

INTERNATIONAL STANDARD

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**Radio-frequency connectors –
Part 47: Sectional specification for radio-frequency coaxial connectors with
clamp coupling, typically for use in 75 Ω cable networks (type F-Quick)**

**Connecteurs pour fréquences radioélectriques –
Partie 47: Spécification intermédiaire relative aux connecteurs coaxiaux pour
fréquences radioélectriques avec couplage par bride, spécifiquement utilisés
dans les réseaux câblés 75 Ω (type F-Quick)**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RADIO-FREQUENCY CONNECTORS –

**Part 47: Sectional specification for radio-frequency coaxial
connectors with clamp coupling, typically for use in
75 Ω cable networks (type F-Quick)**

FOREWORD

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International Standard IEC 61169-47 has been prepared by subcommittee 46F: R.F. and microwave passive components, of IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

This bilingual version (2017-11) corresponds to the monolingual English version, published in 2015-03.

This second edition cancels and replaces the first edition published in 2012. It constitutes a technical revision.

The main changes are listed below:

- Subclause 3.2 has been updated to better define gauging.
- Table 2 has been updated for insertion and removal forces.
- Clause 4 has been updated to refer to the new edition of IEC 61169-1.

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

CDV	Report on voting
46F/272/CDV	46F/306/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.

The French version of this standard has not been voted upon.

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

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- withdrawn,
- replaced by a revised edition, or
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RADIO-FREQUENCY CONNECTORS –

Part 47: Sectional specification for radio-frequency coaxial connectors with clamp coupling, typically for use in 75 Ω cable networks (type F-Quick)

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 RF coaxial connectors with clamp coupling, typically for use in 75 Ω cable networks (type F-Quick).

It describes the interface dimensions with gauging information, electrical and mechanical performance including the mandatory tests selected from IEC 61169-1:2013, applicable to all DS relating to type F-Quick connectors.

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

NOTE This interface is typically used for indoor connections, which are easily disconnected and reconnected. The typical application is for F-type coaxial receiver leads or F-type coaxial patch cables. The interface may also be known as a Push-on connector. It is preferred to use the fixed (screwed) connectors type F according to IEC 61169-24:2009.

2 Normative references (standards.iteh.ai)

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 61169-24:2009, *Radio-frequency connectors – Part 24: Sectional specification – Radio frequency coaxial connectors with screw coupling, typically for use in 75 Ω cable networks (type F)*

IEC 62037 (all parts), *Passive RF and microwave devices, intermodulation level measurement*

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

3 Interface dimensions

3.1 Dimensions

3.1.1 Common dimensions

Millimetres are original dimensions.

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

Figure 1 and Table 1 depict the dimensions that are common to any F connector and thus indispensable for compatibility. Examples of specific design with their dimensions are given in 3.1.2 to 3.1.4.

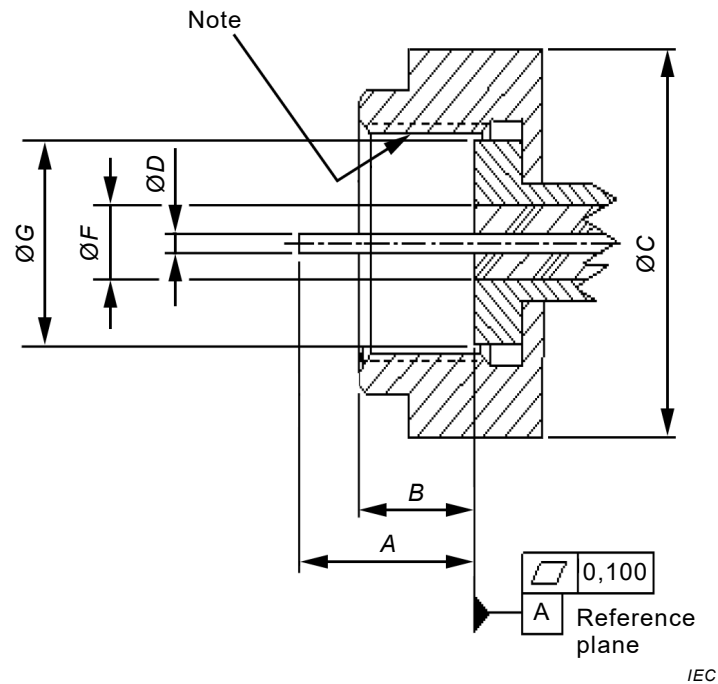


Figure 1 – Connector “F-Quick” type male plug: general dimensions

Table 1 – Connector “F” type male plug (indoor)

Description	Ref.	mm		inches		Additional notes
		Min.	Max.	Min.	Max.	
Inner conductor length	A	6,35	8,63	0,250	0,340	
Length of nut	B	4,00	7,29	0,167	0,287	
Maximum envelope dimension	C		16,61		0,654	
Inner conductor diameter	D	0,64	1,13	0,025	0,044	
Reference plane opening inner diameter	F		6,84		0,230	(1)
Reference plane outer diameter	G	7,11		0,280		
(1) No protrusion of the dielectric beyond the reference plane is permitted.						

3.1.2 Example of connector “F-Quick” type male plug with resilient outer conductor sleeve (indoor) physical dimensions

The connector is shown in Figure 2. Common dimensions are given in 3.1.1.

Dimensions in millimetres

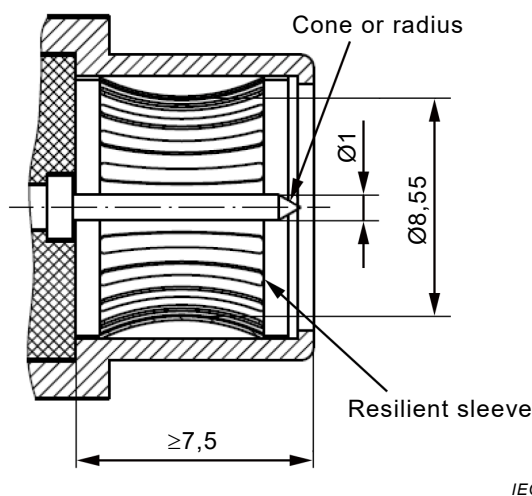


Figure 2 – Example of connector “F-Quick” type male plug with resilient outer conductor sleeve (indoor)

3.1.3 Example of connector “F-Quick” type male plug with slotted outer conductor (indoor) physical dimensions

The connector is shown in Figure 3. Common dimensions are given in 3.1.1.

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Dimensions in millimetres

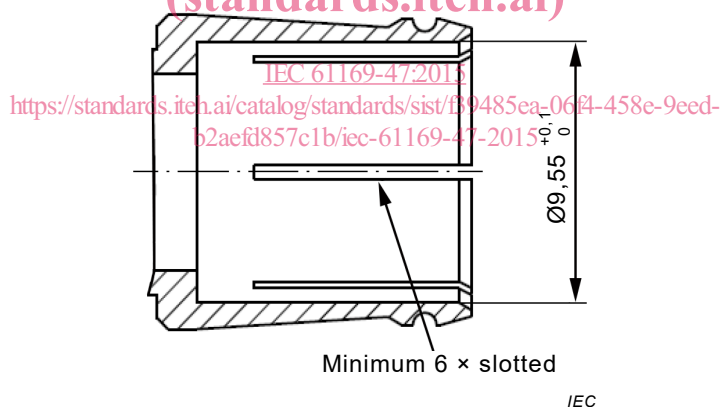


Figure 3 – Example of connector “F-Quick” type male plug with slotted outer conductor (indoor)

3.1.4 Example of connector “F-Quick” type male plug with slotted outer conductor and snap ring (indoor) physical dimensions

The connector is shown in Figure 4. Common dimensions are given in 3.1.1.

Dimensions in millimetres

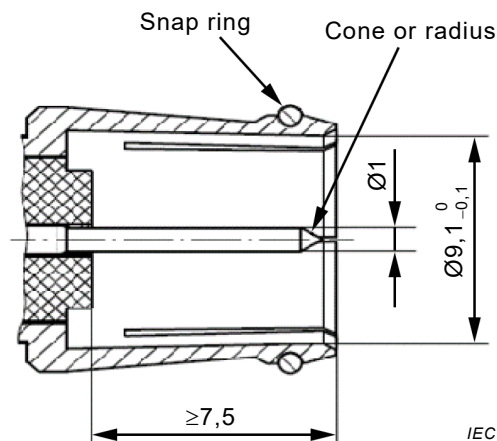
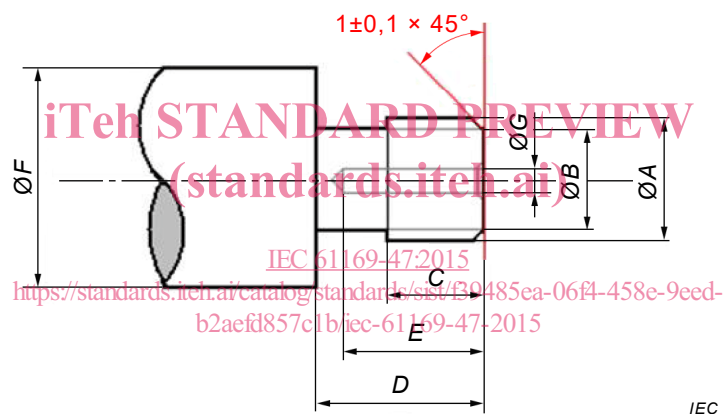


Figure 4 – Example of connector “F-Quick” type male plug with slotted outer conductor and snap ring (indoor)

3.2 Mechanical gauges

Dimensions in millimetres



Material: stainless steel, polish, Ra 0,4-0,1

Description	Dimension	mm	inches
Outside diameter over thread ^a	A	9,35	0,368
Reference plane outer diameter	B	7,35	0,289
Port thread length	C	7,5	0,295
Port length	D	12,69	0,5
Bore depth [min]	E	10,54	0,415
Bulkhead diameter	F	16,6	0,654
Bore diameter [min]	G	3,5	0,14

^a Outside diameter of thread (3/8-32 UNEF 2A).

Figure 5 – Mechanical gauge for resilient outer conductor

Requirement (see Table 2):

The insertion force required to insert the outer conductor gauge as defined in

Figure 5 into the plug shall not exceed 35 N.

The withdrawal force required to withdraw the completely inserted outer conductor gauge from the plug shall be a minimum of 15 N.

4 Quality assessment procedures

4.1 General

Subclauses 4.2 to 4.4 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 inspection.

4.2 Ratings and characteristics

The r.f. connectors defined in this standard are designed for use with a variety of flexible and semi-rigid coaxial cables and in microwave integrated circuits and similar uncabled applications.

Table 2 – Ratings and characteristics

Rating and characteristics	IEC 61169-1: 2013 Subclause	Values	Remarks, deviations from standard test method
Electrical			
Nominal impedance		$Z_c = 75 \Omega$	Shall meet the requirements of 9.2.1.1 of IEC 61169-1:2013 when terminating a $Z_c = 75 \Omega$ cable
Frequency range			See DS
		5 MHz to 1 GHz 5 MHz to 2 GHz 5 MHz to 3 GHz	For most applications For some satellite applications For some head end applications
Return loss ^a	9.2.1		
– straight styles		> 30 dB up to 1 GHz > 25 dB up to 2 GHz > 20 dB up to 3 GHz	
– right-angle styles ⁿ		See DS	
– component mounting styles	–	Under consideration	
– solder bucket and PCB mounting styles		Under consideration	
– insertion loss		0,1 dB max. up to 1 GHz 0,2 dB max. at 2 GHz 0,3 dB max. at 3 GHz	(for information only)
Centre contact resistance ^b	9.2.3		
– initial		≤ 5 mΩ	
– after conditioning		≤ 10 mΩ	
Outer conductor continuity ^b	9.2.3		
– initial		≤ 2,5 mΩ	
– after conditioning		≤ 5 mΩ	
Insulation resistance ^b	9.2.5		
– initial		≥ 1 GΩ	
– after conditioning		≥ 1 MΩ	
Proof voltage at sea level ^{c,d}	9.2.6		86 kPa to 106 kPa
– uncabled styles		750 V	

Rating and characteristics	IEC 61169-1: 2013 Subclause	Values	Remarks, deviations from standard test method
Proof voltage at 4,4 kPa ^{c,d}	9.2.6		4,4 kPa approximately
– uncabled styles			Equivalent to 20 km
Environmental test voltage at sea level ^{c,d}	9.2.6		86 kPa to 106 kPa
– uncabled styles		750 V	
Environmental test voltage at 4,4 kPa ^{c,d}	9.2.6		4,4 kPa approximately equivalent to 20 km
– uncabled styles		V	
Screening effectiveness (straight cables only) ^g	9.2.7	$\geq a_s \geq 90$ dB at 1 GHz	$Z_l < 3,2$ m Ω (mated interface)
Intermodulation level	IEC 62037-3	na ^f	
Discharge test (corona effect)	9.2.8	na ^f	Extinction voltage
Centre contact captivation	9.3.5		
– axial force		≥ 20 N	
– torque		See DS	
Engagement and separation	9.3.6		
– Engagement force		35 Nm ^f	
– Separation force		> 15 Nm	
Coupling moment	9.3.6		
– normally moment		na ^f	
– moment resistance		na ^f	
Gauge retention force (resilient contacts)	9.3.4		
– centre		10 N to 20 N	
– outer		na ^f	
Technical tests on cable fixing			
– cable rotation (nutation)	9.3.7	See DS	
– cable pulling	9.3.8	120 N	
– cable bending	9.3.9	See DS	
– cable torsion	9.3.10	0,1 Nm	
Tensile strength of coupling mechanism	9.3.11	≥ 300 N	
Safety wire hole pull-out bending moment (and shearing force)	9.3.12	> 2 Nm	
Vibration	9.3.3	98 m/s ² 10 Hz to 500 Hz	10 g _n acceleration
Climatic category		A:40/70/21	
Sealing non-hermetic	9.4.7	na ^f	100 kPa to 110 kPa pressure differential
Hermetic	9.4.8	na ^f	100 kPa to 110 kPa pressure differential
Salt mist	9.4.10	48 h	Duration of spraying
Endurance			
Mechanical	9.3.15	See DS for the number of cycles	