BS EN 61169-14:2010

Radio-frequency connectors

Part 14: R.F. coaxial connectors with inner diameter of outer conductor 12 mm with screw coupling — Characteristic impedance 75 ohms (Type 3,5/12)

National foreword

This British Standard is the UK implementation of EN 61169-14:2010. It is identical to IEC 61169-14:2010.

The UK participation in its preparation was entrusted to Technical Committee EPL/46, Cables, wires and waveguides, radio frequency connectors and accessories for communication and signalling.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Radio-frequency connectors - Part 14: R.F. coaxial connectors with inner diameter of outer conductor 12 mm with screw coupling - Characteristic impedance 75 ohms (Type 3,5/12)

(IEC 61169-14:2010)

Connecteurs pour fréquences radioélectriques - Partie 14: Connecteurs coaxiaux pour fréquences de diamètre intérieur du conducteur extérieur de 12 mm à verrouillage à vis - Impédance caractéristique 75 ohms (Type 3,5/12)
(CEI 61169-14:2010)

Hochfrequenz-Steckverbinder - Teil 14: Koaxiale HF-Steckverbinder mit 12 mm Innendurchmesser des Außenleiters mit Schraubverbindung - Wellenwiderstand 75 Ohm (Typ 3,5/12)
(IEC 61169-14:2010)

This European Standard was approved by CENELEC on 2010-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 46F/148/CDV, future edition 1 of IEC 61169-14, prepared by IEC/SC 46F, R.F. and microwave passive components, of IEC TC 46, Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61169-14 on 2010-12-01.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-09-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-12-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61169-14:2010 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61169-1	1992	Radio-frequency connectors -	EN 61169-1	1994
+ A1	1996	Part 1: Generic specification - General	+ A1	1996
+ A2	1997	requirements and measuring methods	+ A2	1997

CONTENTS

RADIO-FREQUENCY CONNECTORS –

Part 14: R.F. coaxial connectors with inner diameter of outer conductor 12 mm with screw coupling – Characteristic impedance 75 ohms (Type 3,5/12)

1 Scope

This standard concerns RF coaxial connectors for use with RF cables both flexible and semi-rigid, where air dielectric interface and high mechanical stability is required for severe environmental exposure. The connectors provide low reflection in the microwave region up to 12 GHz and all patterns may provide sealing up to a pressure differential of 3 bar.

For this type of connector, cables IEC 75-7-and 75-8 of IEC 61196-6: *Coaxial communication cables – Part 6: Sectional specification for CATV drop cables*, are recommended.

This type is known commercially as the 3,5/12 connector.

2 Normative references

The following referenced documents are indispensable for the application 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 61169-1:1992, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*[1]
Amendment 1 (1996)
Amendment 2 (1997)

3 IEC type designation

Connectors conforming to this standard shall be designated by:

a) the reference to this standard: 61169-14 IEC;

b) number of the grade:

Grade 0 = standard test connector = G0

Grade 1 = high performance connector = G1

Grade 2 = general purpose connector

– if Grade 2 is required, no grade designation is necessary;

c) a serial number (see Clause 7);

d) a group of figures specifying the climatic category (see Clause 4).

Example

61169-14 IEC-GI-1 (40/85/21) denotes a free pin Grade 1 high performance connector (straight) for cable 96-2 IEC 75-7-1/2/8 with mating face as indicated in Clause 5 of this standard with a reflection coefficient not greater than 0,06 at frequencies up to 6 GHz belonging to climatic category 40/85/21.

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[1] There exists a consolidated edition 1.2 (1998) that comprises IEC 61169-1:1992, its Amendment 1:1996 and its Amendment 2:1997.

4 Mating face for general purpose connector

4.1 Connector with pin centre contact (see Figure 1)

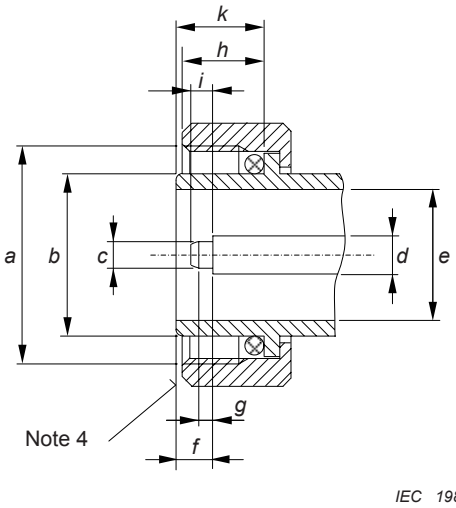


Figure 1 – Connector with pin centre contact (for dimensions, see Table 1)

Table 1 – Dimensions for connector with pin centre contact

Ref.	mm		Note
	Min.	**Max.**	
a	M 20 × 1		2
b	14,84	14,95	
c	2,855	2,945	
d	3,5 ref		1/3
e	12,0 ref		1/3
f	2,51	2,7	6
g	1,8	–	
h	7	9	
i	2,2	2,7	
k	8	–	5

NOTE 1 The tolerance on this dimension is determined by the tolerance of characteristic impedance. (For Grade 1 connector, the characteristic impedance should be 75 Ω ± 0,38 Ω).

NOTE 2 M 20 × 1 indicates metric ISO screw-thread with nominal diameter 20 mm and pitch 1 mm.

NOTE 3 Reference dimensions.

NOTE 4 Mechanical and electrical reference plane.

NOTE 5 This dimension together with O-ring gasket to meet environmental requirements.

NOTE 6 For Grade 1 connectors: dimension *f:* 2,51 mm min.
2,6 mm max.

NOTE 7 All undimensioned pictorial configurations are for reference purposes only.

4.2 Connector with socket centre contact (see Figure 2)

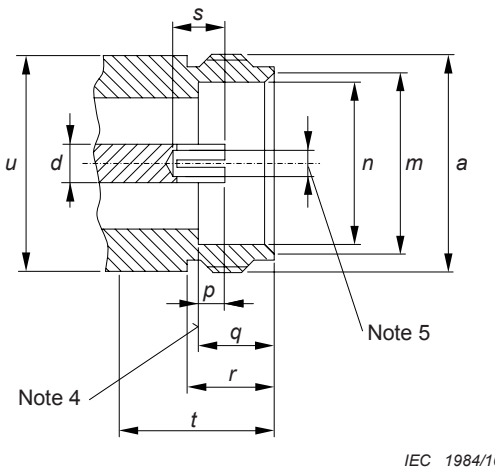


Figure 2 – Connector with socket centre contact (for dimensions, see Table 2)

Table 2 – Dimensions for connector with socket centre contact

Ref.	mm		Note
	Min.	**Max.**	
a	M 20 × 1		2
d	3,5 ref.		1/3
m	15,5	16,0	
n	15,0	15,1	
p	2,3	2,49	6
q	6,9	7,1	
r	9,0	11	
s	4,5	–	
t	15,5	–	
u	19,7	20,2	

NOTE 1 The tolerance on this dimension is determined by the tolerance of characteristic impedance. (For Grade 1 connector the characteristic impedance should be 75 Ω ± 0,38 Ω).

NOTE 2 M 20 × 1 indicates metric ISO screw-thread with nominal diameter 20 mm and pitch 1 mm.

NOTE 3 Reference dimension.

NOTE 4 Mechanical and electrical reference plane.

NOTE 5 Bore diameter and slots to meet gauge requirements.

NOTE 6 For Grade 1 connectors:

dimension *p:* 2,4 mm min.
2,49 mm max.

NOTE 7 All undimensioned pictorial configurations are for reference purposes only.

5 Gauges and standard test connectors

5.1 Mechanical gauges

5.1.1 Socket connector

5.1.1.1 Centre contact

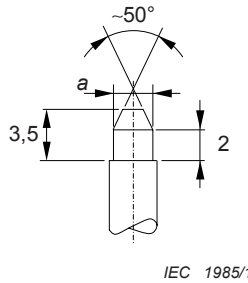


Figure 3 – Gauge pins for centre contact of socket connector

5.1.1.2 Test sequence

a) A steel test pin (Figure 3) with a diameter *a* of 3,1 mm ± 0,005 mm shall be inserted once into the centre contact a minimum distance of 2 mm.

b) A second steel test pin (Figure 3) with a diameter *a* of 2,855 mm ± 0,005 mm and a 0,4 µm finish shall then be inserted. The contact shall then exert a retention force of 4 N minimum/9 N maximum after insertion into the centre contact.

It is recommended that the mass of this gauge should be 400 g.

5.2 Standard test connectors (Grade 0)

5.2.1 General

In order to carry out the reflection coefficient measurement according to Subclause 14.1 of IEC 61169-1, the measuring equipment should be provided with standard test connectors (Grade 0). The standard test connectors with tolerances specified in 5.2.2 and 5.2.3 guarantee an accuracy of characteristic impedance of 75 Ω ± 0,1 Ω.

5.2.2 Standard test connectors with pin centre contact

The dimensions of the standard test connectors with pin centre contact shall be as specified in Subclause 5.1 but with the following tolerances (see Table 3).

Table 3 – Dimensions for connector with pin centre contact Grade 0

Dimension	mm	
	Min.	Max.
c	2,898	2,902
d	3,482	3,485
e	12,165	12,185
f	2,51	2,53

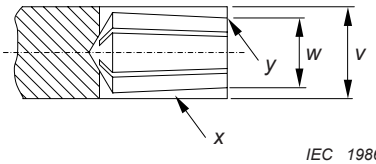
5.2.3 Standard test connectors with socket centre contact

The dimensions of the standard test connectors with socket centre contact shall be as specified in 5.2 and with the following tolerances (see Table 4).

Table 4 – Dimensions for connector with socket centre contact Grade 0

Dimension	mm	
	Min.	Max.
d	3,482	3,485
e	12,165	12,185
p	2,47	2,49

Additionally, dimensions of the slotted centre contact (see Figure 4) shall be as follows:



Key

y = ∅ 3,483 mm min.
∅ 3,485 mm max.

with pin gauge ∅ 2,898 mm min.
∅ 2,902 mm max.

inserted 2 mm deep

w = to fulfil the requirements of dimension *y* and gauge retention

x = six slots spaced 60° apart
0,3 mm wide
4,5 mm min. length
4,7 mm) max. length

y = radius of chamfer *r* = 0,1 mm

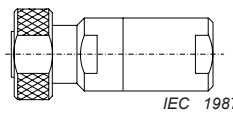
Figure 4 – Slotted centre contact

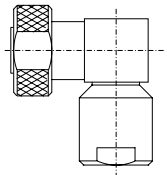
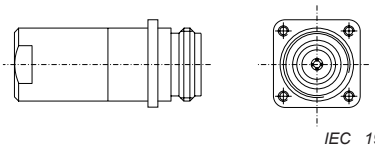
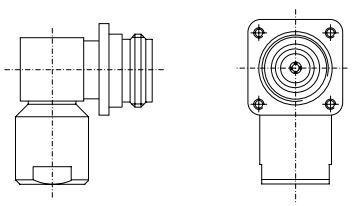
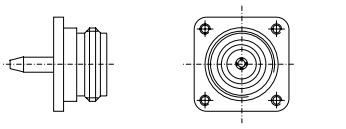
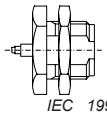
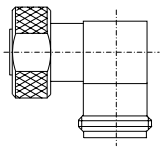
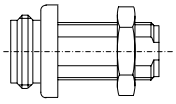
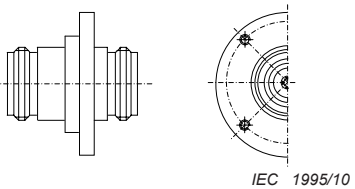
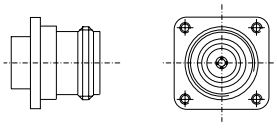
A pair of standard test connectors shall not introduce a reflection coefficient greater than 0,01 at 6 GHz.

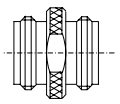
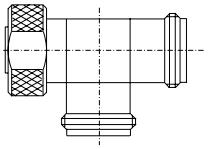
6 Survey of patterns

Table 5 is a survey of existing patterns.

Table 5 – Survey of patterns

Test class	Description	Contact	Pattern	Type designation[1]
1	Free connector (straight)	Pin		61169-14 IEC-1 See Note

Test class	Description	Contact	Pattern	Type designation[1]
1	Free connector (right angle)	Pin	 IEC 1987/10	61169-14 IEC-2 See Note
1	Free connector (straight)	Socket	 IEC 1988/10	61169-14 IEC-3 See Note
1	Fixed connector (straight 4-hole panel mounting with entry for r.f. cable)	Socket	 IEC 1989/10	61169-14 IEC-4 See Note
1	Fixed connector (right angle), 4-hole panel mounting with entry for r.f. cable)	Socket	 IEC 1990/10	61169-14 IEC-5 See Note
3	Fixed connector (4-hole panel mounting with solder bucket)	Socket	 IEC 1991/10	61169-14 IEC-6
3	Fixed connector (panel and barrier sealed, single hole panel mounting with solder bucket)	Socket	 IEC 1992/10	61169-14 IEC-7
2	Free adaptor (right angle)	Pin-socket	 IEC 1993/10	61169-14 IEC-8
2	Fixed adaptor (panel and barrier sealed, single hole panel mounting)	Socket-socket	 IEC 1994/10	61169-14 IEC-9
2	Fixed adaptor (4-hole panel mounting)	Socket-socket	 IEC 1995/10	61169-14 IEC-10
2	Fixed connector (4-hole panel mounting for rigid lines)	Socket	 IEC 1996/10	61169-14 IEC-11

Test class	Description	Contact	Pattern	Type designation[1]
2	Free adaptor	Socket-socket	 IEC 1997/10	61169-14 IEC-12
3	T-adaptor	Pin-socket-socket	 IEC 1998/10	61169-14 IEC-13
1 If no details are given, Grade 2 is referred to. Grade 1 has to be indicated.				
NOTE To be used with r.f: cables 61196-6 IEC 75-7 or 8.				

In Table 5, the test classes applicable to the various connector patterns are indicated.

A test class comprises all connectors to which the same tests are applicable although in some cases the test requirements may differ in part.

Test Class 1: Connectors attached to cables.

Test Class 2: Adaptors with mating faces at both ends.

Test Class 3: Connectors to which the reflection coefficient measurements do not apply.

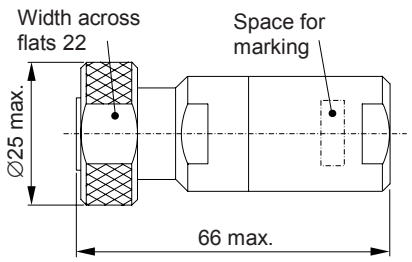
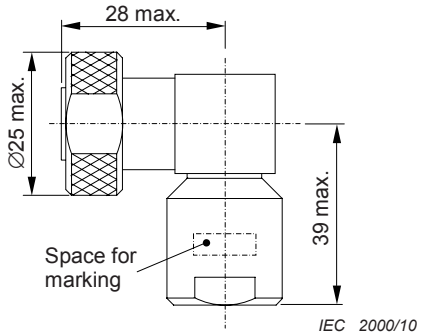
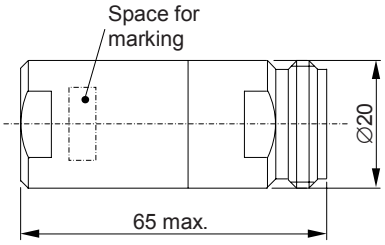
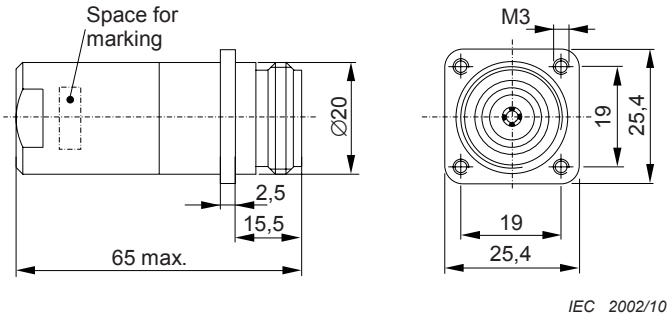
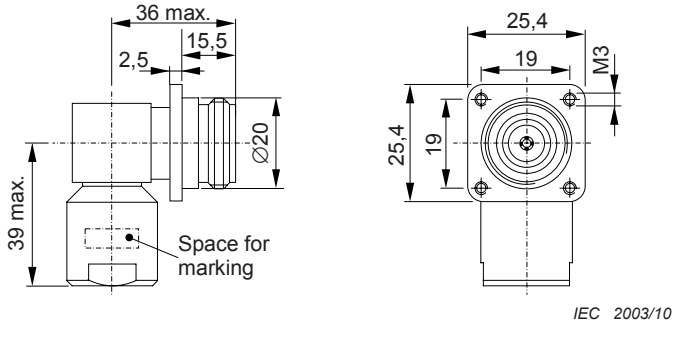
7 Outline dimensions

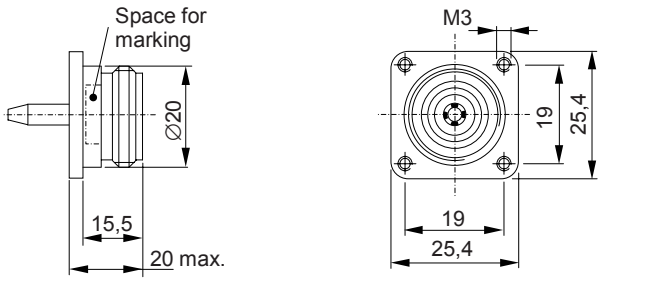
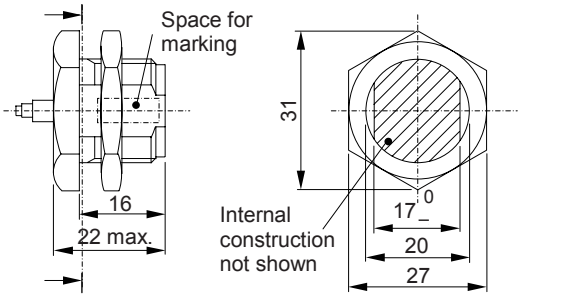
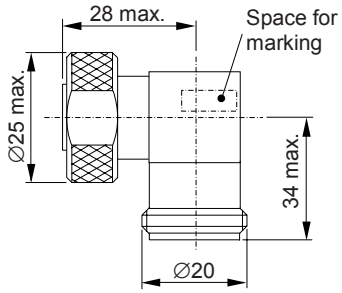
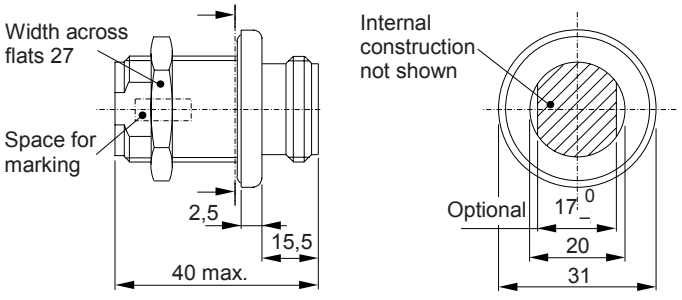
The appearance of the connectors shown in the following Table 6 drawings is typical. Only the main dimensions given are mandatory *(dimensions in millimetres).*

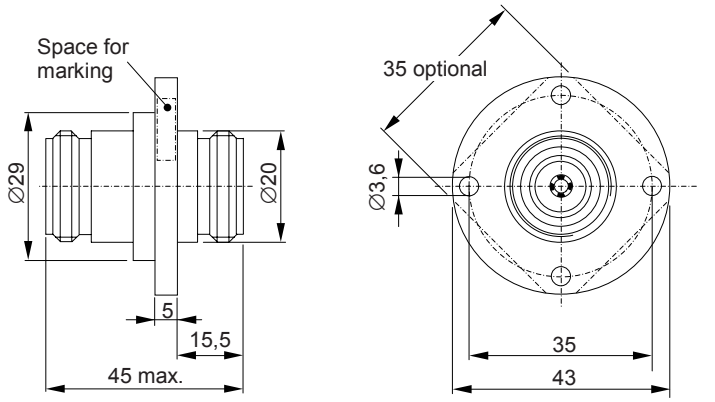
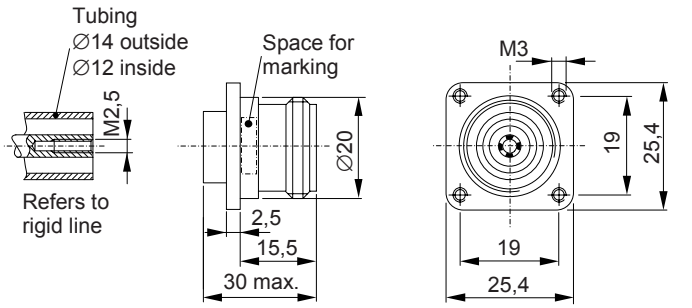
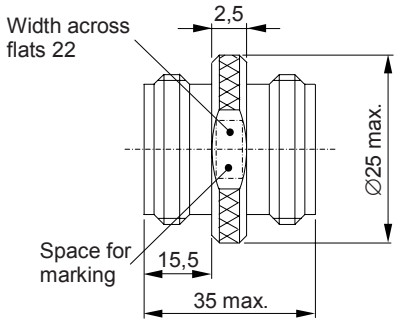
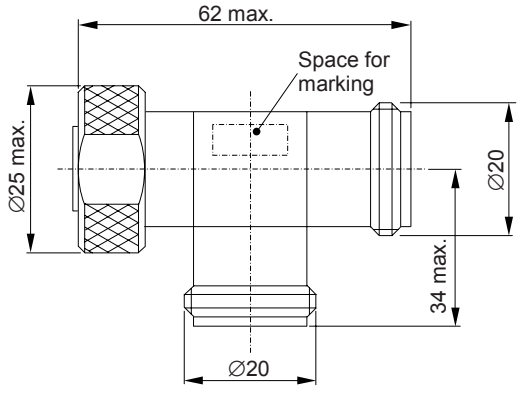
Other constructions or the use of other cables are permissible if the dimensions according to Clause 5 are met, together with the gauging requirements of Clause 6 and applicable test conditions of Clause 9.

The type designation refers to Grade 2 (for Grade 1 and 0, see Clause 2).

Table 6 – Outline dimensions

Style		Test Class	Type designation
Free connector (straight) with pin contact		1	61169-14 IEC1-
Free connector (right angle) with pin contact		1	61169-14 IEC-2
Free connector (straight) with socket con		1	61169-14 IEC-3
Fixed connector (straight, 4-hole panel mounting with entry for r.f. cable) with socket contact		1	61169-14 IEC-4
Fixed connector (right angle, 4-hole panel mounting with entry for r.f. cable) with socket contact		1	61169-14 IEC-5

Style		Test Class	Type designation
Fixed connector (4-hole panel mounting with solder bucket) with socket contact		3	61169-14 IEC-6
Fixed connector (panel and barrier sealed, single hole panel mounting with solder bucket) with socket contact		3	61169-14 IEC-7
Free adaptor (right angle) with pin-socket contact		2	61169-14 IEC-8
Fixed adaptor (panel and barrier sealed, single hole panel mounting) with socket-socket contacts		2	61169-14 IEC-9

Style		Test Class	Type designation
Fixed adaptor (4-hole panel mounting) with socket-socket contacts		2	61169-14 IEC-10
– Fixed connector (4-hole panel mounting for rigid lines) with socket contacts		2	61169-14 IEC-11
Free adaptor with socket-socket contacts		2	61169-14 IEC-12
– T-adaptor with pin-socket-socket contacts		3	61169-14 IEC-13

8 Quality assessment procedures

8.1 General

The following subclauses 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.

8.2 Ratings and characteristics

The values indicated in Table 7 are recommended for type 3.5/12 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.

Current: Test Class 1: 15 A a.c. minimum

Test Class 2: 15 A a.c. maximum

Test Class 3: 10 A a.c. minimum

Table 7 – Rating and characteristic

Ratings and characteristics	IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Electrical			
Nominal impedance		75 Ω	
Frequency range – Grade 1 connectors		Up to 6 GHz	
Reflection factor	9.2.1		
– straight styles [a]		Test class 1: Frequency ±300 MHz 1 GHz 0,01 2 GHz 0,015 4 GHz 0,03 6 GHz 0,06 Value for one connector Test class 2: Frequency ±300 MHz 1 GHz 0,01 2 GHz 0,015 4 GHz 0,02 6 GHz 0,03 Value for the whole adaptor	(for test classes 1 and 2) Grade 1 only (this test is not applicable for Grade 2 connectors) Standard test connector to be used in accordance with Subclause 6.2
Centre contact resistance	9.2.3		
– initial		≤ 1,0 mΩ	
– after conditioning		≤ 2,0 mΩ	
Outer conductor continuity [a]	9.2.3		
– initial		≤ 1,5 mΩ	
– after conditioning		≤ 1,9 mΩ	
Insulation resistance[a]	9.2.5		
– initial		≥ 5 GΩ	
– after conditioning		≥ 100 MΩ	

Ratings and characteristics	IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Proof voltage at sea level [b, c]	9.2.6	2 500 V	
Proof voltage at 4,4 kPa [b,c]	9.2.6	450 V	4,4 kPa approximately equivalent to 20 km
Screening effectiveness (straight cabled connectors only)	9.2.8	114 dB to 1 GHz	$Z_t \leq 0{,}01$ mΩ applied torque 10 Nm
Discharge test (Corona) – at sea level (cable 60096 IEC 50-3)	9.2.9	≥ 2 100 V	Extinction voltage Test class 1 only
Intermodulation level	IEC 62037	Over -100 dBc	Test power 60 dBmv (75 Ω)
Mechanical			
Centre contact captivation axial force – torque	9.3.5	80N, 1 min Na	Maximum displacement 0,25 mm each direction
Engagement and separation force and torque, – axial force – torque	9.3.6	≤ 12 N >10 <35 Nm.	
Gauge retention force (resilient contacts) – centre – outer	9.3.4	>4 N <9 N Na	Only for slotted contacts
Mechanical tests on cable fixing cable pulling, force minimum	9.3.7	200 N	For cables 96 IEC 75-7-1/2/8
Cable bending	9.3.9	500N	Bending number 1 Bending angle 90°
Cable torsion	9.3.10	3,5 Nm	For cables 96 IEC 75-7-1/2/8
Tensile strength of coupling mechanism	9.3.11	300 N	
Bending moment (and static load)	9.3.12	500N at 10mm	
Vibration	9.3.3	100 m/s^2 10 Hz – 500 Hz	**gn acceleration** During the test with measuring equipment with a resolution better than 1 ns there shall be no indicated intermittency
Bump	9.3.13	–	
Shock	9.3.14	500 m/s^2 ½ sin 6 ms	50 g_n acceleration
Environmental			
Climatic sequence [d]		A: 40/5/21 B:55/155/56	
Sealing – non-hermetic	9.4.5.1	1 cm^3/h max. 300 kPa differential	
Sealing – hermetic	9.4.5.2	na	
Salt mist	9.4.6	Duration of spraying: 48 h	There shall be no corrosion such as would impair normal operation Disengagement and engagement shall be achieved in the normal manner by hand.

Ratings and characteristics	IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Endurance			
Mechanical	9.5 7.10	500 operations 12 operations per minute	After the test, the following requirements shall be met: Voltage proof: 2,5 kV The contact resistance shall not increase more than 1 mΩ for the inner conductor compared with the values of Subclause 9.4.2. Engagement and disengagement of the connectors by means of the screw coupling shall be possible by hand in the normal manner. Gauge retention force for the inner conductor shall not be less than 4 N.
High temperature [d]	9.6	1 000 h at 155 °C	

[a] These values apply to basic connectors. They depend on the cable used. Relevant values are given in the DS.

[b] Voltage values are r.m.s. values at 50 Hz to 60 Hz, unless otherwise specified.

[c] Cables used with these connectors may have values of lower performance than those given in this table.

[d] For certain connectors the upper temperature limit is restricted by the cable characteristics. Reference should be made to the relevant cable specification.

8.3 Test schedule and inspection requirements

8.3.1 Acceptance tests

Table 8 – Acceptance tests

	Test method IEC 61169-1 Subclause	Assessment level M (higher)				Assessment level H (lower)			
		Test required	IL	AQL %	Period	Test required	IL	AQL %	Period
Group A1									
Visual examination	9.1.2	a	II	1,0		a	S3	1,5	
Group B1									
Outline dimensions	9.1.3.1	a	S4	0,4		a	S3	4,0	
Mechanical compatibility	9.1.3.3	a	II	1,0		a	S3	1,5	
Engagement and separation	9.3.6	a	S4	0,40	Lot	a	S3	1,5	Lot
Gauge retention (resilient contact)	9.3.4	ia	II	1,0		ia	S3	1,5	
Sealing, non-hermetic	9.4.5.1	ia	II	0,65	by	ia	S3	1,0	by
Sealing, hermetic	9.4.5.2	ia	II	0,015		ia	S3	0,025	
Voltage proof	9.2.6	a	S4	0,40	lot	a	II	4,0	lot
Solderability piece parts	9.3.2.1.1	ia	S4	0,40		ia	S3	4,0	
Insulation resistance	9.2.5	a	S4	0,40		a	S3	4,0	

8.3.2 Periodic tests

There are no group C tests for levels H and M.

Table 9 – Periodic tests

	Test method IEC 61169-1 subclause	Assessment level M (higher)				Assessment level H (lower)			
		Test required	Number of specimens	Permitted failures per group[2]	Period	Test required	Number of specimens	Permitted failures per group[2]	Period
Group D1 (d)			6	1	3 years		3	1	3 years
Solderability connector assemblies	9.3.2.1.1	ia				ia			
Resistance to soldering heat	9.3.2.1.2	ia				ia			
Mechanical tests on cable fixing									
- cable rotation (nutation)	9.3.7.2	na				na			
- cable pulling	9.3.8	ia				ia			
- cable bending	9.3.9	ia				ia			
- cable torsion	9.3.10	ia				ia			
Group D2 (d)			6	1	3 years		3	1	3 years
Contact resistance, outer conductor and screen continuity centre conductor continuity	9.2.3	a				a			
Vibration	9.3.3	a							
Damp heat, steady state	9.4.3	a				a			
Group D3 (d)			1[1]	1	3 years		1[1]	1	3 years
Dimensions piece-parts and materials	9.1.3.2	a				a			
Group D4 (d)			6	1	3 years		3	1	3 years
Mechanical endurance	9.5	a				a			
High tempera-ture endurance	9.6	a				a			
Discharge test	9.2.9								
Sulphur dioxide	9.4.8	na				na			
Group D5 (d)			6	1	3 years		3	1	3 years
Reflection factor	9.2.1	a				a			
Screening effectiveness	9.2.8	a				a			
Water immersion	9.2.7	ia				ia			
Group D6 (d)			6	1	3 years		3	1	3 years
Contact captivation	9.3.5	a				a			
Rapid change of temperature	9.4.4	na				na			
Climatic sequence	9.4.2	a				a			

	Test method IEC 61169-1 subclause	Assessment level M (higher)				Assessment level H (lower)			
		Test required	Number of specimens	Permitted failures per group[2]	Period	Test required	Number of specimens	Permitted failures per group[2]	Period
Group D7 (d) Salt mist	9.4.6	a	1[3]		3 years		1[3]		3 years

Details of symbols, abbreviations and procedures:

a = suggested as applicable

ia = test suggested (if technically applicable)

na = not applicable

IL = inspection level

AQL = acceptable quality level

1 = one set of piece-parts each style and variant, unless using common piece parts

2 = for Qualification Approval (QA) a total of two failures only permitted for level H and 1 failure only for level M from groups D1 to D7

3 = Group D7 – number of pairs for each solvent

(d) = destructive tests – specimens shall not be returned to stock

8.4 Procedures

8.4.1 Quality conformance inspection

This shall consist of test groups A1 and B1 on a lot-by-lot basis.

8.4.2 Qualification approval and its maintenance

This shall consist of three consecutive lots passing test groups A1 and B1 followed by selection of specimens from the lots as appropriate.

These specimens shall be divided into five lots that shall successfully pass the specified periodic D tests.

The group of connectors to be tested should be selected from the whole range of patterns. For the different patterns the tests should be carried out as appropriate. For patterns 61169-14 IEC-1/2/3/4/5, type of cable to be used: 96 IEC 75-7-1/2/8.

Where appropriate, the manufacturer shall specify the type of cable to be used for carrying out the test on a particular type of connector in accordance with the current standard.

Length of cable for each test shall be three times the minimum bending radius of the cable used.

a) First lot

Connectors of test Class 1 are fitted to the specified cable at both ends. A cable with close tolerance of characteristic impedance and high homogeneity shall be used.

During fitting of the solder type connectors to the cables the conformity of the connectors with the soldering requirements in Subclause 9.2.1 of IEC 601169-1 should be checked.

First lot shall be submitted to tests D1, D5, D7.

b) Second, third and fourth lots

Connectors of test Class 1 are fitted to the specified cable. The free end of the cable is prepared in such a way that inner and outer conductors can be electrically connected for measuring purposes.

Sealed fixed specimens shall be mounted in a suitable test jig.

The contact resistance should be measured according to Subclause 9.2.3 of IEC 61169-1 including the resistance of the specified piece of cable. The value measured minus the calculated value for the inner conductor of the two pieces of cable must not exceed 1 mat.

NOTE Instead of using a calculated value, the resistance of the inner conductor may be obtained by measuring the resistance of a piece of cable with twice the length specified. After this, the cable should be cut in the middle and the connectors should be fixed. When fixing the two halves of the cable onto the connectors, the original length of the cable inner conductor must not be shortened.

The values are to be recorded.

c) Second lot

Second lot shall be submitted to tests D2,D3.

d) Third lot

Half of the connectors fitted with cable are mated and the other half is unmated. One half of the test Class 2 and the test Class 3 connectors are mated and the other half are unmated.

The mated pairs of connectors shall stay mated throughout the test sequence; care being taken to avoid movement between the two connectors.

Third lot shall be submitted to tests D6.

e) Fifth lot

Connectors are mounted according to Figure 1 of IEC 61169-1, Subclause 9.2.8.

Cable fitted according to 9.4.1, but with a length six times the minimum bending radius.

The open ends of the cables should be prepared in such a way that no corona effects occur at this point.

Third lot shall be submitted to tests D4.

9 Instructions for preparation of detail specifications

9.1 General

Detail specifications (DS) writers shall use the appropriate BDS pro-forma. The following pages comprise the pro-forma BDS dedicated for use with type BNC connectors. As such, it will already have entered on it information relating to

a) the basic specification number applicable to all the detail specifications covering connector styles of the type covered by the sectional specification;
b) the connector series designation.

The specification writer should enter the details relating to the connector style/variant(s) to be covered as indicated. The numbers in brackets on the BDS pro-forma correspond to the following indications which shall be given.

9.2 Identification of the detail specification

(1) The name of the National Standards Organization (NSO) under whose authority the DS is published and, if applicable, the organization from whom the DS is available.

(2) The relevant mark of conformity and the number allotted to the DS by the relevant national or international organization authorizing the DS.

(3) The number and issue number of the IEC/IECQ generic or sectional specification as relevant; also national reference if different.

(4) If different from the IEC/IECQ number, any national number of the DS, date of issue and any further information required by the national system, together with any amendment numbers.

9.3 Identification of the component

(5) Enter the following details:

Style: The style designation of the connector including type of fixing and sealing, if applicable.

Attachment: By deletion of the inapplicable options of cable/wire: given for centre and outer conductors.

Special features and markings: As applicable.

(6) Enter details of assessment level and the climatic category.

(7) A reproduction of the outline drawing and details of the panel piercing, if applicable. It shall provide the maximum envelope dimensions, also the position of the reference plane and, in the case of a fixed connector, the position of the mounting plane(s) relative to the front face of the connector.

Any maximum panel thickness limitations for fixed connectors shall be stated.

(8) Particulars of all variants covered by the DS. As appropriate, the information shall include:

- cable types (or sizes) applicable to each variant;
- alternative plated or protective finishes;
- details of alternative mounting flanges having either tapped or plain mounting holes;
- details of alternative solder spills or solder buckets including, when applicable, those for use with microwave integrated circuit (MIC) components.

9.4 Performance

(9) Performance data listing the most important characteristics of the connector taking into account the recommended values of 7.2 in this specification. Deviations from the minimum requirements shall be clearly indicated. Non-applicable parameters shall be marked ‘na’.

9.5 Marking, ordering information and related matters

(10) Insert marking and ordering information as appropriate, together with details of related documents and any invoked structural similarity.

9.6 Selection of tests, test conditions and severities

(11) ‘na’ shall be used to indicate non-applicable tests. All tests marked ‘a’ by the detail specification writer shall be mandatory.

When using the normal procedure with a dedicated BDS, the letter ‘a’ – for applicable – shall be entered in the ‘Test required’ column against each of the tests indicated as being mandatory in the test schedule as in 7.3 of this specification. Any additional tests required at the discretion of the specification writer shall also be indicated by an ‘a’.

The specification writer shall also indicate, when necessary, details of deviations from the standard test methods and test conditions, including any relevant deviations given in the test schedule of the sectional specification.

The qualification approval and conformance inspection shall be such that the National Supervising Inspectorate (NSI) shall be satisfied that they are appropriate and in line with those for other connectors within the system providing a reasonably comparable service.

10 Blank detail specification pro-forma for type 3.5/12 connector

The following pages contain the complete BDS pro-forma.

(1)	Page 1 of …..
ELECTRONIC COMPONENT OF ASSESSED QUALITY IN ACCORDANCE WITH GENERIC SPECIFICATION IEC 61169-1 NATIONAL REFERENCE	(4) ISSUE ....
(5) Detail specification for Radio frequency coaxial connector of assessed quality	type 3.5/12
Style:.....	Special features and markings
Method of cable/wire+ attachment	centre conductor – solder/crimp+ outer conductor – solder/clamp/crimp + + delete as appropriate
(6) Assessment level.....	Characteristic impedance … Ω / Climatic category..../.../.../
(7) Outline and maximum dimensions	Panel piercing and mounting details

(8) Variants

Variant No.	Description of variant	60096 IEC			
01.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....

Information about manufacturers who have components qualified to this detail specification is available through the IECQ on-line certificate system.

(9) Performance (including limiting conditions of use)

Ratings and characteristics		IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Electrical				
Nominal impedance			....Ω	
Frequency range			....GHz	Measurement frequency range
Reflection factor	Variant No. Designation 01.....	9.2.1		 ....
Centre contact resistance		9.2.3	≤ .....mΩ ≤.....mΩ	Initial After conditioning
Centre conductor continuity	01.....	9.2.3	.....mΩ .....mΩ .....mΩ .....mΩ	Resistance change due to conditioning
Outer contact continuity		9.2.3	≤ .....mΩ ≤.....mΩ	Initial After conditioning
Insulation resistance		9.2.5	≥.....GΩ ≥.....GΩ	Initial After conditioning
+ Proof voltage at sea level	01.....	9.2.6	.....kV .....kV .....kV .....kV	86-106 kPa
+ Proof voltage at 4,4 kPa	01.....	9.2.6	.....V .....V .....V V	.....kPa (if not 4,4 kPa)
Screening effectiveness	01.....	9.2.8	....dB at....GHz	Z_t ≤..... mΩ
Discharge test (corona) at sea level	01.....	9.2.9	≥..... V ≥..... V ≥..... V ≥..... V	Extinction voltage
ADDITIONAL ELECTRICAL CHARACTERISTICS				
+ Voltage values are r.m.s. values at 50 Hz to 60 Hz, unless otherwise specified.				

Ratings and characteristics		IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Mechanical				
Soldering - bit size		9.3.2.1.1	.....	
Gauge retention resilient contacts - inner contact - outer contact		9.3.4	.....N .....N	
Centre contact captivation - axial force - permitted displacement each direction - torque		9.3.5	.....N .....mm .....Nm	
Engagement and separation - axial force		9.3.6		
Strength of coupling mechanism		9.3.11	.....N	
Effectiveness of cable fixing against				
- cable rotation	01.....	9.3.7	Rotations	
- cable pulling	01.....	9.3.8	.....N	
- cable bending	01.....	9.3.9	.....Cycles	Length of cable mass ....
- cable torsion	01.....	9.3.10	.....Nm	
Bending moment		9.3.12	.....Nm	Relative to reference plane
Bumps total		9.3.13	.....m/s^2 .....to..... Hz	(..... g_n acceleration)
Vibration		9.3.3	.....m/s^2 .....to..... Hz	(..... g_n acceleration)
Shock		9.3.14	.....m/s^2 .....Shape .....ms	(..... g_n acceleration)
ADDITIONAL MECHANICAL CHARACTERISTICS				

Ratings and characteristics	IEC 61169-1 Subclause	Value	Remarks including any deviations from standard test methods
Environmental			
Climatic category		...../...../.....	
Sealing non-hermetically sealed connectors	9.4.5.1	.....cm^3/h	100 kPa to 110 kPa pressure differential
Sealing hermetically sealed connectors	9.4.5.2	10^{-5} bar/cm^3/h	100 kPa to 110 kPa pressure differential
Water immersion	9.2.7		
Salt mist	9.4.6	..... h	Duration of spraying
ADDITIONAL ENVIRONMENTAL CHARACTERISTICS			
ENDURANCE			
Mechanical	9.5	.....operations	
High temperature	9.6	.....h at.....°C	
ADDITIONAL ENDURANCE CHARACTERISTICS			
CHEMICAL CONTAMINATION			
Resistance to solvents and contaminating fluids to be used.	9.7	....	
Applicable fluids.		....	
Sulphur dioxide	9.4.8	..... days	

(10) Supplementary information

– Marking of the component: in accordance with 11.1 of IEC 61169-1 in the following order of preference:

1) Manufacturer code: .....
2) Manufacturing date code: year/week
3) Component identification: Variant No./ Identification Designation
.....
.....
.....
.....
.....
.....
.....
.....

– Marking and contents of package: in accordance with 11.2 of IEC 61169-1

1) Information prescribed in 11.1 of IEC 61169-1 detailed above
2) Nominal characteristic impedance .... Ω.....
3) Assessment level code letter .....
4) Any additional marking required .....

Ordering information
1) Number of the detail specification ..../Variant code
2) Assessment level code letter .....
3) Body finish (if more than one listed) .....
4) Any additional information or special requirements .....

– Related documents (if not included in IEC 61169-1 or sectional specification):

.....

.....

– Structural similarity in accordance with 10.2.2 of IEC 61169-1

NOTE Relevant information on a basic style should be entered as variant 01.

_____

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