

INTERNATIONAL STANDARD

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**Radio-frequency connectors –
Part 45: Sectional specification for SQMA series quick lock RF coaxial
connectors**

**Connecteurs pour fréquences radioélectriques –
Partie 45: Spécification intermédiaire relative aux connecteurs coaxiaux RF à
verrouillage rapide, série SQMA**



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**Radio-frequency connectors –
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**Connecteurs pour fréquences radioélectriques –
Partie 45: Spécification intermédiaire relative aux connecteurs coaxiaux RF à
verrouillage rapide, série SQMA**

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RADIO-FREQUENCY CONNECTORS –

Part 45: Sectional specification for SQMA series quick lock RF coaxial connectors

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

CDV	Report on voting
46F/238/CDV	46F/256/RVC

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 web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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RADIO-FREQUENCY CONNECTORS –

Part 45: Sectional specification for SQMA series quick lock RF coaxial 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 type SQMA quick lock RF coaxial connectors.

The connectors are normally used with 50 Ω in microwave, telecommunication, wireless and other fields, connecting with RF cables or micro-strips. The operating frequency limit is up to 18 GHz.

It describes the interface dimensions for general purpose connectors grade 2 and standard test connectors – grade 0 with gauging information and the mandatory tests selected from IEC 61169-1, applicable to all detail specifications relative to type SQMA connectors.

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

2 Normative references

[IEC 61169-45:2014](#)

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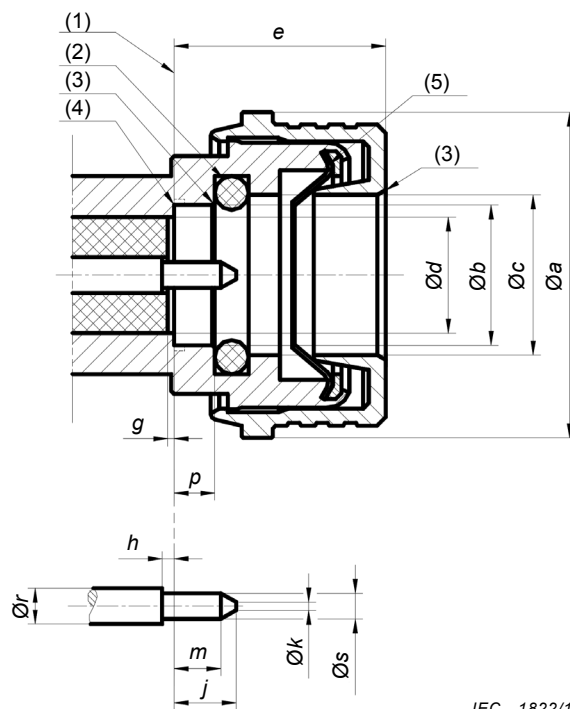
IEC 61169-1:2013, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

3 Mating face and gauge information

3.1 Dimensions – General connectors – Grade 2

3.1.1 Connector with pin-centre contact (see Figure 1)

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



IEC 1822/14

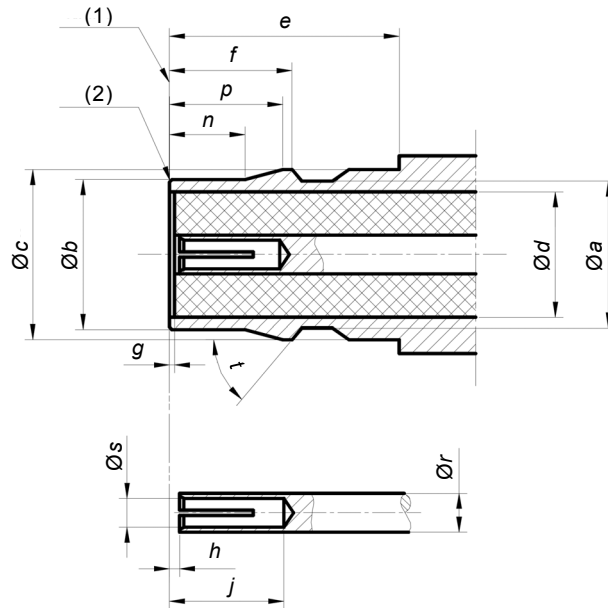
Figure 1 – Connector with pin-centre contact (for dimensions and key, see Table 1)

Table 1 – Dimensions of connector with pin-centre contact
(standards.iteh.ai)

Ref.	mm		Additional notes
	Min.	Max.	
a	–	11,50	
b	4,98	5,02	
c	5,62	5,68	
d	–	4,18	
e	–	7,50	(6)
g	0,00	0,25	
h	0,00	0,25	
j	–	2,54	
k	–	0,30	
m	1,27	–	
p	1,70	2,00	
r	–	–	(7)
s	0,90	0,94	

- (1) Mechanical and electrical reference plane.
- (2) Design and location of the seal ring are optional, but shall meet environmental requirements.
- (3) Chamfer.
- (4) No chamfer, undercut acceptable.
- (5) Design of spring is optional, but shall meet mechanical requirement.
- (6) Prefix locknut (maximal dimension).
- (7) Diameter is chosen to obtain a normal impedance of 50 Ω and meet electrical and mechanical requirements.

3.1.2 Connector with socket-centre contact (see Figure 2)



IEC 1823/14

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

Table 2 – Dimensions of connector with socket-centre contact

Ref.	mm		Additional notes
	Min.	Max.	
a	4,90	4,95	
b	4,90	4,95	
c	5,55	5,59	
d	–	4,18	
e	7,60	–	
f	3,97	4,00	
g	–	0,25	
h	–	0,25	
j	2,82	–	
n	2,00	2,50	
p	3,20	3,40	
r	–	–	(3)
s	–	–	(4)
t	49°	51°	Angle

(1) Mechanical and electrical reference plane.

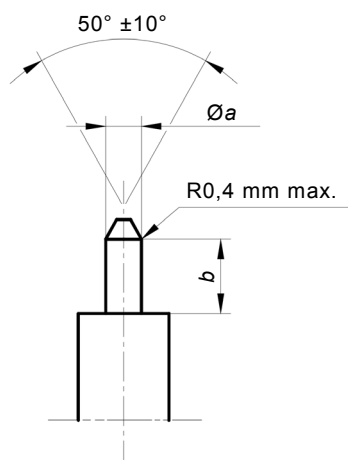
(2) Design of chamfer is optional, but shall meet mechanical requirements.

(3) Diameters are chosen to obtain a normal impedance of 50 Ω and meet electrical and mechanical requirements.

(4) Design for slotting optional, and should meet electrical and mechanical requirements, when mating with Ø0,90 mm ~ Ø0,94 mm pin.

3.2 Gauges

3.2.1 Gauge pins for socket-centre contact (see Figure 3)



IEC 1824/14

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

Table 3 – Dimensions of gauge pins for socket-centre contact

Ref.	Gauge A Maximum material for sizing purposes		Gauge B Minimum material for measurement of retention force Mass of gauge: 28 g +2 g	
	mm		mm	
	Min.	Max.	Min.	Max.
<i>a</i>	0,940	0,945	0,899	0,902
<i>b</i>	0,76	1,14	1,27	1,90

Material: steel, polished.
Surface roughness: $R_a \leq 0,4 \mu\text{m}$ on the cylindrical surface of length *b*.

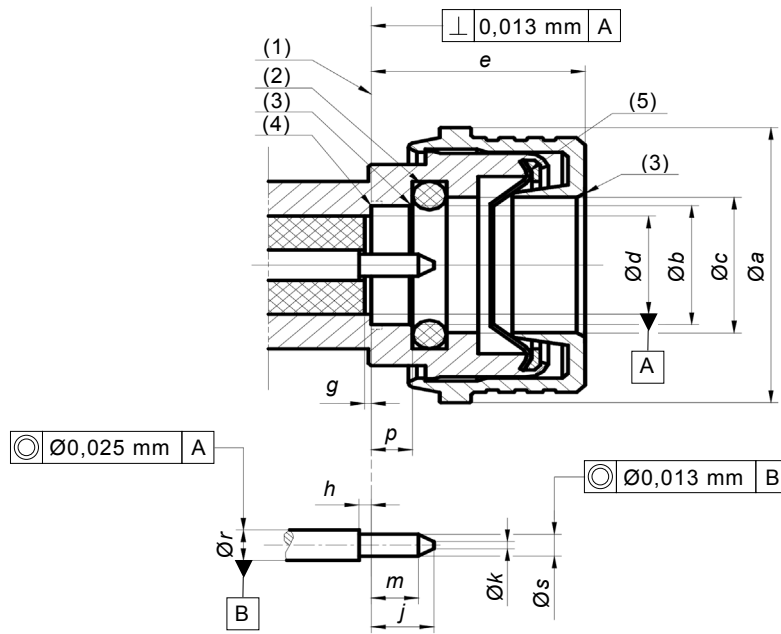
3.2.2 Test procedure

The gauge A shall be inserted into the socket-centre contact three times with a minimum depth of 0,76 mm. This is a sizing operation and should only be carried out when the socket-centre contact is removed from the connector.

After this, the gauge B shall be inserted into socket-centre contact. The contact shall retain the mass of the gauge in a vertical downward position. The test also shall be carried out on connector when the socket-centre contact is not removed.

3.3 Dimensions – Standard test connectors – Grade 0

3.3.1 Connector with pin-centre contact (see Figure 4)



IEC 1825/14

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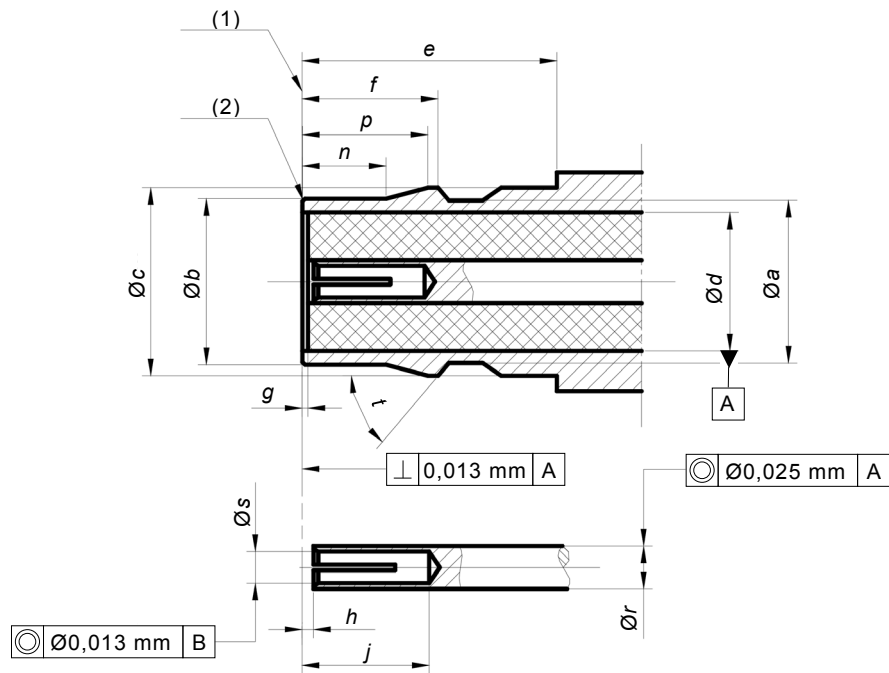
Figure 4 – Connector with pin-centre contact (for dimensions and key, see Table 4)

Table 4 – Dimensions of connector with pin-centre contact

Ref.	mm		Additional notes
	Min.	Max.	
a	–	11,50	
b	4,98	5,00	
c	5,62	5,68	
d	4,10	4,13	
e	–	7,50	(6)
g	–	0,05	
h	–	0,08	
j	2,03	2,29	
k	–	0,30	
m	1,27	–	
p	1,70	2,00	
r	1,27 nominal		(7)
s	0,92	0,94	

- (1) Mechanical and electrical reference plane.
- (2) Design and location of the seal ring are optional, but shall meet environmental requirements.
- (3) Chamfer.
- (4) No chamfer, undercut acceptable.
- (5) Design of spring is optional, but shall meet mechanical requirements performance.
- (6) Prefix locknut (maximal dimension).
- (7) Diameters are chosen to obtain a normal impedance of $50 \Omega \pm 0,5 \Omega$ and meet electrical and mechanical requirements.

3.3.2 Connector with socket-centre contact (see Figure 5)



IEC 1826/14

Figure 5 – Connector with socket-centre contact (for dimensions and key, see Table 5)
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Table 5 – Dimensions of connector with socket-centre contact

IEC 61169-45:2014

Ref.	mm		Additional notes
	Min.	Max.	
a	–	4,95	
b	4,92	4,95	
c	5,55	5,56	
d	4,10	4,13	
e	7,60	–	
f	3,97	4,00	
g	–	0,05	
h	–	0,08	
j	2,82	–	
n	2,00	2,20	
p	3,20	3,40	
r	1,27 nominal		(3)
s	–	–	(4)
t	49°	51°	

(1) Mechanical and electrical reference plane.

(2) Design of chamfer is optional, but shall meet mechanical requirements.

(3) Diameters are chosen to obtain a normal impedance of $50 \Omega \pm 0,5 \Omega$.

(4) Design for slotting optional, and should meet electrical and mechanical requirements when mating with $\varnothing 0,92 \text{ mm} \sim \varnothing 0,94 \text{ mm}$ pin.

4 Quality assessment procedure

4.1 General

The subclauses of this Clause 4 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.

4.2 Ratings and characteristics

The values indicated below in Tables 6 and 7 are recommended for type SQMA 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.

Table 6 – Climatic categories

Category designation	Letter	Temperature range	Damp heat steady state
65/125/51		–65 °C to +125 °C	

Table 7 – Ratings and characteristics

Ratings and characteristics	Test method IEC 61169-1:2013 subclause	Value	Remarks, deviation from standard test method
Electrical			
Nominal impedance		50 Ω	
Frequency range		DC to 18 GHz	Or upper frequency limit of cable
Reflection factor ^a	9.2.1		
Straight styles			
– High performance connectors		≤0,06	Up to 6 GHz
Semi rigid/semi flexible cables		≤0,13	6 GHz to 18 GHz
Flexible cables		See DS	
– Right angle styles		See DS	
Semi rigid/semi flexible cables		See DS	
Solder bucket and PCB mounting style		See DS	
– Component mounting styles		See DS	
Insertion loss		<0,05 × √ f (GHz)	
Centre contact resistance ^b	9.2.3		
– initial		≤ 3,5 mΩ	
– after tests		≤ 5,5 mΩ	
Outer contact continuity ^b	9.2.3		
– initial		3 mΩ	
– after tests		5 mΩ	
Insulation resistance	9.2.5		
– initial		5 000 MΩ	
– after tests		200 MΩ	
Proof voltage ^{cd}			

Ratings and characteristics	Test method IEC 61169-1:2013 subclause	Value	Remarks, deviation from standard test method
<ul style="list-style-type: none"> - at sea level - cables 96 IEC 50-3 - cables 96 IEC 50-2 - cables 96 IEC 50-1 - semi-rigid 3,58 mm (0,141 in) - semi-rigid 2,18 mm (0,086 in) - at 4,4 kPa - cables 96 IEC 50-3 - cables 96 IEC 50-2 - cables 96 IEC 50-1 - semi-rigid 3,58 mm (0,141 in) - semi-rigid 2,18 mm (0,086 in) 	9.2.6	1 000 Vrms 750 Vrms 500 Vrms 1 000 Vrms 750 Vrms	
Screening effectiveness ^e	9.2.7	≥60 dB, at 1 GHz	
Intermodulation level	9.2.9	na	
Mechanical			
Centre contact captivation	9.3.5		Maximum displacement of 0,25 mm in any directions
<ul style="list-style-type: none"> - axial force - torque 		26,7 N 0,028 N.m	
Engagement and separation force	9.3.6		
<ul style="list-style-type: none"> - axial force (engagement) - axial force (separation) - torque 		≤ 25 N ≤ 25 N na	
Gauge retention force	9.3.4		
<ul style="list-style-type: none"> - centre contact - outer contact - torque 		≥ 0,28 N N.m	
Mechanical tests on cable fixing			
<ul style="list-style-type: none"> - cable rotation (nutation) - cable pulling - cable bending - cable torsion 	9.3.7 9.3.8 9.3.9 9.3.10	See DS See DS See DS See DS	
Tensile strength of coupling mechanism	9.3.11	≥ 60 N	
Bending moment of coupling mechanism	9.3.12	na	
Vibration	9.3.3	50 m/s ² 10 Hz to 500 Hz	5 g _n
Shock	9.3.14	150 m/s ² half-sine wave 11 ms	15 g _n