

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Radio-frequency connectors –
Part 67: Sectional specification for series TRL threaded triaxial connectors**

**Connecteurs pour fréquences radioélectriques –
Partie 67: Spécification intermédiaire relative aux connecteurs triaxiaux filetés
de série TRL**



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The text of this International Standard is based on the following documents:

Draft	Report on voting
46F/599/FDIS	46F/609/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts of the IEC 61169 series, under the general title *Radio frequency connectors* can be found on the IEC website.

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RADIO-FREQUENCY CONNECTORS –

Part 67: Sectional specification for series TRL threaded triaxial connectors

1 Scope

This part of IEC 61169, which is a sectional specification (SS), provides information and rules for the preparation of detail specifications (DS) for series TRL threaded triaxial connectors. Series TRL threaded triaxial connectors with high reliability, small size, good salt characteristics can be connected with symmetrically twisted pair cables or triaxial cables. It has been used in 1553B data bus systems or other communication systems for digital signal transmission.

It specifies mating face dimensions for series TRL threaded triaxial connectors, gauging information and tests selected from IEC 61169-1, applicable to all detail specifications relating to series TRL threaded triaxial connectors.

This specification indicates recommended performance characteristics to be considered when writing a detail specification and it covers test schedules and inspection requirements for assessment levels M and H.

NOTE Metric dimensions are original dimensions. All undimensioned pictorial configurations are for reference purpose only.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 61169-1:2013, *Radio frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

IEC 61169-1-5, *Radio frequency connectors – Part 1-5: Electrical test methods – Rise time degradation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61169-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

coaxial pin contact

connecting part with a coaxial structure, the outer conductor of which is a pin and the inner conductor is a socket

3.2

coaxial socket contact

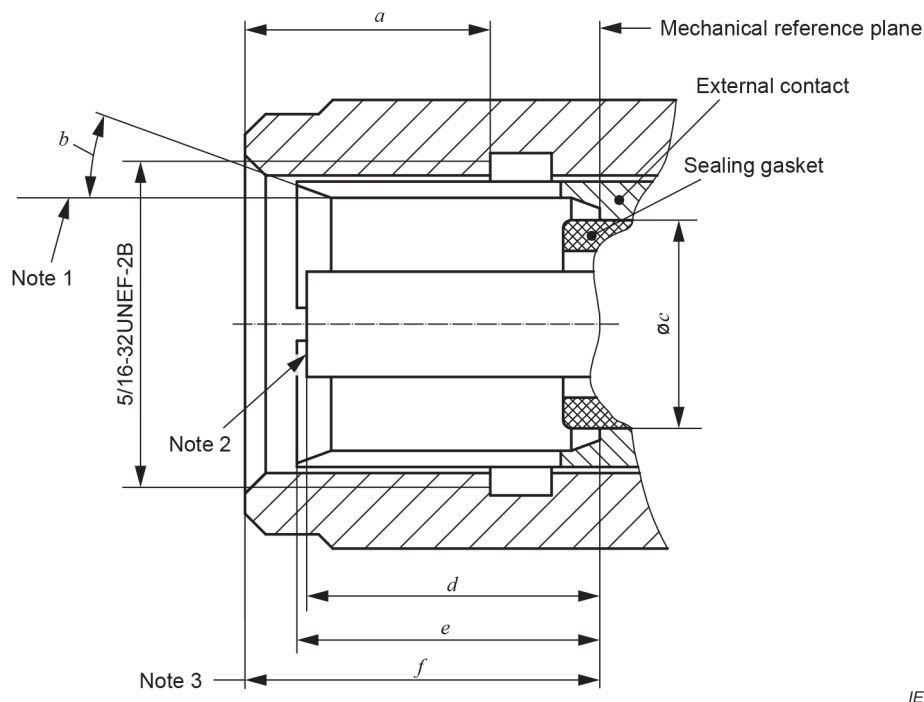
connecting part with a coaxial structure, the outer conductor of which is a socket and the inner conductor is a pin

4 Mating face and gauge information

4.1 Mating face dimensions

4.1.1 Plug connector

The mating face of the plug connector is shown in Figure 1 and its dimensions are shown in Table 1.



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NOTE 1 Slot design of alignment fingers is optional.

NOTE 2 See Figure 3 and Figure 4 for coaxial contact requirements.

NOTE 3 Dimensions in fully mated state.

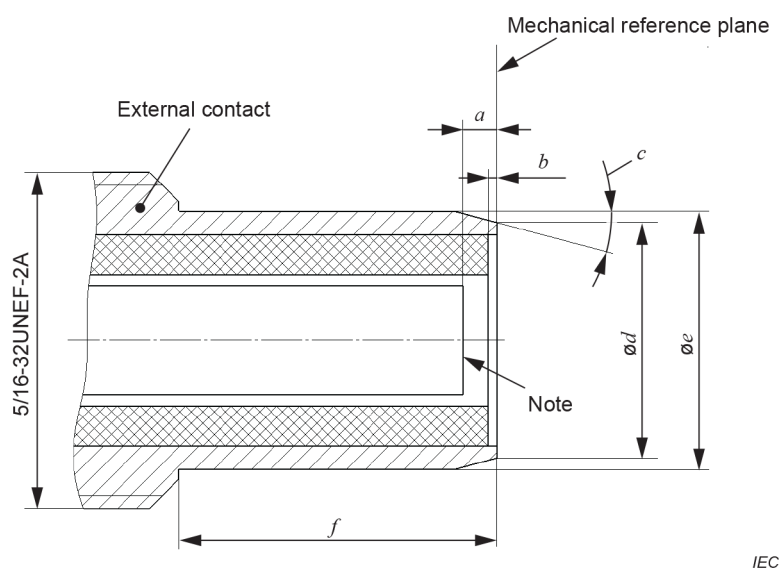
Figure 1 – Plug connector

Table 1 – Dimensions of plug connector

Ref.	mm	
	Min.	Max.
<i>a</i>	5,00	-
<i>b</i>	13°	21°
<i>c</i>	-	5,10
<i>d</i>	6,30	8,25
<i>e</i>	6,20	7,70
<i>f</i>	10,00	10,60

4.1.2 Receptacle connector

The mating face of the receptacle connector is shown in Figure 2 and its dimensions are shown in Table 2.



NOTE See Figure 3 and Figure 4 for coaxial contact requirements.

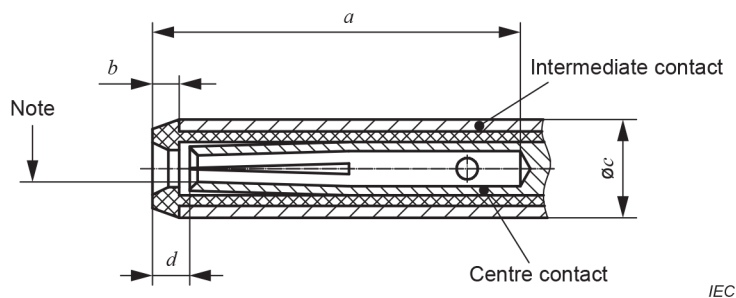
Figure 2 – Receptacle connector

Table 2 – Dimensions of receptacle connector

Ref.	mm	
	Min.	Max.
<i>a</i>	0,25	-
<i>b</i>	-	0,45
<i>c</i>	14°	22°
<i>d</i>	5,33	5,56
<i>e</i>	6,04	6,12
<i>f</i>	7,70	7,80

4.1.3 Coaxial pin contact

The mating face of the coaxial pin contact is shown in Figure 3 and its dimensions are shown in Table 3.



NOTE Slot design is optional.

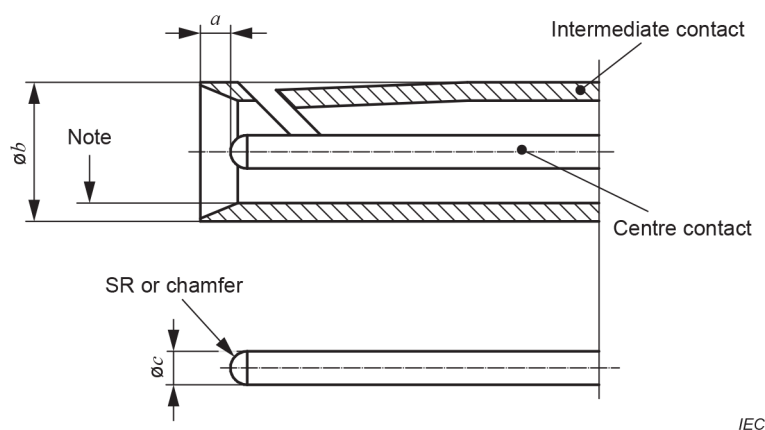
Figure 3 – Coaxial pin contact

Table 3 – Dimensions of coaxial pin contact

Ref.	mm	
	Min.	Max.
<i>a</i>	7,09	-
<i>b</i>	0,35	-
<i>c</i>	1,82	1,88
<i>d</i>	1,00	1,55

4.1.4 Coaxial socket contact

The mating face of the coaxial socket contact is shown in Figure 4 and its dimensions are shown in Table 4.



NOTE Slot design is optional.

Figure 4 – Coaxial socket contact

Table 4 – Dimensions of coaxial socket contact

Ref.	mm	
	Min.	Max.
<i>a</i>	0,18	0,99
<i>b</i>	-	2,70
<i>c</i>	0,58	0,64

4.2 Gauges for resilient contact

4.2.1 Gauge for socket centre contact

The gauge for socket centre contact of connector is shown in Figure 5 and its dimensions are shown in Table 5.

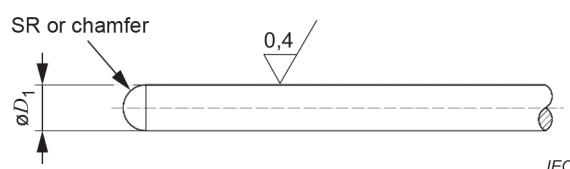


Figure 5 – Gauge for socket centre contact

Table 5 – Dimensions of gauge for socket centre contact

Ref.	Gauge A (For sizing purpose)		Gauge B (For insertion purpose)		Gauge C (For separation purpose)	
	Min.	Max.	Min.	Max.	Min.	Max.
D_1	0,623	0,628	0,623	0,628	0,592	0,597
Material: steel, polished.						

Test procedure is as follows.

a) Sizing test

Gauge A shall be inserted into the socket centre contact of the connector three times with a minimum insertion depth of 5,2 mm. This is a sizing operation.

b) Insertion test

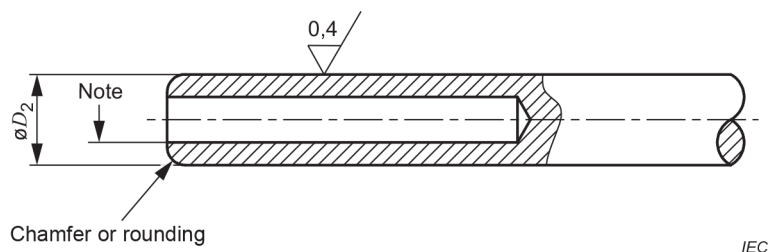
Following the sizing operation, if specified in the detail specification, gauge B shall be axially inserted into the socket centre contact of the connector with a minimum insertion depth of 5,2 mm. When this test is required, the insertion force shall not exceed 1,67 N.

c) Separation test

After the insertion test, gauge C shall be axially inserted into the socket centre contact of the connector with a minimum insertion depth of 5,2 mm and then be separated. The separation force shall not be less than 0,14 N.

4.2.2 Gauge for socket intermediate contact

The gauge for socket intermediate contact of the connector is shown in Figure 6 and its dimensions are shown in Table 6.



NOTE Hole design is optional.

Figure 6 – Gauge for socket intermediate contact

Table 6 – Dimensions of gauge for socket intermediate contact

Ref.	Gauge A (For sizing purpose)		Gauge B (For insertion purpose)		Gauge C (For separation purpose)	
	Min.	Max.	Min.	Max.	Min.	Max.
D_2	1,880	1,885	1,880	1,885	1,815	1,829
Material: steel, polished.						

Test procedure is as follows.

a) Sizing test

Gauge A shall be inserted into the socket intermediate contact of the connector three times with a minimum insertion depth of 5,7 mm. This is a sizing operation.

b) Insertion test

Following the sizing operation, if specified in the detail specification, gauge B shall be axially inserted into the socket intermediate contact of the connector with a minimum insertion depth of 5,7 mm. When this test is required, the insertion force shall not exceed 5,56 N.

c) Separation test

After the insertion test, gauge C shall be axially inserted into the socket intermediate contact of the connector with minimum insertion depth of 5,7 mm and then be separated. The separation force shall not be less than 0,56 N.

5 Quality assessment procedure

5.1 General

Subclauses 5.2 and 5.3 provide recommended ratings, performance and test conditions to be considered when writing a detail specification (DS). They also provide an appropriate schedule of tests with minimum levels of conformance inspection sampling, together with the pro-forma blank detail specification (BDS) and instructions for the preparation of a detail specification.

5.2 Ratings and characteristics

The values indicated below are recommended for TRL series threaded triaxial connectors and are given for the writer of the detail specification. They are applicable for the condition when the connectors are fully mated.

Certain tests will usually not be required. When these tests are required, appropriate values shall be entered in the detail specification at the discretion of the specification writer.

Rating and characteristics are given in Table 7.

Table 7 – Ratings and characteristics

Rating and characteristics	IEC 61169-1: 2013 Subclause	Value	Remarks, deviation from standard test method
Electrical			
Nominal impedance		Not required	
Frequency range		DC~5 MHz	
Working voltage		300 V RMS	
Working current		3 A	
Contact resistance ^a	9.2.3		
Contact resistance of centre contact ^a	9.2.3		
– initial		≤35,0 mΩ	
– after environmental tests		≤40,0 mΩ	
Contact resistance of intermediate contact ^a	9.2.3		
– initial		≤35,0 mΩ	
– after environmental tests		≤40,0 mΩ	
Contact resistance of external contact ^a	9.2.3		
– initial		≤8,0 mΩ	
– after environmental tests		≤12,0 mΩ	
Insulation resistance in normal state	9.2.5		
– between centre contact and intermediate contact		≥5 000 MΩ	
– between intermediate contact and external contact		≥5 000 MΩ	
Insulation resistance after environmental test	9.2.5		
– between centre contact and intermediate contact		≥100 MΩ	
– between intermediate contact and external contact		≥100 MΩ	
Proof voltage ^{b c} at sea level	9.2.6		(86 to 100) kPa, or the lower proof voltage of cable dielectric
– between centre contact and intermediate contact		900 V	
– between intermediate contact and external contact		900 V	
Proof voltage ^{b c} at 4,4 kPa	9.2.6		4,4 kPa approximately equivalent to 20 km, or the lower proof voltage of cable dielectric
– between centre contact and intermediate contact		200 V	
– between intermediate contact and external contact		200 V	

Rating and characteristics	IEC 61169-1: 2013 Subclause	Value	Remarks, deviation from standard test method
Proof voltage ^{b c} at sea level after environmental test	9.2.6		(86 to 100) kPa, or the lower proof voltage of cable dielectric
– between centre contact and intermediate contact		200 V	
– between intermediate contact and external contact		200 V	
Rise time degradation	IEC 61169-1-5	<400 ps	When customers require
Mechanical			
Soldering	9.3.2	See DS	
Contact captivation	9.3.5		
– centre contact		10 N	Displacement shall not exceed 0,8 mm
– intermediate contact		45 N	Displacement shall not exceed 0,8 mm
Engagement and separation forces	9.3.6		
– axial force		≤15 N	
Torque			
– before environmental test		≤0,57 N·m	
– after environmental test		≤0,86 N·m	
Strength of coupling mechanism (only for plug connector)	9.3.11	≤445 N	
Cable retention			
– cable rotation	9.3.7	See DS	
– cable pulling	9.3.8	See DS	
– cable bending	9.3.9	See DS	
– cable torsion	9.3.10	See DS	
Safety wire hole pull-out bending moment	9.3.12	See DS	
Bump	9.3.13	na ^d	
Vibration	9.3.3	200 m/s ² , (10 to 2 000) Hz	20 g acceleration
Shock (specified pulse)	9.3.14	500 m/s ² , terminal- peak sawtooth wave, 11 ms	50 g acceleration
Environmental			
Climatic category	9.4.2	A: 40/85/21 B: 55/125/21 C: 55/155/56	
Damp heat, steady state	9.4.3	See DS	
Rapid change of temperature	9.4.4	See DS	
Sealing – non-hermetic sealed connectors	9.4.7	na ^d	(100 to 110) kPa pressure differential
Sealing – hermetically sealed connectors	9.4.8	na ^d	(100 to 110) kPa pressure differential
Water immersion	9.4.9	na ^d	
Salt mist	9.4.10	96 h	