IEC 61169-58

Edition 1.0 2016-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Radio-frequency connectors – Part 58: Sectional specification for RF coaxial connectors with blind-mate coupling – Characteristic impedance 50 Ω (type SBMA)

Connecteurs pour fréquences radioélectriques – Partie 58: Spécification intermédiaire relative aux connecteurs coaxiaux pour fréquences radioélectriques à accouplement en aveugle – Impédance caractéristique 50 Ω (type SBMA)

IEC 61169-58:2016-08(en-fr)

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International Standard IEC 61169-58 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.

The text of this standard is based on the following documents:

FDIS	Report on voting
46F/347/FDIS	46F/352/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

The contents of the corrigendum of August 2017 have been included in this copy.

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RADIO-FREQUENCY CONNECTORS –

Part 58: Sectional specification for RF coaxial connectors with blind-mate coupling – Characteristic impedance 50 Ω (type SBMA)

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 SBMA series coaxial connectors with blind-mate coupling.

The connectors are used with cables with characteristic impedance 50 Ω in an operating frequency range up to 28 GHz. The connectors are widely used in communications, antennas, radars and other applications for modules interconnections. It is also normally used in conjunction with appropriate transmission line.

It describes the interface dimensions for general purpose connectors with gauging information and the mandatory tests selected from IEC 61169-1, applicable to all detail specifications relative to type SBMA connectors.

This specification indicates the recommended performance characteristics to be considered when writing a DS and covers all tests schedules and inspection requirements.

NOTE Dimension are in mm, however original dimensions were in inches.

All un-dimensioned pictorial configurations are for reference purpose only.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

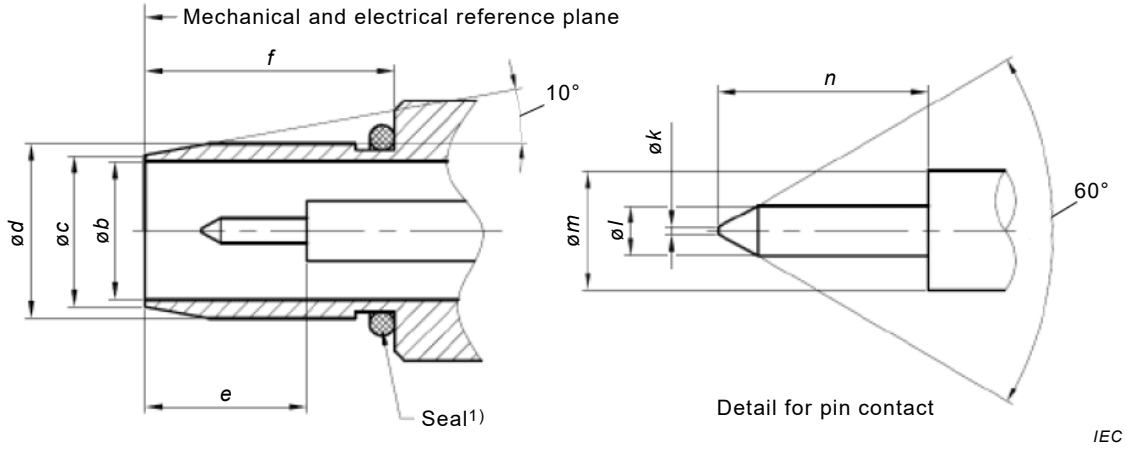
IEC 61169-1:2013, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

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

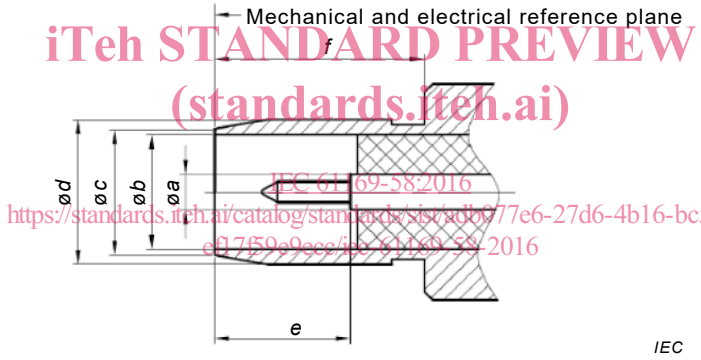
3 Mating face and gauge information

3.1 Dimensions – General connectors

3.1.1 Connector with socket centre contact



a) Air dielectric



b) PTFE dielectric

[1] The design and location of the O-ring seal is optional, but it shall ensure the environmental performance requirements are met.

Air dielectric and polytetrafluorethylene (PFTE) dielectric are optional according to the applications.

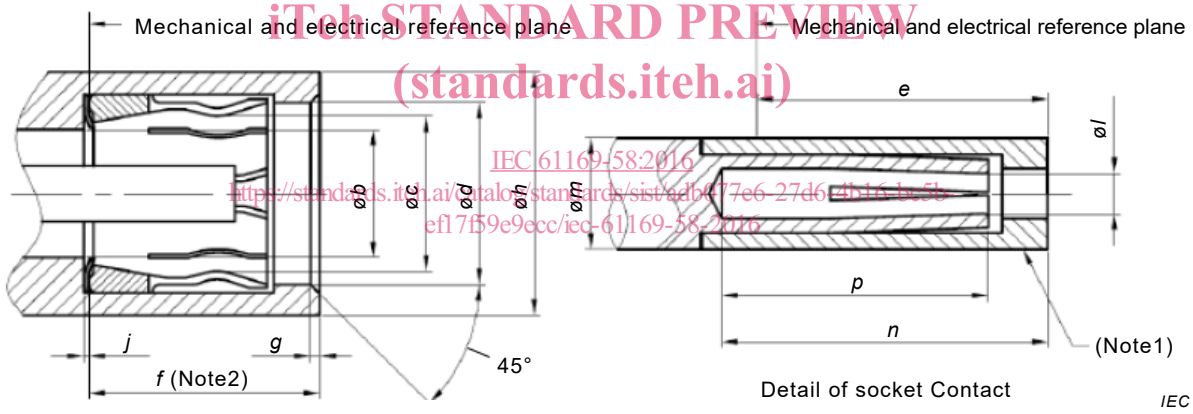
Figure 1 – Connector with pin centre contact (for dimensions, see Table 1)

Table 1 – Dimensions of connector with pin-centre contact

Ref.	mm	
	Min.	Max.
a	0,86	0,88
b	2,78 (nom.)	
c	3,18	3,32
d	3,51	3,56
e	3,25	3,35
f	5,03	–
k	0,10	0,20
l	0,50	0,53
m	1,19	1,23
n	–	2,54

3.1.2 Connector with socket-centre contact

Interface of connector with socket-centre contact is shown in Figure 2, dimensions are shown in Table 2.



Note 1 The outer hoop is optional for some applications.

Note 2 With spring finger bottomed.

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

Table 2 – Dimensions of connector with socket-centre contact

Ref.	mm	
	Min.	Max.
b	2,78 (nom.)	
c [a]	–	–
d	3,90	3,96
e	3,12	3,22
f	–	5,03
g	0,38	0,44
h	5,40	–
j	0,04	0,06
l [b]	–	–
m	1,19	1,23
n	3,00	–
p	2,80	–

[a] Shape of flange is optional, but should meet electrical and mechanical requirements.

[b] Slot design optional, but the dimensions are to meet VSWR mating characteristics and connector durability when mated with 0,50 mm to 0,53 mm diameter pin.

3.2 Gauges for general purpose connectors

3.2.1 Gauge pins for socket centre contact

Gauge pins for socket-centre contact is shown in Figure 3, dimensions are shown in Table 3.

Dimensions in millimetres

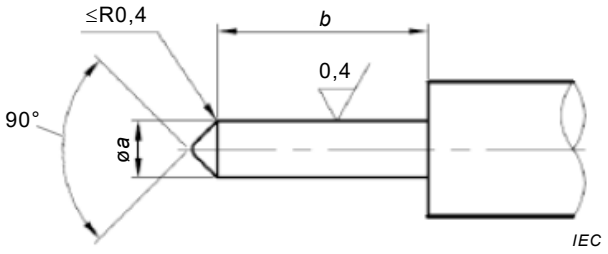


Figure 3 – Gauge pin for socket-centre contact (for dimensions, see Table 3)

Table 3 – Gauge pins dimensions for socket-centre contact

Ref.	Gauge A (For sizing purpose)		Gauge B (For insertion purpose)		Gauge C (For retention purpose) Mass of gauge: $14\,^{+2}_{0}$ g	
	mm		mm		mm	
	Min.	Max.	Min.	Max.	Min.	Max.
a	0,533	0,536	0,528	0,531	0,495	0,500
b	0,76	1,14	1,27	1,91	1,27	1,91
Material: steel, polished.						

3.2.2 Test procedure

a) Sizing test

The gauge A should be inserted into the centre contact for three times, this is a sizing operation.

b) Withdrawal test

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

c) Additional test – Insertion test

Following the sizing operation, and if prescribed in the detail specification, the force necessary to insert gauge A fully into the female centre contact shall be measured. When this test is required, the maximum permitted insertion force shall then be specified and shall not exceed 14 N.

3.2.3 Gauge pins for outer contact

Gauge pins for outer-centre contact is shown in Figure 4, dimensions are shown in Table 4.

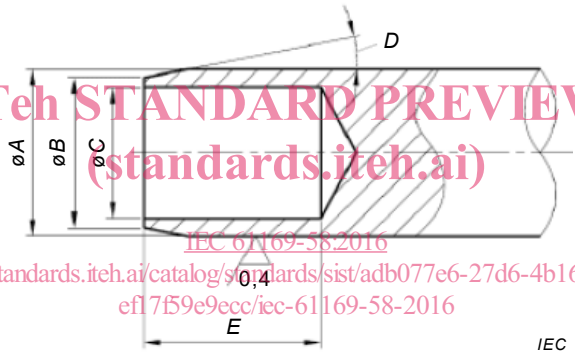


Figure 4 – Gauge pin for outer contact (for dimensions, see Table 4)

Table 4 – Gauge pins dimensions for outer contact

Ref.	Gauge A (For sizing purposes)		Gauge B (For insertion purpose)		Gauge C (For retention purpose) Mass of gauge: $80\,^{+2}_{0}$ g	
	mm		mm		mm	
	Min.	Max.	Min.	Max.	Min.	Max.
A	3,568	3,575	3,51	3,56	3,505	3,51
B	3,18	3,32	3,18	3,32	3,175	3,19
C	2,76	2,80	2,76	2,80	2,76	2,80
D	10°30′	11°30′	10°30′	11°30′	8°30′	9°30′
E	3,50	4,0	3,5	–	3,5	–
Material: Steel, polished.						

3.2.4 Test procedure

a) Sizing test

The gauge A should be inserted into the centre contact one times, this is a sizing operation.

b) Withdrawal test

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

c) Additional test – Insertion test

Following the sizing operation, and if prescribed in the detail specification, the force necessary to insert gauge A fully into the female centre contact shall be measured. When this test is required, the maximum permitted insertion force shall then be specified and shall not exceed 14 N.

3.3 Dimensions – standard test connectors – grade 0

3.3.1 Connector with pin-centre contact

Interface of connector with pin-centre contact is shown in Figure 5, dimensions are shown in Table 5.

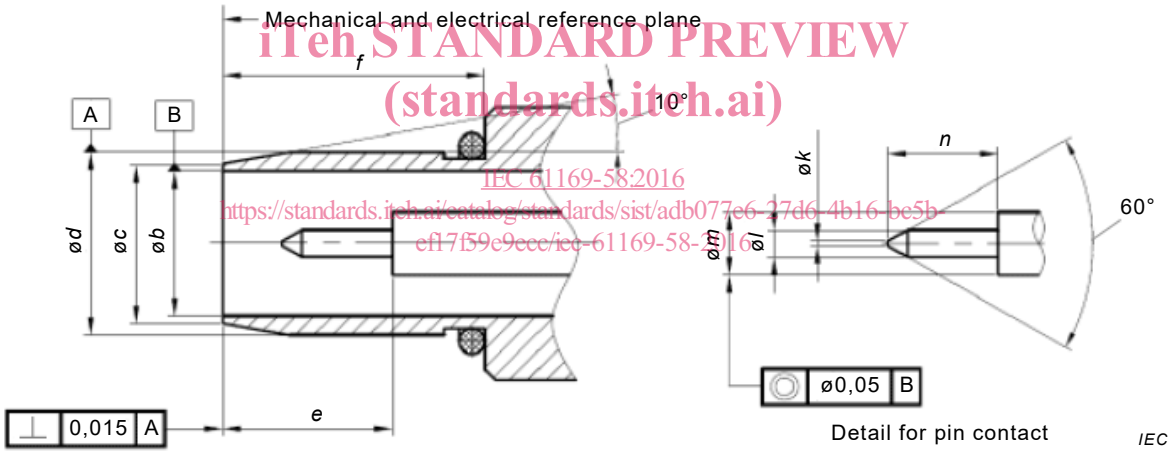


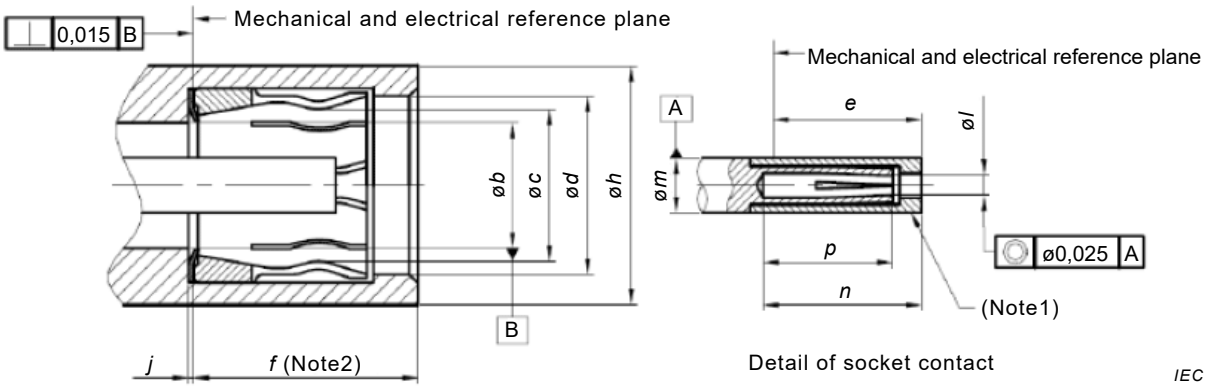
Figure 5 – Connector with pin centre contact (for dimensions, see Table 5)

Table 5 – Dimensions of connector with pin-centre contact

Ref.	mm	
	Min.	Max.
b	2,765	2,795
c	3,18	3,32
d	3,51	3,56
e	3,25	3,35
f	5,03	–
k	0,10	0,20
l	0,50	0,53
m	1,20	1,22
n	–	2,54

3.3.2 Connector with socket-centre contact

Interface of connector with socket-centre contact is shown in Figure 6, dimensions are shown in Table 6.



Note 1 The outer hoop is optional for some applications.

Note 2 With spring finger bottomed.

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

Table 6 – Dimensions of connector with socket-centre contact

Ref.	mm	
	Min.	Max.
b	2,765	2,795
c [a]	–	–
d	3,90	3,96
e	3,12	3,22
f	–	5,03
h	5,40	–
j	0,04	0,06
l [b]	–	–
m	1,20	1,22
n	3,00	–
p	2,80	–

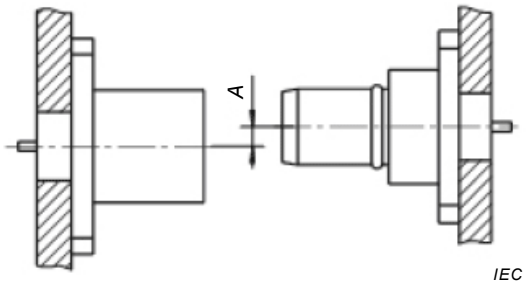
[a] Shape of flange is optional, but should meet electrical and mechanical requirements.

[b] Slot design optional, but the dimensions are to meet VSWR mating characteristics and connector durability when mated with 0,50 mm to 0,53 mm diameter pin.

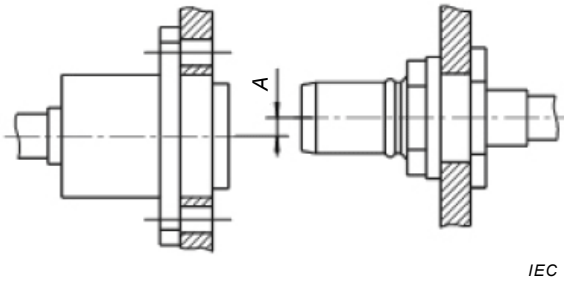
3.4 Requirements for installation

3.4.1 Radial misalignment

The location of the mountings of each pair of mating connectors shall be defined relative to a common datum, such as the centre line of a dowel/dowel hole or “reference connector pair”. The location shall be controlled to ensure that at the point of initial engagement, the radial misalignment of the centre lines of the mating connectors from their true position does not exceed the following limits (see Figure 7):



a) Rigidly mounted: receptacle and jack
Radial misalignment 0,076 mm max.



b) Rigidly mounted: receptacle and float mounted jack
Radial misalignment 0,51 mm max.

Figure 7 – Radial misalignment

3.4.2 Axial separation between mating reference planes

3.4.2.1 Rigidly mounted receptacle and jack

To maintain the electrical and environmental performances, the connector reference planes should be within 0,38 mm max. as shown Figure 8.

Dimensions in millimetres

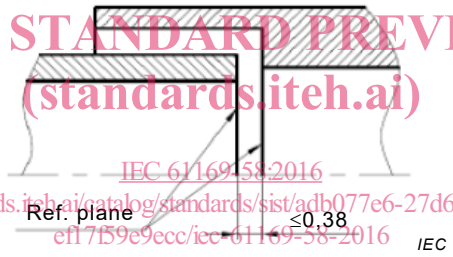


Figure 8 – Rigidly mounted receptacle and jack

3.4.2.2 Rigidly mounted receptacle and float mounted jack

The float mounting allows a total of 1,52 mm axial travel. The mounting arrangements should however ensure a minimum length of travel of 0,25 mm (0,76 mm preferred) to ensure full length of engagement is maintained, under operational conditions as Figure 9.