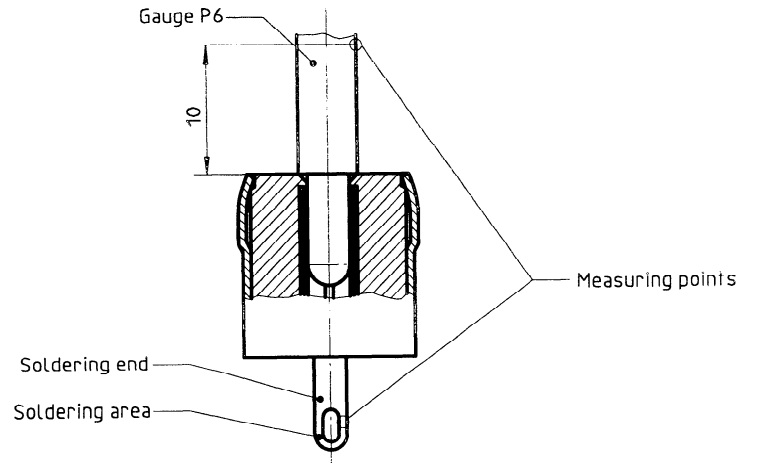
Figure 3 — Gauges for testing the centre sleeve of the socket

Table 3 — Dimensions of the gauges for testing the centre sleeve of the socket

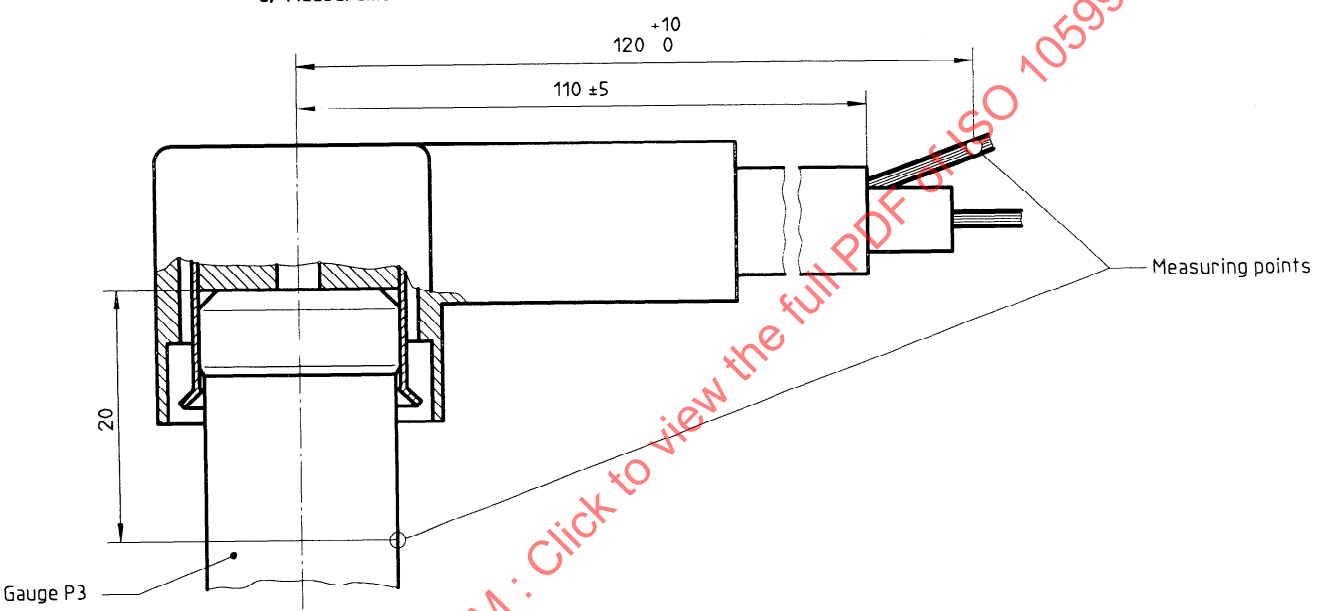
Dimensions in millimetres

Gauge type	Purpose of the gauge	d	Material
P4	Widening of the centre sleeve of the socket	$2{,}4\ ^{+0{,}01}_{0}$	Gauge steel hardened
P5	Measurement of insertion and withdrawal forces	$2{,}35\ ^{0}_{-0{,}01}$	Gauge steel, hardened
P6	Measurement of the contact resistance	$2{,}35\ ^{0}_{-0{,}01}$	Copper-beryl alloy, rhodium coated

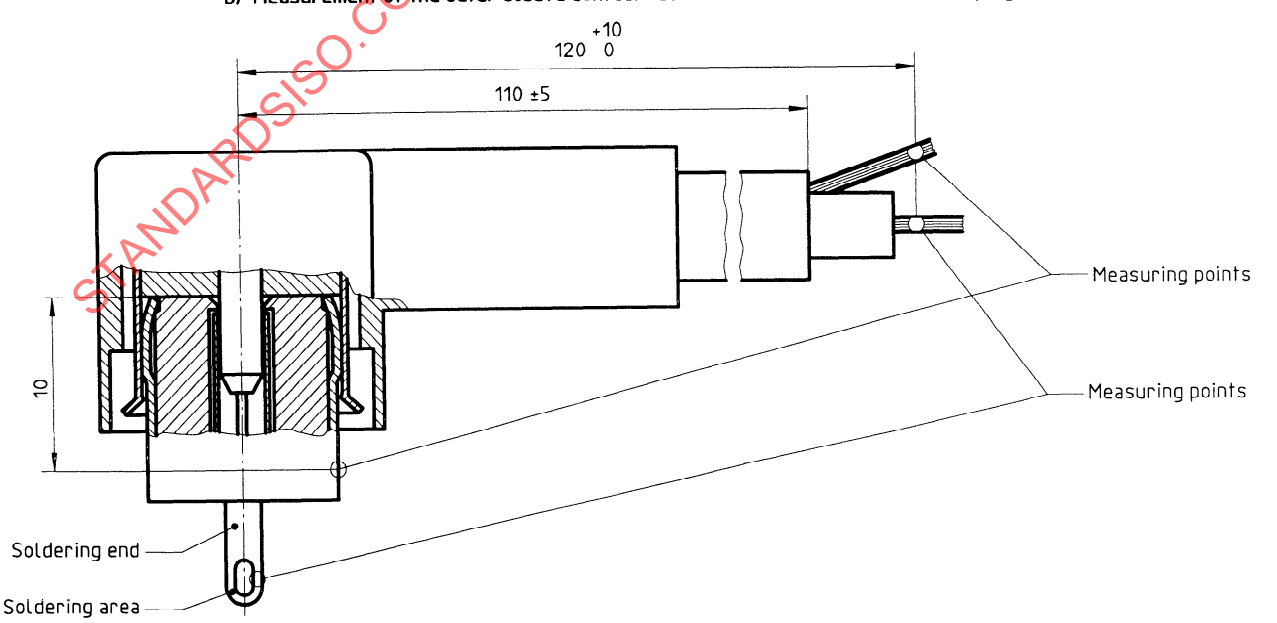
Dimensions in millimetres



a) Measurement of the centre sleeve contact resistance of the aerial connector socket



b) Measurement of the outer sleeve contact resistance of the aerial connector plug



c) Measurement of the contact resistance of the mated aerial connector

Figure 4 — Set-up for measuring the contact resistance

5 Test plan and performance requirements

Each test sequence specified from 5.2 to 5.5 is independent and shall be conducted using at least five pairs of plugs and sockets in accordance with ISO 10599-1, having passed the examinations specified in 5.1.

For the soldering test (5.6), use additionally at least five sockets.

Nº	Test	Test method	Performance requirements
5.1 Initial examination			
5.1.1	Visual examination	IEC 169-1:1987, clause 12.	See IEC 169-1:1987, clause 12.
5.1.2	Dimensional check	IEC 169-1:1987, clause 13.	See IEC 169-1:1987, clause 13.
5.1.3	Contact resistances	IEC 169-1:1987, subclause 14.3.	
	a) Centre sleeve of the socket	Use P6 gauge and the measurement set-up shown in figure 4 a).	Maximum resistance: 20 mΩ
	b) Outer sleeve	Use P3 gauge and the measurement set-up shown in figure 4 b).	Maximum resistance: 20 mΩ
	c) Mated connector	Use the measurement set-up shown in figure 4 c).	Maximum resistance: centre contact: 20 mΩ outer contact: 20 mΩ
5.1.4	Insulation resistance	IEC 169-1:1987, subclause 14.5.	Minimum resistance: 10 mΩ
5.2 Test sequence 1			
5.2.1	Effectiveness of clamping device against cable pulling	IEC 169-1:1987, subclause 15.4.3. Apply the following pulling force for 1 min in the axial direction of the cable: — cables with solid dielectric: 150 N — other dielectric[1]: 100 N	See IEC 169-1:1987, subclause 15.4.3.2.
5.2.2	Gauge retention force (resilient contacts)	IEC 169-1:1987, subclause 15.2.3.	
	a) Centre sleeve of the connector socket	Use P4 and P5 gauges.	Insertion force: 10 N max. Withdrawal force: 0,8 N min.
	b) Outer sleeve of the aerial connector plug	Use P1 and P2 gauges.	Insertion force: 20 N min. 70 N max. Withdrawal force: 20 N min. 60 N max.
5.2.3	Engagement and separation forces	IEC 169-1:1987, subclause 15.3.	Engagement force: 20 N min. 50 N max. Separation force: 15 N min. 40 N max.
5.2.4	Dry heat	IEC 169-1:1987, subclause 16.2.1: for 16 h at 85 °C test temperature, then measure the separation force according to IEC 169-1:1987, subclause 15.3, immediately after the insulation resistance measurements.	Insulation resistance measured at test temperature: 10 mΩ min. Separation force at test temperature: 10 N min. 40 N max.

No	Test	Test method	Performance requirements
5.2.5	Cyclic damp heat and cold test	Carry out a damp heat test according to IEC 169-1:1987, subclause 16.2.2, performing 1 cycle only. Follow with a cold test according to IEC 169-1:1987, subclause 16.2.3 for 2 h at – 40 °C. Measure the insulation resistance according to IEC 169-1:1987, subclause 14.5 and the contact resistance according to IEC 169-1:1987, subclause 14.3, using the gauges indicated in 5.1.3.	Insulation resistance: 10 MΩ min. Maximum resistance: centre contact: 20 mΩ outer contact: 20 MΩ
5.2.6	Vibration test	IEC 169-1:1987, subclause 15.2.2, from 55 Hz to 500 Hz, with an acceleration of 5g. Perform 10 cycles with a 1 octave/min frequency alteration, with the cable fixed 100 mm from the connector axis by a clamp.	See IEC 169-1:1987, subclause 15.2.2.
5.2.7	Visual examination	IEC 169-1:1987, clause 12.	See IEC 169-1:1987, clause 12.
5.3 Test sequence 2			
5.3.1	Steady state damp heat	IEC 169-1:1987, subclause 16.3, at + 55 °C, under 96 % to 99 % relative humidity for 4 days, then measure the insulation resistance in accordance with IEC 169-1:1987, subclause 14.5 and the contact resistance in accordance with IEC 169-1:1987, subclause 14.3.	Minimum insulation resistance: 1 MΩ Maximum resistance: centre contact: 20 mΩ outer contact: 20 mΩ
5.3.2	Visual examination	IEC 169-1:1987, clause 12.	See IEC 169-1:1987, clause 12.
5.4 Test sequence 3			
5.4.1	Mechanical endurance	IEC 169-1:1987, clause 17: Number of operations: 50 Frequency of operations: 10 min^{-1} Minimum break time between two operations: 2 s. then measure the engagement and separation forces in accordance with IEC 169-1:1987, subclause 15.3, and the contact resistance in accordance with IEC 169-1:1987, subclause 14.3.	Engaging force: 20 N min. 60 N max. Separation force: 15 N min. 70 N max. Maximum resistance: centre contact: 20 mΩ outer contact: 20 mΩ
5.5 Test sequence 4			
5.5.1	Sulphur dioxide test	IEC 169-1:1987, subclause 16.9, for 4 days, then measure the insulation resistance in accordance with IEC 169-1:1987, subclause 14.5, and the contact resistance in accordance with IEC 169-1:1987, subclause 14.3.	Insulation resistance: 10 MΩ min. Maximum resistance: centre contact: 20 mΩ outer contact: 20 mΩ
5.6 Soldering test			
5.6.1	Soldering	IEC 169-1:1987, subclause 15.2.1, using a size B soldering iron.	See IEC 169-1:1987, subclause 15.2.1

1) For example, cable with foamed dielectric or tube-like dielectric.

Annex A
(informative)

Bibliography

[1] IEC 68-1:1988, *Environmental testing — Part 1: General and guidance.*

[2] IEC 68-2-1:1990, *Environmental testing — Part 2: Tests — Tests A: Cold.*

[3] IEC 68-2-2:1974, *Environmental testing — Part 2: Tests — Tests B: Dry heat.*

[4] IEC 68-2-3:1969, *Environmental testing — Part 2: Tests — Test Ca: Damp heat, steady state.*

[5] IEC 96-1:1986, *Radio-frequency cables — Part 1: General requirements and measuring methods.*