IEC 61169-17

Edition 1.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Radio-frequency connectors –
Part 17: Sectional specification for RF coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with screw coupling – Characteristic impedance 50 ohms (Type TNC)

Connecteurs pour fréquences radioélectriques –
Partie 17: Spécification intermédiaire relative aux connecteurs RF coaxiaux à couplage à vis avec conducteur extérieur présentant un diamètre intérieur de 6,5 mm (0,256 in) – Impédance caractéristique de 50 ohms (type TNC)

IEC 61169-17:2022-03(en-fr)

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IEC 61169-17 has been prepared by subcommittee 46F: RF and microwave passive components, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is an International Standard.

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

Draft	Report on voting
46F/603/FDIS	46F/615/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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

RADIO-FREQUENCY CONNECTORS –

Part 17: Sectional specification for RF coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with screw coupling – Characteristic impedance 50 ohms (Type TNC)

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 TNC RF coaxial connectors with threaded coupling with a characteristic impedance of 50 Ω.

This document prescribes mating face dimensions for high performance connectors – grade 2, dimensional details of standard test connectors − grade 0, gauging information and tests selected from IEC 61169-1, applicable to all detail specifications relating to series TNC RF connectors.

This document 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.

The series TNC connectors which are used with all kinds of RF cables and microstrips in microwave transmission systems. The operating frequency is up to 11 GHz.

NOTE Metric dimension 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 62153-4-7, *Metallic cables and other passive components test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance Z_T and screening attenuation a_S or coupling attenuation a_C of connectors and assemblies –Triaxial tube in tube method*

IEC 62037-3, *Passive RF and microwave devices, intermodulation level measurement – Part 3: Measurement of passive intermodulation in coaxial connectors*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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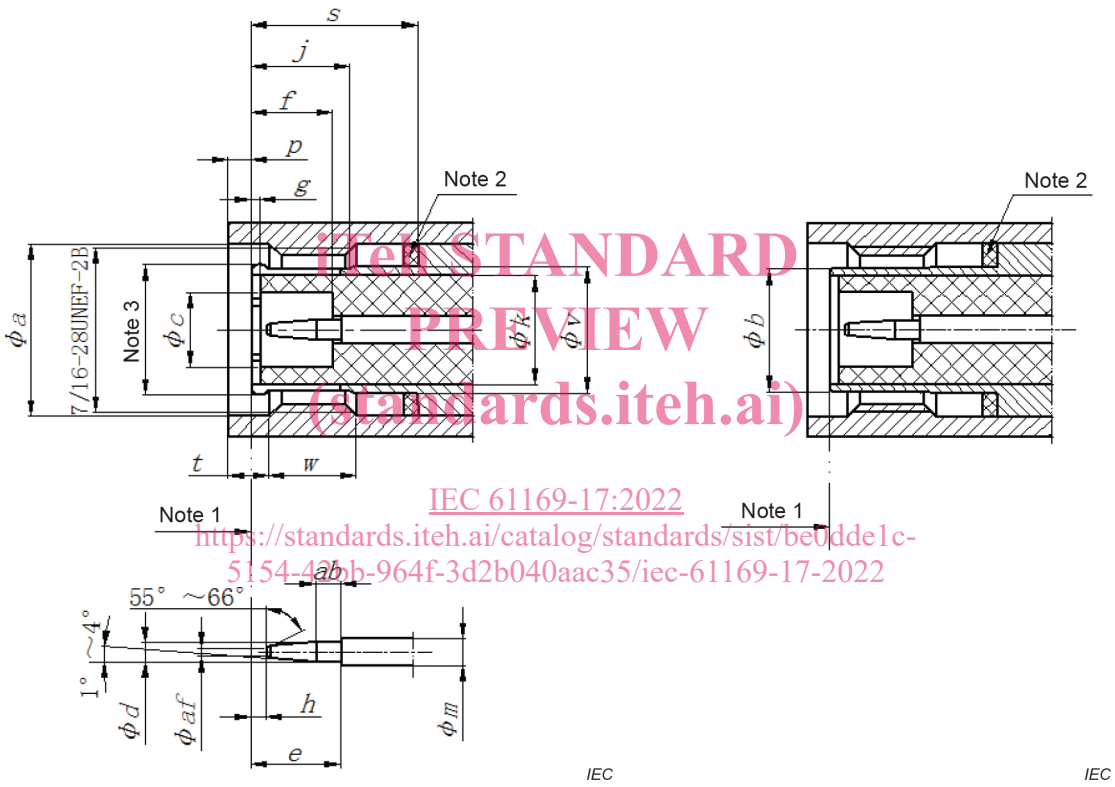
4 Mating face and gauge information

4.1 General connectors – Grade 2

4.1.1 Connector with pin centre contact

The mating face of a connector with pin centre contact is shown in Figure 1 and its dimensions are shown in Table 1.



a) Connector with slotted outer conductor

b) Connector with unslotted outer conductor

NOTE 1 Mechanical and electrical reference plane.

NOTE 2 Sealing ring.

NOTE 3 Slot is optional. Slotted and flared to meet gauge requirements of 4.2.2.

Figure 1 – Connector with pin centre contact (for dimensions, see Table 1)

Table 1 – Dimensions of connector with pin centre contact

Ref.	mm		in		Remarks
	min	max	min	max	
a	11,18	——	0,440	——	
b	7,98	8,08	0,314	0,318	
c	4,83	——	0,190	——	
d	1,32	1,37	0,052	0,054	
e	5,31	5,84	0,209	0,230	
f	5,28	5,79	0,208	0,228	
g	0,15	——	0,006	——	
h	0,08	1,02	0,003	0,040	
j	5,38	——	0,212	——	
k[a]	——	——	——	——	
m	2,14 (nom.)		0,084 (nom.)		
p[b]	——	1,98	——	0,078	
s[c]	——	——	——	——	
t	1,60	——	0,063	——	
v	——	8,18	——	0,322	
w	3,96	——	0,156	——	
af	——	0,64	——	0,025	
ab	1,98	——	0,078	——	

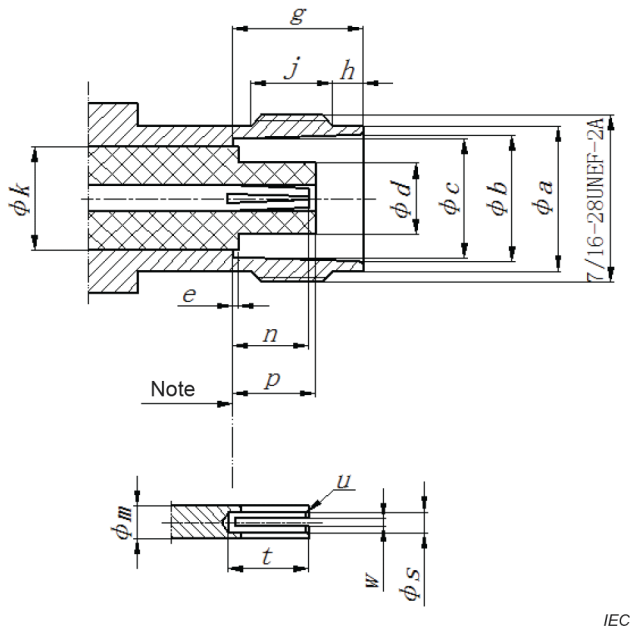
[a] Dimension *k* depends on the dimension *m* and dielectric constant, and shall meet the requirement of 50 Ω characteristics.

[b] Coupling nut in forward position.

[c] Dimension *s* shall meet electrical and sealing performance requirements.

4.1.2 Connector with socket centre contact

The mating face of a connector with socket centre contact is shown in Figure 2 and its dimensions are shown in Table 2.



NOTE Mechanical and electrical reference plane.

Figure 2 – Connector with socket centre contact (for dimensions, see Table 2)

Table 2 – Dimensions of connector with socket centre contact

Ref.	mm		in		Remarks
	min	max	min	max	
a	9,60	9,68	0,378	0,381	
b	8,31	8,46	0,327	0,333	
c	8,10	8,15	0,319	0,321	
d	4,72	——	0,186	——	
e	0,15	——	0,006	——	
f	10,52	——	0,414	——	
g	8,31	8,51	0,327	0,335	
h	1,73	2,24	0,068	0,088	
j	4,75	——	0,187	——	
k[a]	——	——	——	——	
m	2,14 (nom.)		0,084 (nom.)		
n	4,72	5,28	0,186	0,208	
p	4,78	5,28	0,188	0,208	
s[b]	——	——	——	——	
t	4,95	——	0,195	——	
u[c]	——	——	——	——	
w[d]	——	——	——	——	
rb	0,15	0,30	0,006	0,012	Radius or chamfer

[a] Dimension *k* depends on the dimension *m* and dielectric constant, and shall meet the requirement of characteristic impedance of 50 Ω.

[b] Design of slotting is optional. It is chosen to meet return loss (RL), mating characteristics, and connector durability requirements, when mated with a 1,32 mm to 1,37 mm (0,052 in to 0,054 in) gauge pin.

[c] Spherical or chamfered.

[d] Dimension *w* shall meet the requirements of 4.2.1.

4.2 Gauges

4.2.1 Gauge pin for socket centre contact

The gauge pin for a socket centre contact is shown in Figure 3 and its dimensions are shown in Table 3.

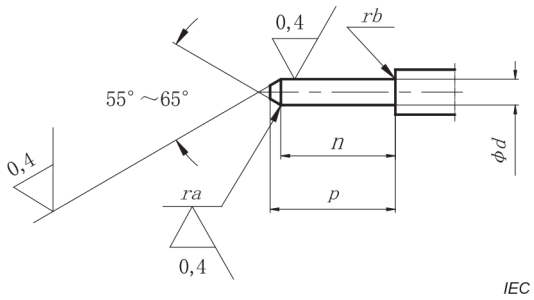


Figure 3 – Gauge pin for socket centre contact (for dimensions, see Table 3)

Table 3 – Dimensions of gauge pin for socket centre contact

Ref.	Gauge A (For sizing purpose)				Gauge B (For insertion purpose)				Gauge C (For retention purpose) Mass of gauge: 57 g ± 1 g			
	mm		in		mm		in		mm		in	
	min	max	min	max	min	max	min	max	min	max	min	max
d	1,38	1,460	0,0543	0,0575	1,370	1,375	0,0539	0,0541	1,308	1,321	0,0515	0,0520
n	3,17	—	0,125	—	3,17	—	0,125	—	3,17	—	0,125	—
p	—	4	—	0,157	—	4	—	0,157	—	4	—	0,157
ra	0,10	0,30	0,004	0,012	0,10	0,30	0,004	0,012	0,10	0,30	0,004	0,012
rb	—	0,20	—	0,008	—	0,20	—	0,008	—	0,20	—	0,008
Material: steel, polished.												

The test procedure is as follows:

a) Sizing test

The gauge A shall be inserted into the socket-centre contact three times. This is a sizing operation and should only be carried out when the socket-centre contact is removed from the connector.

b) Insertion test

After the sizing test, the standard gauge B should be inserted into the socket-centre contact. The insertion depth should not be less than 3,17 mm and the insertion force should not be more than 8,9 N.

c) Retention test

After the sizing test, the gauge C shall be inserted into socket-centre contact. The contact shall retain the mass of the gauge B in a vertical downward position.

4.2.2 Gauge for outer contact of connector with pin centre contact

The gauge for outer contact of a connector with pin centre contact is shown in Figure 4 and its dimensions are shown in Table 4.

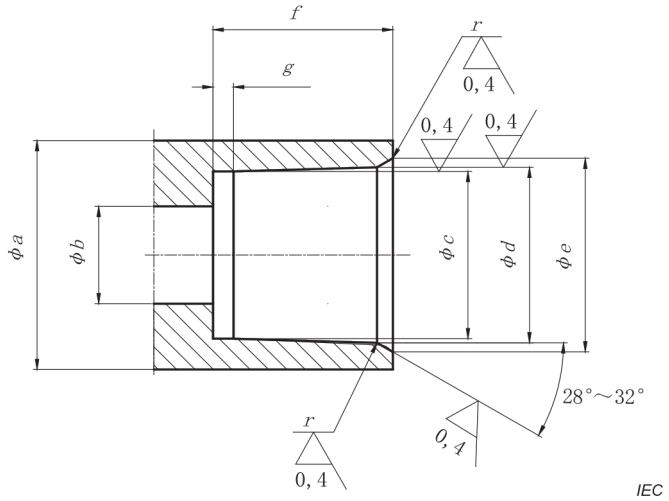


Figure 4 – Gauge for outer contact of connector with pin centre contact (for dimensions, see Table 4)

Table 4 – Dimensions of gauge for outer contact of connector with pin centre contact

Ref.	Gauge D (For sizing purpose)				Gauge E (For retention purpose) Mass of gauge: 225 g ± 5 g			
	mm		in		mm		in	
	min.	max.	min.	max.	min.	max.	min.	max.
a	9,63	9,68	0,379	0,381	9,63	9,68	0,379	0,381
b	——	5,08	——	0,200	——	5,08	——	0,200
c	8,08	8,10	0,318	0,319	8,15	8,18	0,321	0,322
d	8,31	8,36	0,327	0,329	8,41	8,46	0,331	0,333
e	8,79 (nom.)		0,346 (nom.)		8,79 (nom.)		0,346(nom.)	
f	8,41	8,46	0,331	0,333	8,36	8,41	0,329	0,331
g	4,00	——	0,157	——	4,00	——	0,157	——
r [a]	0,50	0,80	0,020	0,031	0,50	0,80	0,020	0,031

Material: steel, polished.

[a] Radius.

The test procedure is as follows:

a) Sizing test

The outer contact shall be inserted into the gauge D once. This is a sizing operation.

b) Retention test

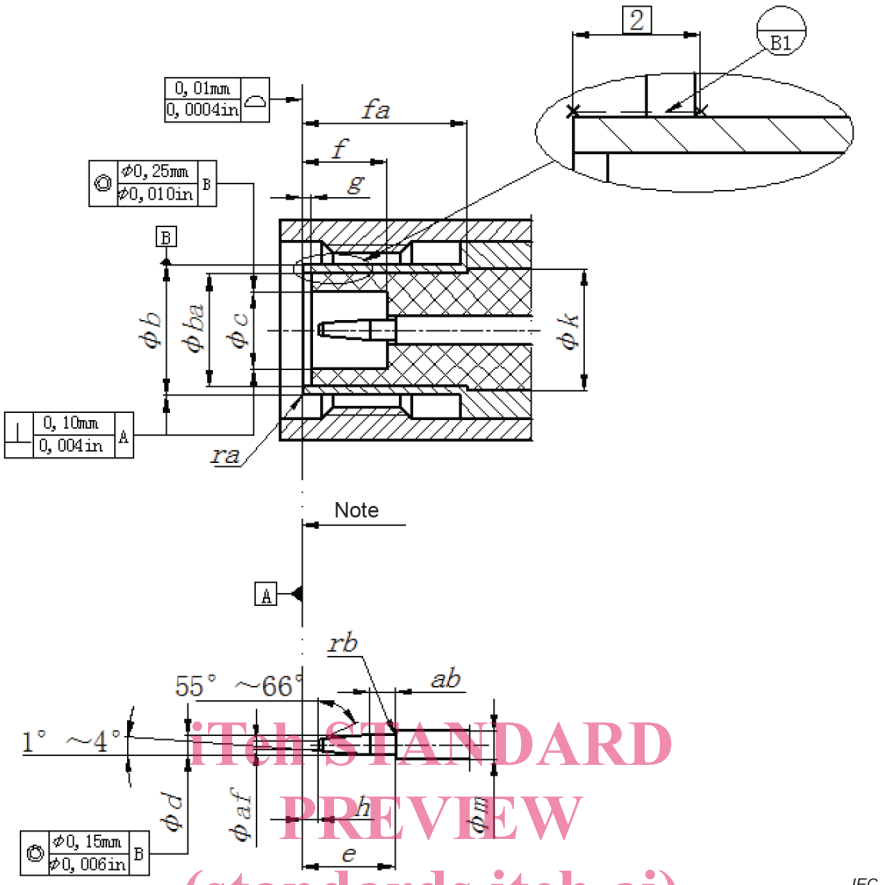
After the sizing test, the outer contact shall be inserted into the gauge E. The outer contact shall retain the gauge in a vertical downward direction.

This test may also be carried out on the connector with the insulator unremoved.

4.3 Dimensions – Standard test connectors – Grade 0

4.3.1 Connectors with pin centre contact

The interface of a connector with pin centre contact is shown in Figure 5, and its dimensions are shown in Table 5.



NOTE Mechanical and electrical reference plane.

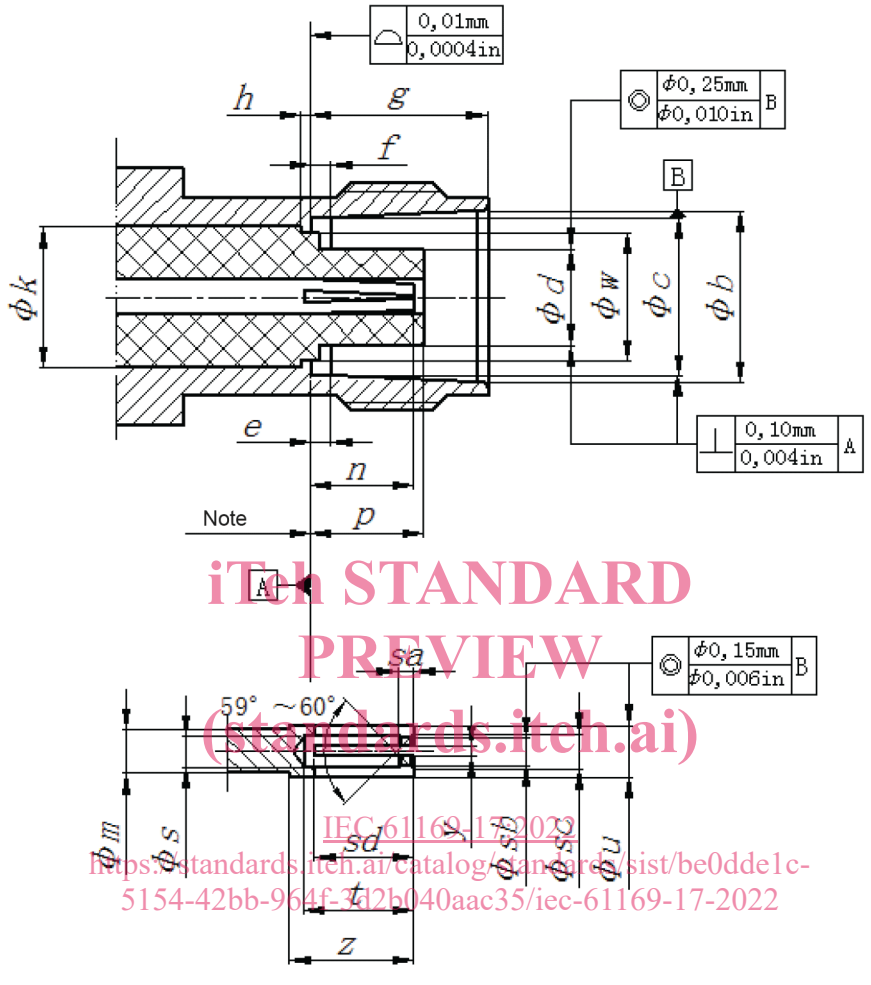
Figure 5 – Connector with pin centre contact (for dimensions, see Table 5)

Table 5 – Dimensions of connector with pin centre contact

Ref.	mm		in		Note
	min.	max.	min.	max.	
b	8,06	8,09	0,3173	0,3185	
ba	6,72	6,74	0,265	0,266	
c	4,88	4,93	0,192	0,194	
k	6,99	7,01	0,275	0,276	
fa	5,31	5,36	0,209	0,211	
e	5,31	5,38	0,209	0,212	
h	0,08	1,02	0,003	0,040	
g	0,15	0,30	0,006	0,012	
f	5,38	5,54	0,212	0,218	
d	1,35	1,37	0,053	0,054	
m[a]	2,14 (nom.)		0,084 (nom.)		
ra	0,10	0,30	0,004	0,012	radius
rb	—	0,13	—	0,005	radius
ab	1,98	—	0,078	—	
af	—	0,64	—	0,025	
NOTE Dimensions not specified in this table, see 4.1.1.					
[a] Dimension *m* depends on the dimension *k* and dielectric constant, and shall meet the requirements of characteristic impedance of 50 Ω ± 0,5 Ω.					

4.3.2 Connector with socket centre contact

The mating face of a standard test connector with socket centre contact is shown in Figure 6 and its dimensions are shown in Table 6.



NOTE Mechanical and electrical reference plane.

Figure 6 – Connector with socket in centre contact (for dimensions, see Table 6)