BS EN 4652-001:2015

BSI Standards Publication

Aerospace series — Connectors, coaxial, radio frequency

Part 001: Technical specification

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National foreword

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

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 4652-001:2015) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.

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1 Scope

This European Standard specifies the required characteristics, test methods, qualification and acceptance conditions of coaxial, radio frequency connectors used with flexible radio frequency cables in accordance with EN 4604-001 and semi-rigid coaxial cables.

This family of connectors is derived from MIL-PRF-39012. Front face dimensions are identical and products are fully intermateable.

Cables usable with present specification are listed in TR 6058.

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.

EN 2424, *Aerospace series - Marking of aerospace products*

EN 2591 [1)], *Aerospace series — Elements of electrical and optical connection — Test methods*

EN 3909, *Aerospace series - Test fluids and test methods for electric components and sub-assemblies*

EN 4604-001, *Aerospace series - Cable, electrical, for signal transmission - Part 001: Technical specification*

EN 9133, *Aerospace series - Quality management systems - Qualification procedure for aerospace standard parts*

MIL-HDBK-454, *General Guidelines for Electronic Equipment* [2)]

MIL-PRF-39012, *Connectors, coaxial, radio frequency — General specification for* [2)]

TR 6058, *Aerospace series — Cable code identification list* [3)]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 apply.

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1) All parts quoted in this European Standard.

2) Published by: DoD National (US) Mil. Department of Defense. http://www.defenselink.mil/

3) Published as ASD-STAN Technical Report at the date of publication of this European Standard. http://www.asd-stan.org/

4 Description

4.1 Types of connectors

The characteristics of types of coaxial radio frequency connectors are defined in this European Standard.

— Type 1: BNC interface, 50 Ω impedance, bayonet coupling.

— Type 2: TNC interface, 50 Ω impedance, screw-on coupling.

— Type 3: N interface, 50 Ω impedance, screw-on coupling.

— Type 4: C interface, 50 Ω impedance, bayonet coupling.

— Type 5: HN interface, 50 Ω impedance, screw-on coupling

— Type 6: SMA interface, 50 Ω impedance, screw-on coupling

4.2 Models of connectors

Models of connectors are defined in this European Standard.

— Model code 0: straight plug.

— Model code 1: right angle plug.

— Model code 2: square flange receptacle.

— Model code 3: bulkhead receptacle.

— Model code 4: adaptor.

4.3 Technologies of assembly

Cable and connector assemblies are defined in this European Standard.

— Code 0: solder type.

— Code 1: clamp type.

— Code 2: crimp type.

4.3.1 Solder technology

The core and the braid of the cable are soldered to the connector.

4.3.2 Clamp technology

The core of the cable is plugged into the centre contact.

A clamp nut fixes the braid of the cable onto the body of the connector (see product standard).

4.3.3 Crimp technology

The core of the cable is crimped (or soldered see product standard) into the centre contact.

A ferrule crimps the braid of the cable onto the body of the connector (see product standard).

4.4 Permissible cables

The permissible coaxial cables shall be specified in the product standard.

Their cable codes are given by TR 6058.

4.5 Materials and surface treatments

See product standard.

5 Definition and mass

5.1 Dimensions and masses

The general dimensions and masses of the straight plug, right angle plug, square flange receptacle, bulkhead receptacle and adaptor are given in the product standard.

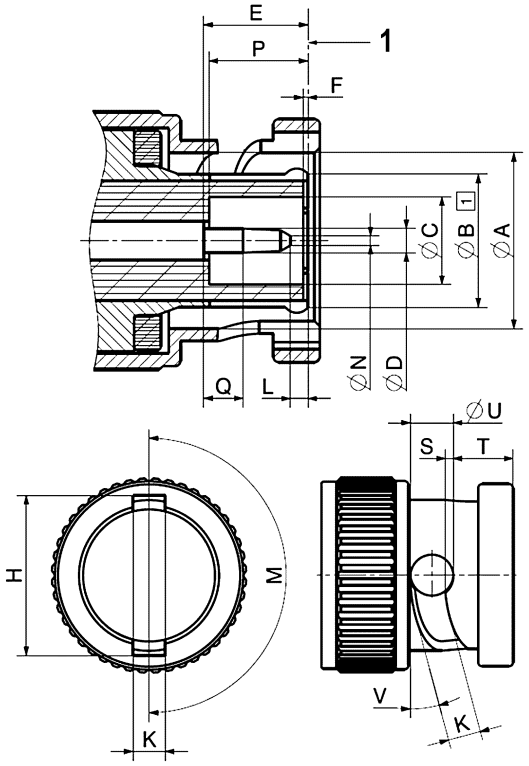
5.2 Interface dimensions

5.2.1 Type 1 connectors BNC interface

5.2.1.1 Plug, 50 Ω

See Figure 1 and Table 1.

Dimensions in millimetres



Key

1 REF. Plane

Figure 1 — BNC plug interface

Table 1 — BNC plug dimensions

Dimensions in millimetres

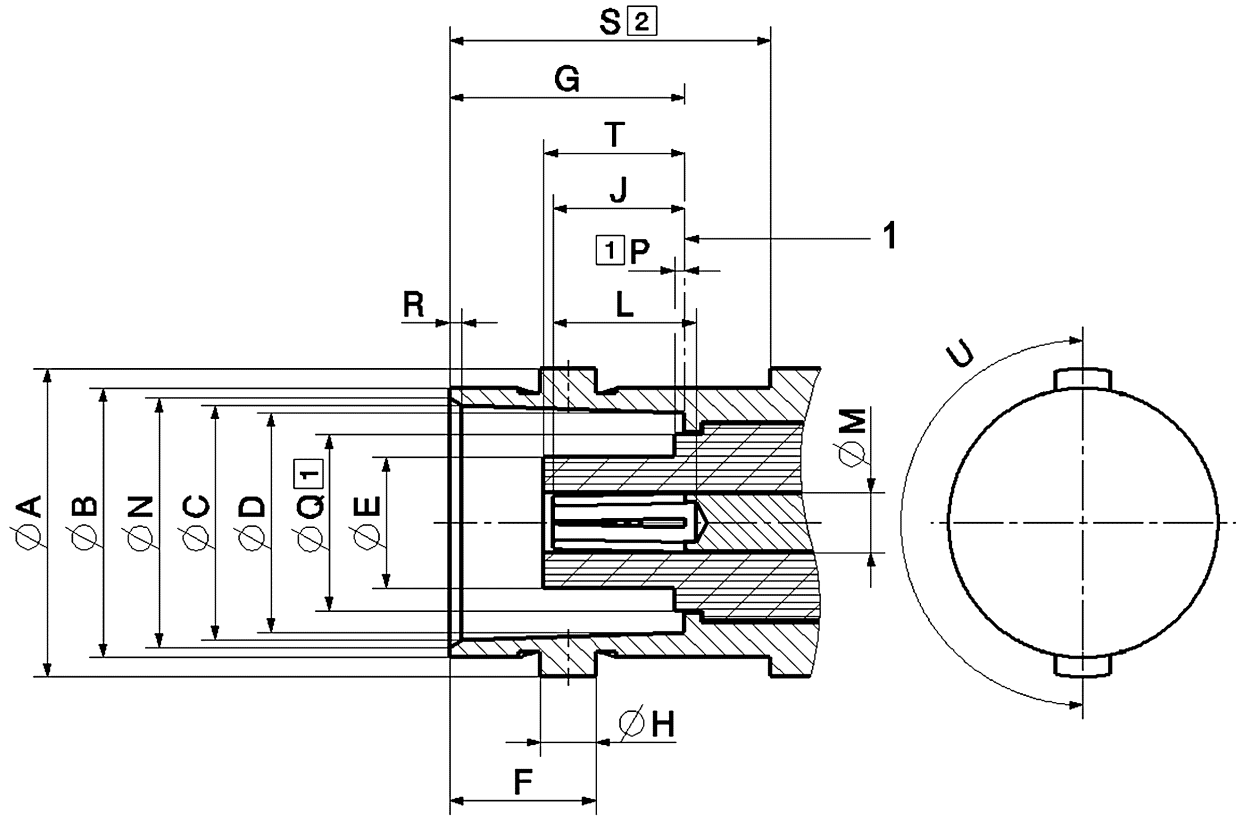
	Ø *A*	Ø *B*	Ø *C*	Ø *D*	*E*	*F*	*H*	*K*	*L*	*M*	Ø *N*	*P*	*Q*	*S*	*T*	Ø *U*	*V*
min.	9,78	–	4,83	1,32	5,33	0,15	11,76	2,31	0,08	179°	–	5,28	1,98	0,46	4,57	3,15	14,5°
max.	9,91	8,31	–	1,37	5,84	–	12,01	2,46	–	181°	0,64	5,79	–	0,56	4,67	–	15,5°

NOTE Slotted and flared to meet electrical and mechanical performance.

5.2.1.2 Receptacle, 50 Ω

See Figure 2 and Table 2.

Dimensions in millimetres



Key

1 REF. Plane

Figure 2 — BNC receptacle interface

Table 2 — BNC receptacle dimensions

Dimensions in millimetres

	Ø *A*	Ø *B*	Ø *C*	Ø *D*	Ø *E*	*F*	*G*	Ø *H*	*J*	*L*	Ø *M*	Ø *N*	*P*	Ø *Q*	*R*	*S*	*T*	*U*
min.	10,97	9,60	8,31	8,10	–	5,18	8,31	1,91	4,72	4,95	2,06	8,79	–	–	0,38	10,52	4,78	179°
max.	11,07	9,70	8,46	8,15	4,72	5,28	8,51	2,06	5,23	–	2,21	9,04	0,15	6,5	0,76	–	5,28	181°

NOTE 1 *Q* dimension applies to that portion (if applicable) of the dielectric which protrudes beyond the metal shoulder (or reference plane) by dimension *P*.

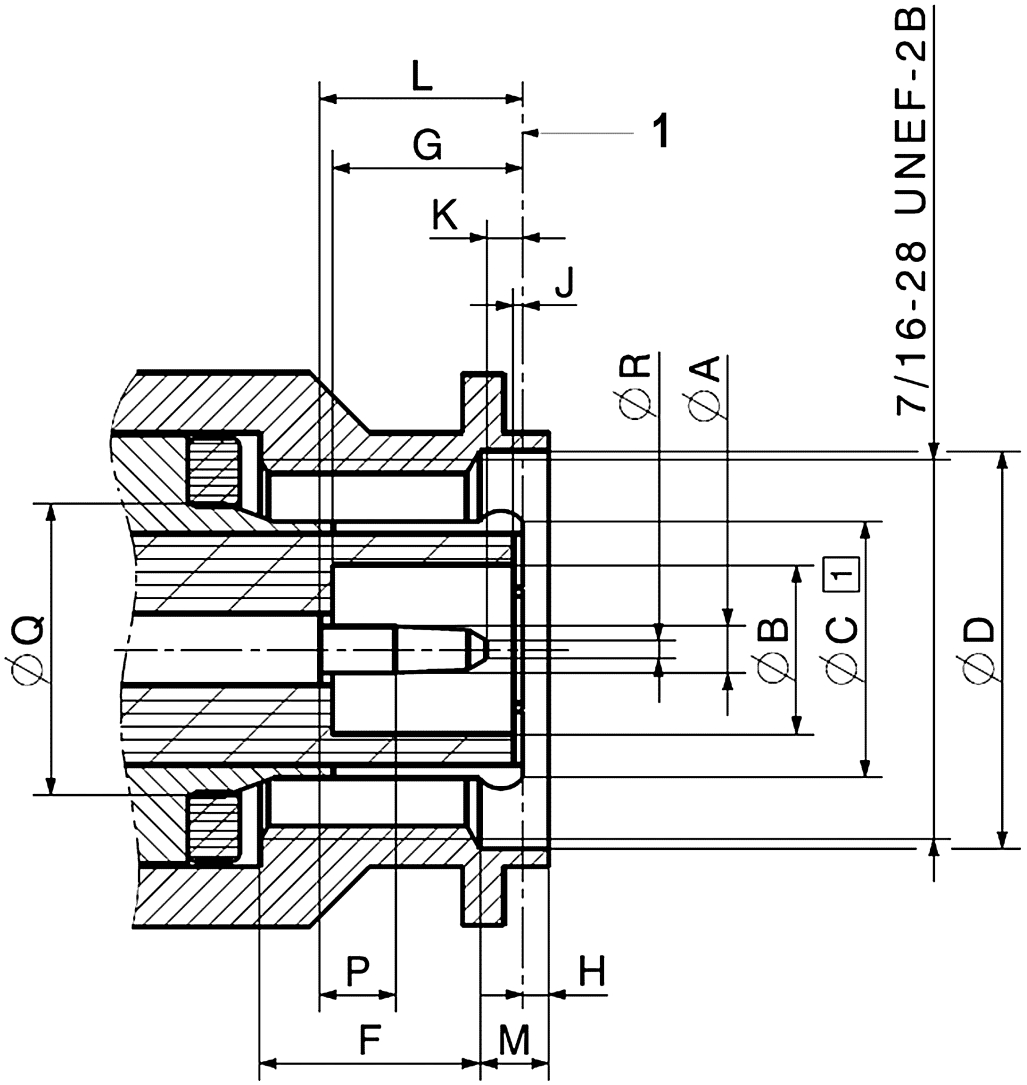
NOTE 2 Clearance for mating connector coupling nut.

5.2.2 Type 2 connectors TNC interface

5.2.2.1 Plug, 50 Ω, style A

See Figures 3a and Table 3a.

Dimensions in millimetres



Key

1 REF. Plane

Figure 3a — TNC plug style A interface

Table 3a — TNC plug style A dimensions

Dimensions in millimetres

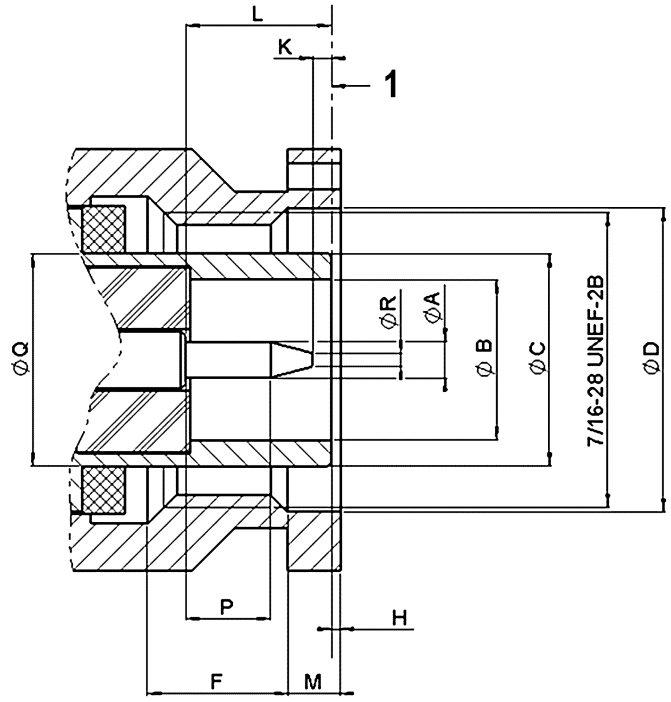
	Ø *A*	Ø *B*	Ø *C*	Ø *D*	*F*	*G*	*H*	*J*	*K*	*L*	*M*	*P*	Ø *Q*	Ø *R*
min.	1,32	4,83	–	11,18	3,96	5,28	–	0,15	0,08	5,33	1,60	1,98	–	–
max.	1,37	–	8,31	–	–	5,79	1,98	–	1,02	5,84	–	–	8,18	0,64

NOTE Flared to meet electrical and mechanical performance.

5.2.2.2 Plug, 50 Ω, style B

See Figure 3b and Table 3b.

Dimensions in millimetres



Key

1 REF. Plane

Figure 3b — TNC plug style B interface

Table 3b — TNC plug style B dimensions

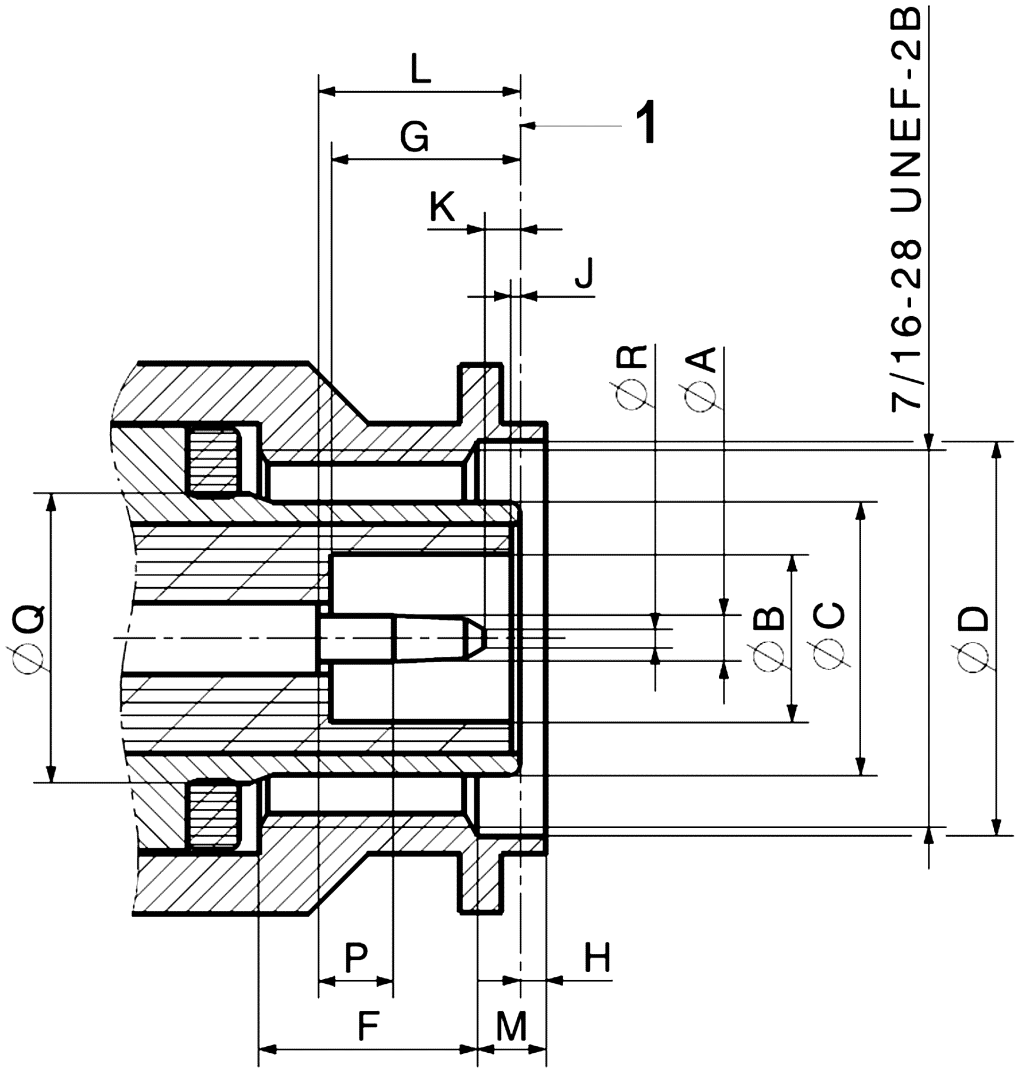
Dimensions in millimetres

	Ø A	*Ø B*	*Ø C*	*Ø D*	*F*	*G*	*H*	*K*	*L*	*M*	*P*	*Ø R*
min.	1,32	6,05	–	11,18	3,96	5,28	–	0,08	5,33	1,60	1,98	–
max.	1,37	6,15	8,09	–	–	5,79	1,98	1,02	5,84	–	–	0,64

5.2.2.3 Plug, 50 Ω, style C

See Figure 3c and Table 3c.

Dimensions in millimetres



Key

1 REF. Plane

Figure 3c — TNC plug style C interface

Table 3c — TNC plug style C dimensions

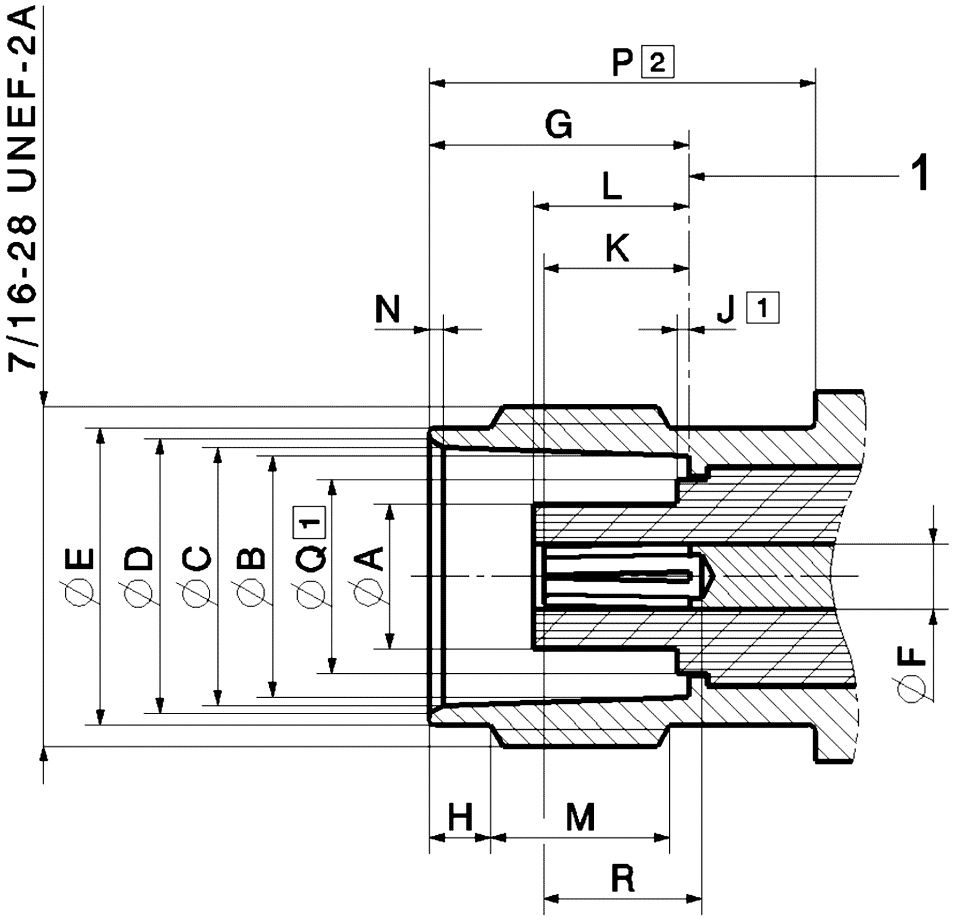
Dimensions in millimetres

	Ø *A*	Ø *B*	Ø *C*	Ø *D*	*F*	*G*	*H*	*J*	*K*	*L*	*M*	*P*	Ø *Q*	Ø *R*
min.	1,32	4,83	–	11,18	3,96	5,28	–	0,15	0,08	5,33	1,60	1,98	–	–
max.	1,37	–	8,09	–	–	5,79	1,98	–	1,02	5,84	–	–	8,18	0,64

5.2.2.4 Receptacle, 50 Ω

See Figure 4 and Table 4.

Dimensions in millimetres



Key

1 REF. Plane

Figure 4 — TNC receptacle interface

Table 4 — TNC receptacle dimensions

Dimensions in millimetres

	Ø *A*	Ø *B*	Ø *C*	Ø *D*	Ø *E*	Ø *F*	*G*	*H*	*J*	*K*	*L*	*M*	*N*	*P*	Ø *Q*	*R*
min.	–	8,10	8,31	8,79	9,60	2,06	8,31	1,73	–	4,72	4,78	4,75	0,38	10,52	–	4,95
max.	4,72	8,15	8,46	9,04	9,68	2,21	8,51	2,24	0,15	5,23	5,28	–	0,76	–	6,50	–

NOTE 1 *Q* dimension applies to that portion (if applicable) of the dielectric which protrudes beyond the metal shoulder (or reference plane) by dimension *J*.

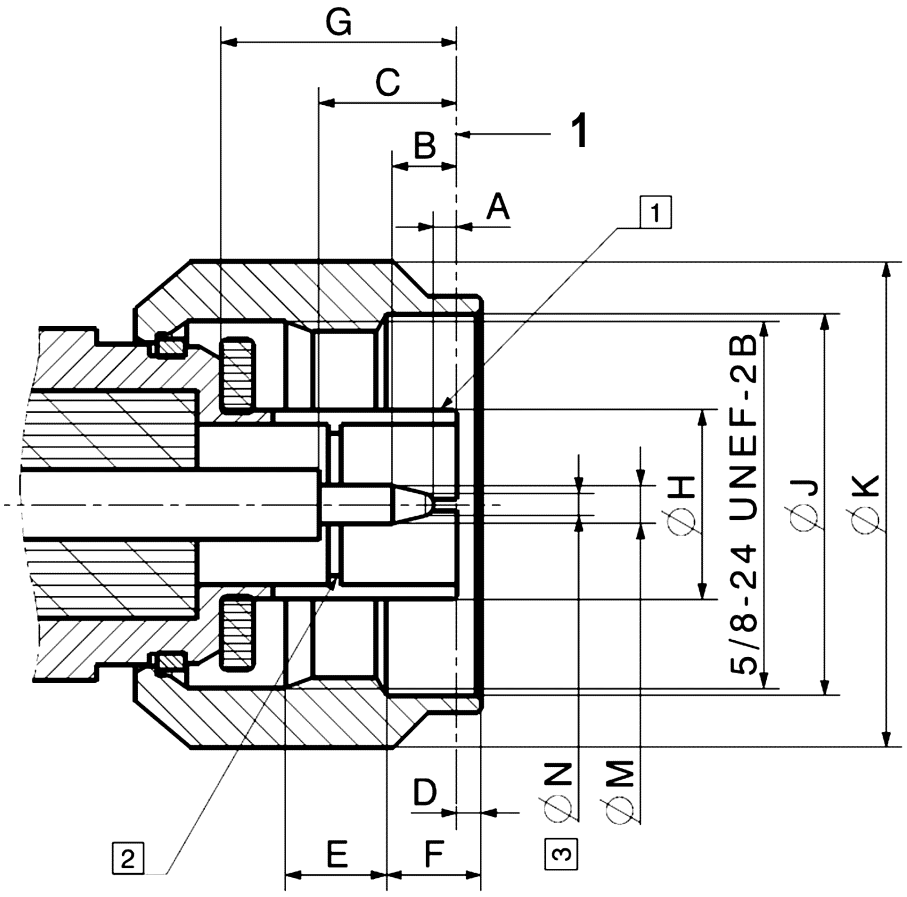
NOTE 2 Clearance for mating connector coupling nut.

5.2.3 Type 3 connectors N interface

5.2.3.1 Plug, 50 Ω

See Figure 5 and Table 5.

Dimensions in millimetres



Key

1 REF. Plane

Figure 5 — N plug interface

Table 5 — N plug dimensions

Dimensions in millimetres

	A	*B*	*C*	*D*	*E*	*F*	*G*	Ø *H*	Ø *J*	Ø *K*	Ø *M*	Ø *N*
min.	0,08	2,79	5,33	0,41	4,50	4,01	10,11	7,98	16,0	20,90	1,60	–
max.	1,03	3,56	5,84	1,52	–	4,27	10,46	8,38	–	21,7	1,68	0,25

NOTE 1 Slots optional (flared to meet electrical and mechanical performance).

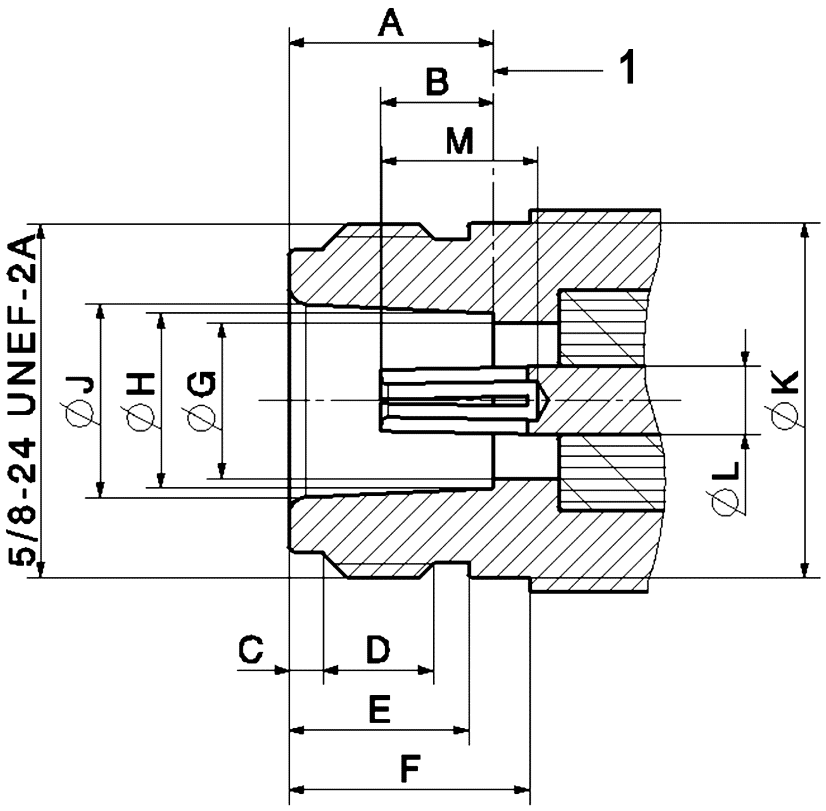
NOTE 2 Compensating ring optional.

NOTE 3 Radius or chamfer, shape of tip optional.

5.2.3.2 Receptacle, 50 Ω

See Figure 6 and Table 6.

Dimensions in millimetres



Key

1 REF. Plane

Figure 6 — N receptacle interface

Table 6 — N receptacle dimensions

Dimensions in millimetres

	A	*B*	*C*	*D*	*E*	*F*	Ø *G*	Ø *H*	Ø *J*	Ø *K*	Ø *L*	*M*
min.	9,04	4,75	1,19	4,37	6,76	10,72	−	8,03	8,53	−	3,02	5,33
max.	9,19	5,26	1,96	5,13	−	−	7,06	8,13	8,74	15,93	3,15	−

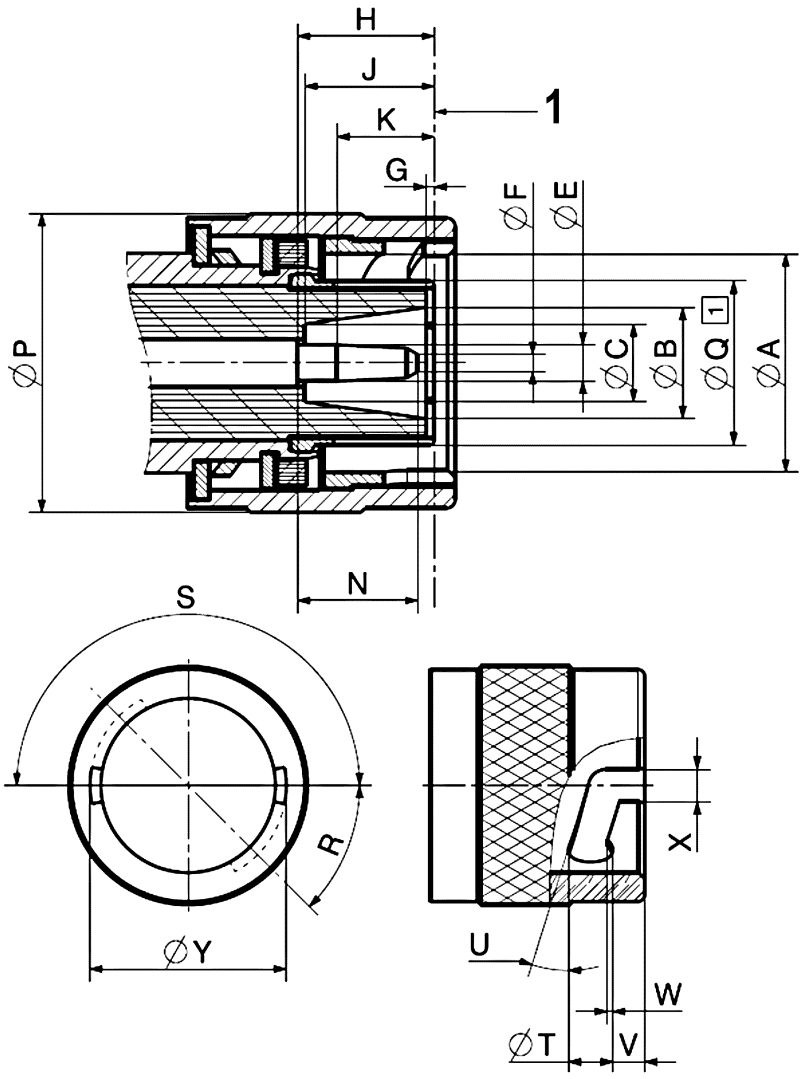
NOTE Clearance for mating connector coupling nut.

5.2.4 Type 4 connectors C interface

5.2.4.1 Plug, 50 Ω

See Figure 7 and Table 7.

Dimensions in millimetres



Key

1 REF. Plane

Figure 7 — C plug interface

Table 7 — C plug dimensions

Dimensions in millimetres

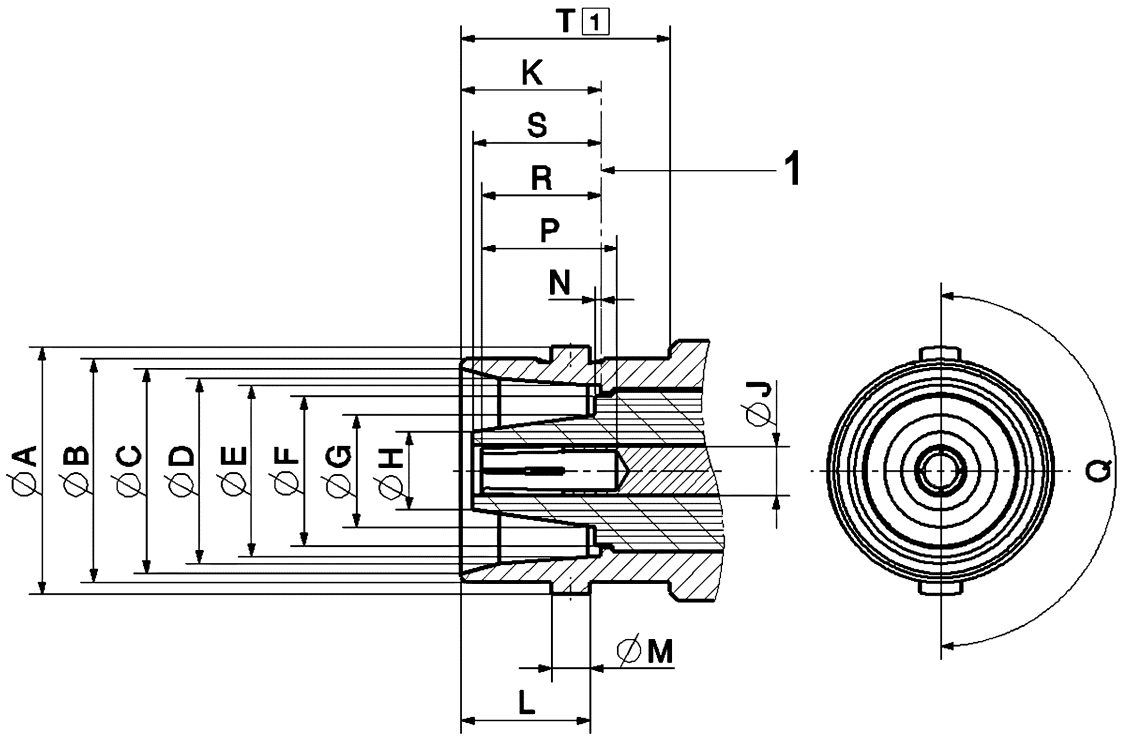
	Ø *A*	Ø *B*	Ø *C*	Ø *E*	Ø *F*	*G*	*H*	*J*	*K*	*N*
min.	13,79	7,01	4,93	2,29	–	0,18	7,80	7,85	4,85	7,54
max.	13,94	–	–	2,34	1,27	–	8,56	–	6,38	7,72

	Ø *P*	Ø *Q*	*R*	*S*	Ø *T*	*U*	*V*	*W*	*X*	Ø *Y*
min.	–	–	44,5°	179,5°	3,33	14,5°	2,62	0,25	2,64	15,54
max.	19,84	11,18	45,5°	180,5°	3,58	15,5°	2,87	0,41	2,90	–

5.2.4.2 Receptacle, 50 Ω

See Figure 8 and Table 8.

Dimensions in millimetres



Key

1 REF. Plane

Figure 8 — C receptacle interface

Table 8 — C receptacle dimensions

Dimensions in millimetres

	Ø *A*	Ø *B*	Ø *C*	Ø *D*	Ø *E*	Ø *F*	Ø *G*	Ø *H*	Ø *J*
min.	14,99	13,46	12,32	11,18	10,44	–	–	–	3,02
max.	15,24	13,72	12,57	11,43	10,54	9,50	6,91	4,83	3,15

	K	*L*	Ø *M*	*N*	*P*	*Q*	*R*	*S*	*T*
min.	8,43	7,80	2,24	–	7,62	179°	6,93	–	12,57
max.	8,59	7,95	2,49	0,18	–	181°	7,70	7,85	–

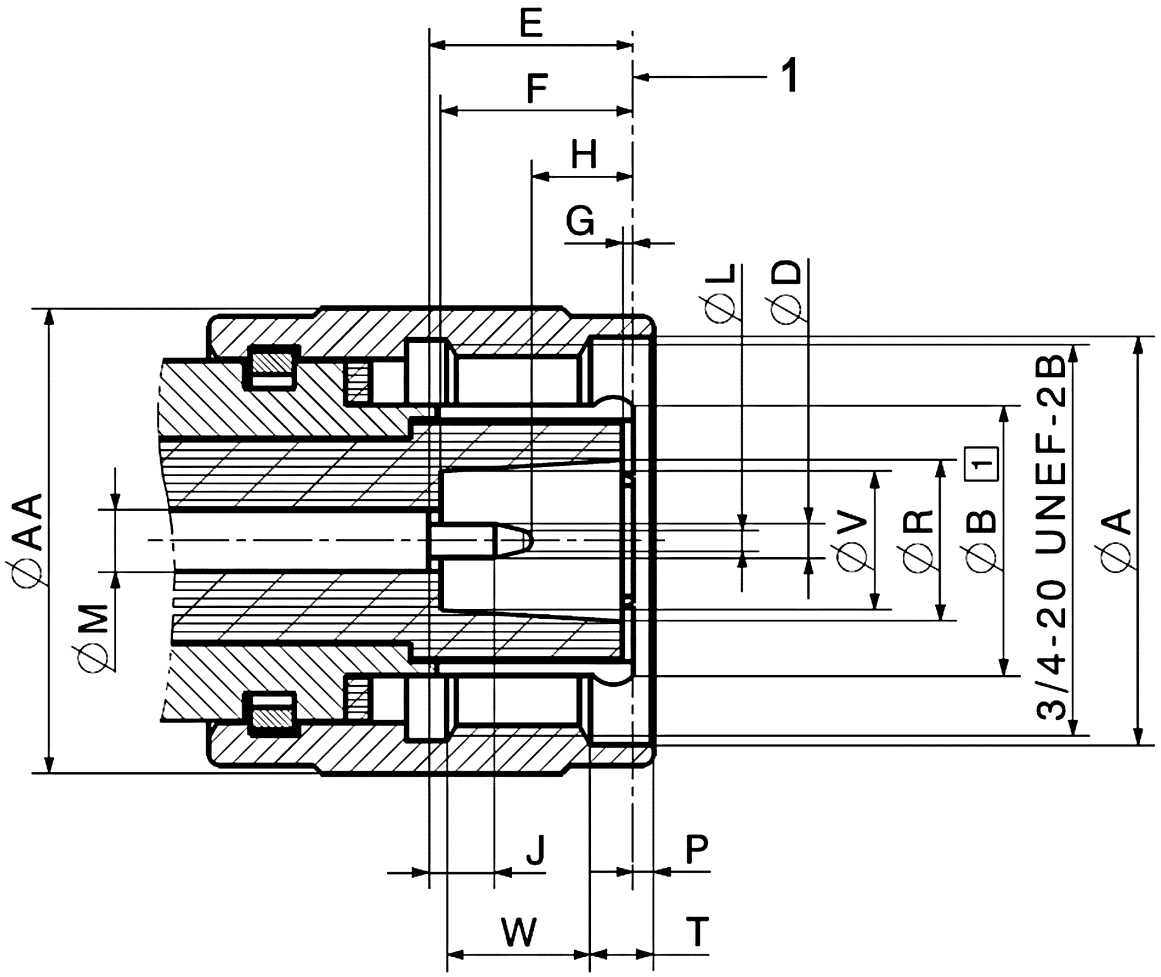
NOTE Clearance for mating connector coupling nut.

5.2.5 Type 5 connectors HN interface

5.2.5.1 Plug, 50 Ω

See Figure 9 and Table 9.

Dimensions in millimetres



Key

1 REF. Plane

Figure 9 — HN plug interface

Table 9 — HN plug dimensions

Dimensions in millimetres

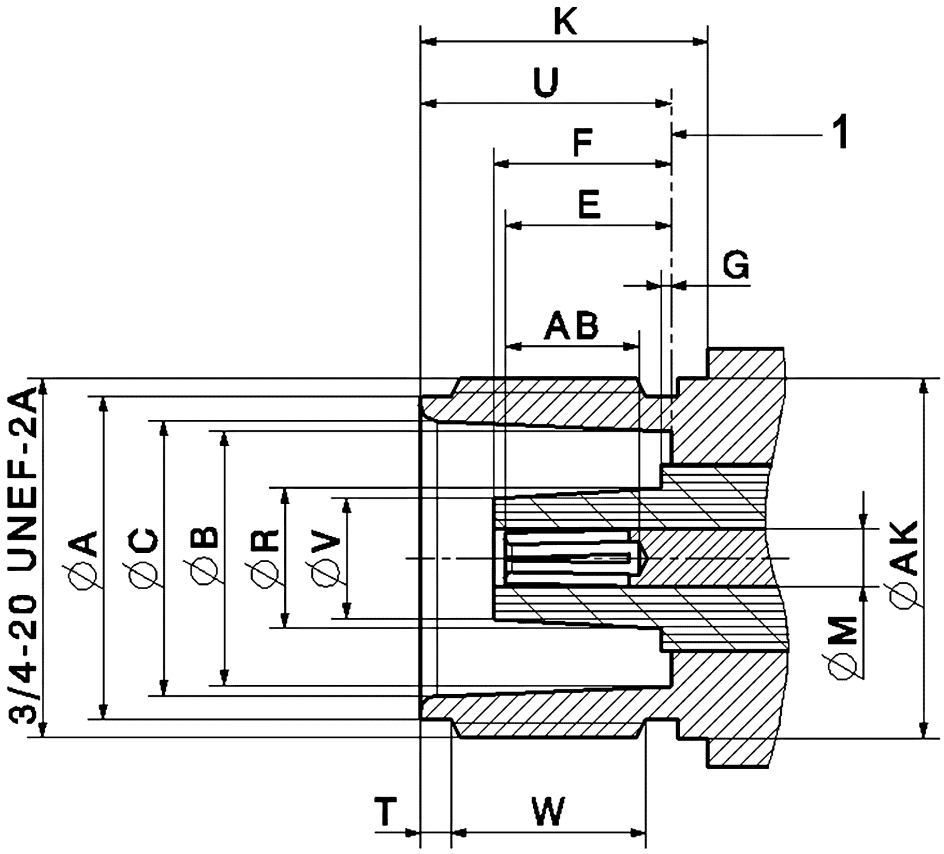
	Ø *A*	Ø *AA*	Ø *B*	Ø *D*	*E*	F	*G*	*H*	*J*	Ø *L*	Ø *M*	*P*	Ø *R*	*T*	Ø *V*	*W*
min.	19,30	–	–	1,60	9,10	9,33	0,13	3,50	3,05	–	–	–	7,34	2,54	6,69	10,24
max.	–	23,50	14,50	1,68	9,85	–	–	–	–	0,38	3,35	1,48	–	–	–	–

NOTE Flared to meet electrical and mechanical performance.

5.2.5.2 Receptacle, 50 Ω

See Figure 10 and Table 10.

Dimensions in millimetres



Key

1 REF. Plane

Figure 10 — HN receptacle interface

Table 10 — HN receptacle dimensions

Dimensions in millimetres

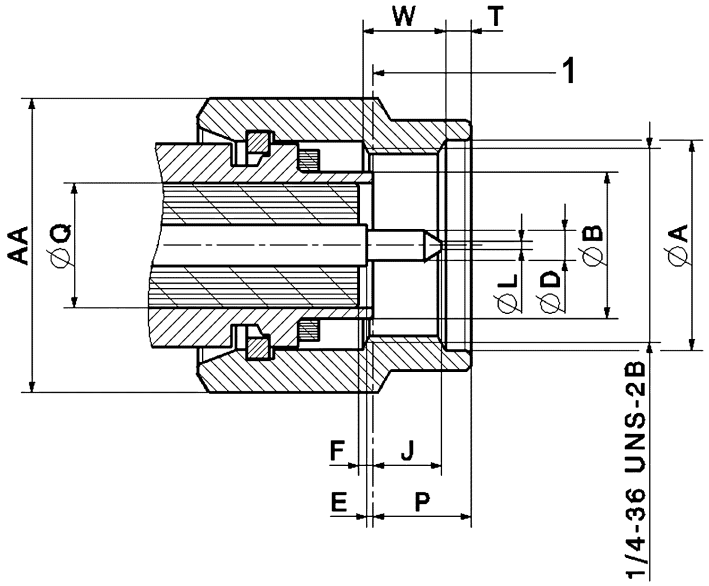
	Ø *A*	*AB*	*AK*	Ø *B*	Ø *C*	*E*	*F*	*G*	*K*	Ø *M*	Ø *R*	*T*	*U*	Ø *V*	*W*
min.	16,80	9,02	–	13,92	14,50	8,33	–	–	14,99	–	–	1,96	13,11	–	9,12
max.	17,35	–	19,18	14,05	14,68	9,09	9,35	0,13	–	3,35	7,47	2,21	13,26	6,81	–

5.2.6 Type 6 connectors SMA interface

5.2.6.1 Plug, 50 Ω

See Figure 11 and Table 11.

Dimensions in millimetres



Key

1 REF. Plane

Figure 11 — SMA plug interface

Table 11 — SMA plug dimensions

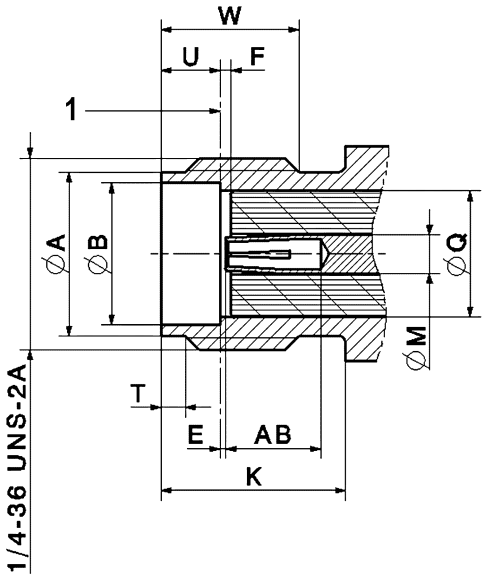
Dimensions in millimetres

	Ø *A*	Hex *AA*	Ø *B*	Ø *D*	*E*	*F*	*J*	Ø *L*	*P*	Ø *Q*	*T*	*W*
min.	6,35	7,85	–	0,90	0,00	0,00	–	–	–	–	0,38	2,16
max.	–	8,00	4,59	0,94	0,25	0,25	2,54	0,38	3,43	4,18	1,14	–

5.2.6.2 Receptacle, 50 Ω

See Figure 12 and Table 12.

Dimensions in millimetres



Key

1 REF. Plane

Figure 12 — SMA receptacle Interface

Table 12 — SMA receptacle dimensions

Dimensions in millimetres

	Ø *A*	*AB*	Ø *B*	*E*	*F*	*K*	Ø *M*	Ø *Q*	*T*	*U*	*W*
min.	5,28	2,67	4,60	0,00	0,00	5,54	1,24	–	0,38	1,88	4,32
max.	5,49	–	–	0,25	0,25	–	1,29	4,18	1,14	1,98	–

NOTE Clearance for mating connector coupling nut.

6 Test methods

6.1 List of tests

See Table 13.

Table 13 — List of tests

EN 2591-	Designation of the test	Details
101	Visual examination	Applicable
102	Examination of dimensions and mass	Applicable
201	Contact resistance - low level	Applicable (see product standard)
202	Contact resistance at rated current	Applicable (see product standard)
203	Electrical continuity at microvolt level	Not applicable
204	Discontinuity of contacts in the microsecond range	Applicable
205	Housing (shell) electrical continuity	Not applicable
206	Measurement of insulation resistance	Applicable (see product standard)
207	Voltage proof test	Applicable (see product standard)
208	Temperature rise due to rated current	Not applicable
209	Current temperature derating	Not applicable
210	Electrical overload	Not applicable
212	Surface transfer impedance	Applicable (see product standard)
213	Shielding effectiveness from 100 MHz to 1 GHz	Not applicable
214	Lightning strike, current and voltage pulse	Applicable (see product standard)
216	Engagement depth of contacts	Not applicable
221	Voltage Standing Wave Ratio (VSWR)	Applicable (see product standard)
222	Insertion Loss (I.L.)	Applicable (see product standard)
223	Measurement of characteristic impedance of a coaxial connector or contact	Applicable (see product standard)
224	RF leakage	Applicable (see product standard)
225	RF high potential withstanding voltage	Applicable (see product standard)
226	Corona level	Applicable (see product standard)
301	Endurance at temperature	Not applicable
302	Climatic sequence	Not applicable
303	Cold/low pressure and damp heat	Applicable (see product standard)
304	Damp heat steady-state	Not applicable
305	Rapid change of temperature	Applicable (see product standard)
306	Mould growth	Applicable (see 7.2.3)
307	Salt mist	Applicable (see product standard)

308	Sand and dust	Applicable (see product standard)
309	Dry heat	Not applicable
310	Cold	Not applicable
311	Low air pressure	Applicable
312	Air leakage	Not applicable
313	Artificial rain	Not applicable
314	Immersion at low air pressure	Applicable (see product standard)
315	Fluid resistance	Applicable (see Table 14) Restriction: Electrical tests shall not be performed after immersion for fluids 3 and 15.
316	Ozone resistance	Not applicable
317	Flammability	Applicable (see product standard)
318	Fire-resistance	Not applicable
319	Gastightness of solderless wrapped connections	Not applicable
320	Simulated solar radiation at ground level	Not applicable
321	Damp heat, cyclic test	Not applicable
322	Hermeticity	Not applicable
323	Thermal shock	Not applicable
324	Interfacial sealing	Not applicable
401	Acceleration, steady-state	Not applicable
402	Shock	Applicable (see product standard)
403	Sinusoidal and random vibration	Applicable (see product standard)
404	Transverse load	Applicable (see product standard)
405	Axial load	Not applicable
406	Mechanical endurance	Applicable (see product standard)
407	Durability of contact retention system and seals	Not applicable
408	Mating and unmating forces	Applicable (see product standard)
409	Contact retention in insert	Applicable (see product standard)
410	Insert retention in housing (axial)	Not applicable
411	Insert retention in housing (torsional)	Not applicable
412	Contact insertion and extraction forces	Not applicable
413	Holding force of grounding spring system	Not applicable
414	Unmating of lanyard release connectors	Applicable (for push-pull coupling only)
415	Test probe damage (female contacts)	Not applicable
416	Contact bending strength	Not applicable
417	Tensile strength	Applicable (see product standard)

418	Gauge insertion/extraction forces (female contacts)	Applicable (see 6.3)
419	Stability of male contacts in insert	Not applicable
420	Mechanical strength of rear accessories	Not applicable
424	Stripping force, solderless wrapped connections	Not applicable
425	Unwrapping, solderless wrapped connections	Not applicable
426	Contact retention system effectiveness	Not applicable
427	Robustness of protective cover attachment	Applicable (see product standard)
501	Soft solderability	Applicable (for soldered connectors)
502	Restricted entry	Not applicable
503	Contact deformation after crimping	Applicable (for crimped connectors)
505	Contact protection effectiveness (scoop-proof)	Not applicable
506	Use of tools	Not applicable
507	Plating porosity	Applicable
508	Measurement of thickness of coating on contacts	Applicable
509	Adhesion of coating on contacts	Applicable
512	Effectiveness of non-removable fixing of hermetically sealed connector shell	Not applicable
513	Magnetic permeability	Applicable
514	Solderability of contacts with self-contained solder and flux	Applicable for soldered connectors unless otherwise specified in the product standard.
515	Hydrolitic stability	Not applicable

6.2 List of fluids

See Table 14.

Table 14 — List of fluids

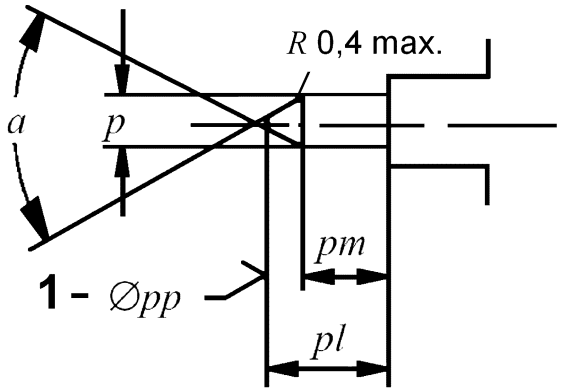
Fluid		Immersion		Temp.	Number of cycles
Category	Test fluid number EN 3909	Duration min	Temp. °C	in oven °C	
Fuel	2	5 $^{+2}_{0}$	25	85	7
Mineral hydraulic fluid	5	15 $^{+5}_{0}$	85	100	5
Synthetic hydraulic fluid	3	15 $^{+5}_{0}$	85	100	5
Mineral lubricant	7	15 $^{+5}_{0}$	120	125	5
Synthetic lubricant	9	15 $^{+5}_{0}$	150	125	5
Cleaning products	12	15 $^{+5}_{0}$	25	25	5
De-icing fluid	15	15 $^{+5}_{0}$	50	100	5
Cooling liquid	19	15 $^{+5}_{0}$	50	25	5

6.3 Gauge test EN 2591-418

The specified insertion and withdrawal forces are given in Table 15. The dimensions of the gauge pins to be used in EN 2591-418 are listed in Table 16.

Table 15 — Insertion and withdrawal forces for EN 2591–418

Connector type	Insertion force N max.	Withdrawal force N min.
Type 1: BNC	8,9	0,56
Type 2: TNC	8,9	0,56
Type 3: N	8,9	0,56
Type 4: C	8,9	0,56
Type 5: HN	8,9	0,56
Type 6: SMA	8,9	0,28



Key

1 Plat flat

Figure 13 — Gauge test pin

Material: steel, polished

Surface roughness: R_a = 0,4 µm maximum

Table 16 — Test pin dimensions for EN 2591–418

Dimensions in millimetres

Connector type	Insertion force test pin					
	Ø *p*		Ø *pp*	*pl*	*pm*	*a*
	min.	max.	max.	max.	min.	±2°
Type 1: BNC	1,370	1,373	0,64	4,8	3,2	53°
Type 2: TNC	1,370	1,373	0,64	4,8	3,2	53°
Type 3: N	1,680	1,683	0,25	5,2	3,3	53°
Type 4: C	2,340	2,343	1,27	7,5	4,9	53°
Type 5: HN	1,680	1,683	0,38	8,9	7,0	53°
Type 6: SMA	0,940	0,943	0,38	2,5	1,4	53°

Connector type	Withdrawal force test pin					
	Ø *p*		Ø *pp*	*pl*	*pm*	*a*
	min.	max.	max.	max.	min.	±2°
Type 1: BNC	1,317	1,320	0,64	4,8	3,2	53°
Type 2: TNC	1,317	1,320	0,64	4,8	3,2	53°
Type 3: N	1,597	1,600	0,25	5,2	3,3	53°
Type 4: C	2,287	2,290	1,27	7,5	4,9	53°
Type 5: HN	1,597	1,600	0,38	8,9	7,0	53°
Type 6: SMA	0,897	0,900	0,38	2,5	1,4	53°

7 Quality assurance

7.1 General

See EN 9133.

7.2 Qualification conditions

Qualification is obtained when the specimens defined in 7.2.1 and 7.2.2 have passed the Qualification Test Programme defined in 7.2.3.

7.2.1 Sampling and definition of specimens

Three pairs of connectors for each cable type for each group of test. Except for group 7: one pair for each fluid.

7.2.2 Preparation of specimens

The specimen shall be prepared as detailed in Table 17. All specimens shall be prepared without heat-shrinkable sleeve unless otherwise specified in the product standard.

Table 17 — Preparation of specimens

Groups	Remarks
Groups 0, 3, 4, 5, 6, 7	Connector shall be wired with at least 30 cm of cable. An additional "reference" assembly shall be prepared with double cable length similar to the requirements of EN 2591–222. The connector shall be mated with counterpart of same technology.
Group 1	1a) Connector shall be wired according to test procedure EN 2591–212. 1b) Connector shall be wired with length described in test procedure EN 2591–224. 1c) Connector shall be wired as pigtails. Length and stripping method of open cable end shall meet requirements described in test procedures EN 2591–207, EN 2591–225 and EN 2591–226.
Group 2	Connectors shall be wired with at least 30 cm of cable.
Group 8	Connector shall be alone, not wired.
Group 9	Connector shall be wired with length of cable according EN 2591–317.
Group 10	Connector shall not be assembled. The tests are performed on piece parts alone.
Group 11	Measurement on piece parts: centre contact shall be mated with counterpart of same technology. Measurement on pigtails: cable length max. 100 mm.
Group 12	Connector shall be wired with at least 30 cm of cable.

7.2.3 Qualification test programme

Test EN 2591-306 (Mould growth), which is specified on the raw materials, is not included in the following groups. If the materials used conform to group 1 in MIL-HDBK-454, guideline 4, then test EN 2591-306 is not carried out.

7.2.3.1 Qualification program for N and TNC connectors

Group 0 shall be performed each time before groups 3, 4, 5, 6 and 7.

See Table 18.

Table 18 — Qualification program for N and TNC

Designation of the test	EN 2591-	Remarks
Group 0		
Visual examination	101	Initial measurements on all specimens of groups 3, 4, 5, 6 and 7.
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	At sea level
Measurement of insulation resistance	206	
Voltage proof test	207	
Visual examination	101	
Group 1		
Surface transfer impedance	212	Samples 1a)
RF leakage	224	Samples 1b)
Corona level	226	Samples 1c)
Low air pressure	311	Samples 1c)
RF high potential withstanding voltage	225	Samples 1c)
Visual examination	101	All samples
Group 2		Test Group 2 only for connectors with sealing designation E.
Measurement of insulation resistance [a]	206	
Voltage proof test [a]	207	At sea level
Rapid change of temperature [a]	305	Mated condition
Measurement of insulation resistance [a]	206	
Voltage proof test [a]	207	At sea level
Visual examination [a]	101	
Immersion at low air pressure [a]	314	Unmated condition. The final measurements shall be performed out of the salt solution after the specimens are cleaned.
Group 3		
Rapid change of temperature	305	Mated condition
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Visual examination	101	
Immersion at low air pressure	314	Mated condition
Measurement of characteristic impedance of a coaxial connector or contact	223	

Insertion Loss (I.L.)	222	“Reference” section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Tensile strength	417	
Visual examination	101	
Group 4		
Cold /low pressure and damp heat	303	The 300 V d.c shall be applied between outer and inner contact.
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	“Reference” section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Visual examination	101	
Group 5		
Salt mist	307	
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	“Reference” section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Tensile strength	417	
Visual examination	101	
Group 6		
Shock	402	
Sinusoïdal and random vibration	403	
Transverse load (external bending moment)	404	
Sand and dust	308	
Immersion at low air pressure	314	Mated condition
Tensile strength	417	
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	“Reference” section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Visual examination	101	

Group 7		
Fluid resistance	315	
Measurement of insulation resistance	206	
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	“Reference” section not exposed to fluids
Voltage Standing Wave Ratio (VSWR)	221	
Tensile strength	417	Mated condition
Immersion at low air pressure	314	
Visual examination	101	
Group 8		
Examination of dimensions and mass	102	
Magnetic permeability	513	
Gauge insertion/extraction forces (female contacts)	418	
Mechanical endurance	406	
Mating and unmating forces	408	
Gauge insertion/extraction forces (female contacts)	418	
Contact retention in insert	409	
Plating porosity	507	
Visual examination	101	
Group 9		
Locking wire hole strength	422	
Flammability (Method A)	317	
Group 10		
Thickness of coating	508	
Adhesion of coating	509	
Visual examination	101	
Group 11		
Contact resistance - low level	201	On piece parts of centre contact on short pigtails
Contact resistance at rated current	202	
Group 12		
Contact resistance at rated current	202	On outer contact
Lightening strike, current and voltage pulse	214	
Contact resistance at rated current	202	On outer contact
Mating and unmating forces	408	

[a] To be performed only on connectors with cable group A.

7.2.3.2 Qualification program for BNC and C connectors

Group 0 shall be performed each time before groups 3, 4, 5, 6 and 7.

See Table 19

Table 19 — Qualification program for BNC and C

Designation of the test	EN 2591-	Remarks
Group 0		
Visual examination	101	Initial measurements on all specimens of groups 3, 4, 5, 6 and 7.
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Visual examination	101	
Group 1		
Surface transfer impedance	212	Samples 1a)
RF leakage	224	Samples 1b)
Corona level	226	Samples 1c)
Low air pressure	311	Samples 1c)
RF high potential withstanding voltage	225	Samples 1c)
Visual examination	101	All samples
Group 2		Test Group 2 only for connectors with sealing designation E.
Measurement of insulation resistance [a]	206	
Voltage proof test [a]	207	At sea level
Rapid change of temperature [a]	305	Mated condition
Measurement of insulation resistance [a]	206	
Voltage proof test [a]	207	At sea level
Visual examination [a]	101	
Immersion at low air pressure [a]	314	Unmated condition. The final measurements will be performed with the specimens out of the salt solution after they are cleaned.
Group 3		
Rapid change of temperature	305	Mated condition
Voltage proof test	207	At sea level
Measurement of insulation resistance	206	
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	“Reference” section not exposed to environmental tests

Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Tensile strength	417	
Visual examination	101	
Group 4		
Cold /low pressure and damp heat	303	
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	"Reference" section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Visual examination	101	
Group 5		
Salt mist	307	
Measurement of insulation resistance	206	
Voltage proof test	207	At sea level
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	"Reference" section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Tensile strength	417	
Visual examination	101	
Group 6		
Shock	402	
Sinusoïdal and random vibration	403	
Transverse load (external bending moment)	404	
Sand and dust	308	
Tensile strength	417	
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	"Reference" section not exposed to environmental tests
Voltage Standing Wave Ratio (VSWR)	221	
Mating and unmating forces	408	
Visual examination	101	
Immersion at low air pressure [a]	314	Unmated condition. Only for connectors with cable group A. The final measurements will be performed with the specimens out of the salt solution after they are cleaned.

Group 7		
Fluid resistance	315	
Measurement of insulation resistance	206	
Measurement of characteristic impedance of a coaxial connector or contact	223	
Insertion Loss (I.L.)	222	"Reference" section not exposed to fluids
Voltage Standing Wave Ratio (VSWR)	221	
Tensile strength	417	
Visual examination	101	
Immersion at low air pressure [a]	314	Unmated condition. Only for connectors with cable group A. The final measurements will be performed with the specimens out of the salt solution after they are cleaned.
Group 8		
Examination of dimensions and mass	102	
Magnetic permeability	513	
Gauge insertion/extraction forces (female contacts)	418	
Mechanical endurance	406	
Mating and unmating forces	408	
Gauge insertion/extraction forces (female contacts)	418	
Contact retention in insert	409	
Plating porosity	507	
Visual examination	101	
Group 9		
Flammability (Method A)	317	
Group 10		
Thickness of coating	508	
Adhesion of coating	509	
Visual examination	101	
Group 11		
Contact resistance - low level	201	On piece parts of centre contact on short pigtails
Contact resistance at rated current	202	
Group 12		
Contact resistance at rated current	202	On outer contact
Lightening strike, current and voltage pulse	214	
Contact resistance at rated current	202	On outer contact
Mating and unmating forces	408	

[a] To be performed only with connectors for cable group A.

7.3 Acceptance and inspection conditions

Unless otherwise specified by contract, the manufacturer is responsible for carrying out all the batch and production inspections.

7.4 Quality maintenance of qualification

7.4.1 Tests

The tests described in 7.2.3 shall be carried out within a period of 36 months on samples taken at random, unless otherwise notified by the qualification approval organization.

7.4.2 Sampling

Sampling comprises six pairs of connectors.

7.5 Quality control

These inspections, designed to ensure maintenance of the required quality level, are the full responsibility of the manufacturer, from the materials to delivery of the product.

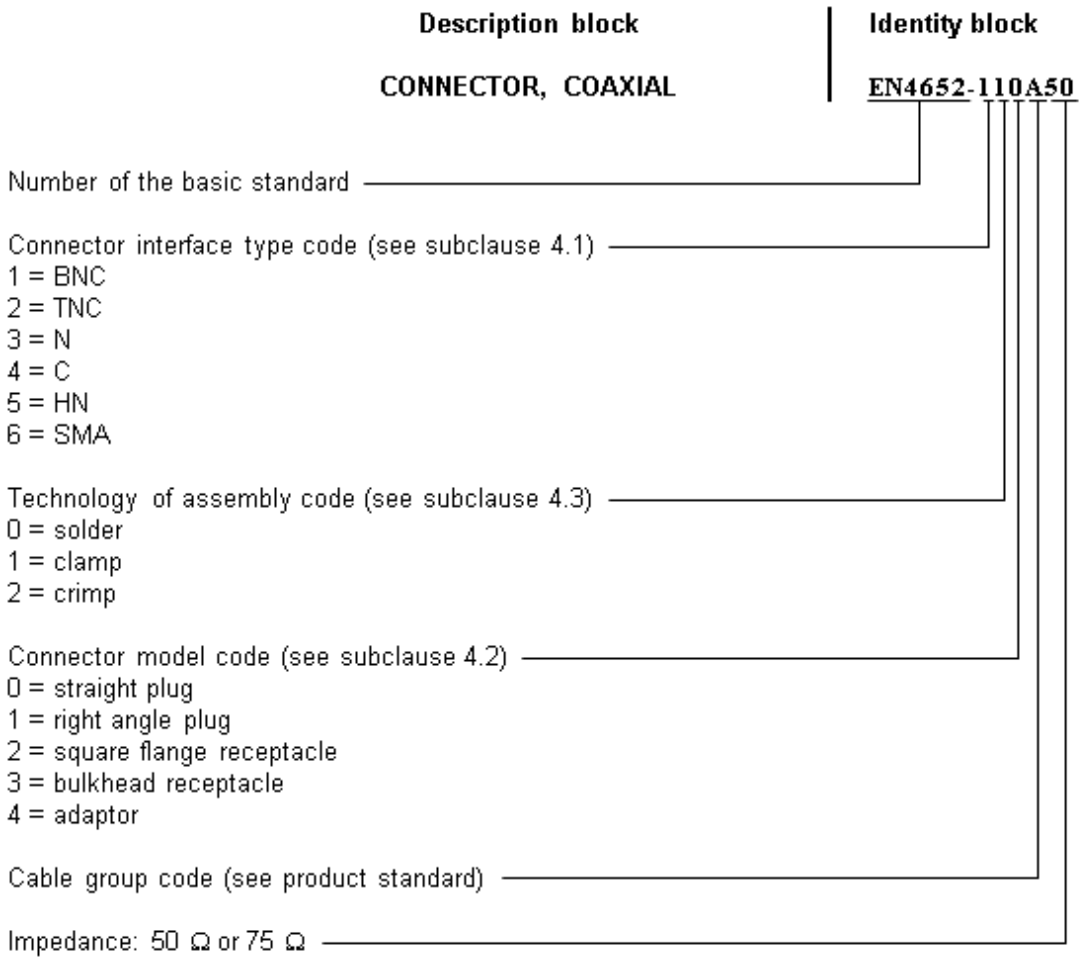
The manufacturer’s quality department shall be able to demonstrate at all times that the product conforms to the manufacturing documentation and the particular specification for the product concerned.

A tracing system for the various inspection phases shall exist. It shall be embodied in documents kept by the manufacturer for a period of five years and sent to the National Official Services on request.

8 Designation and marking

8.1 Designation

EXAMPLE



NOTE If necessary, the code I9005 shall be placed between the description block and the identity block.

8.2 Marking

Identification as per EN 2424 style P with at least the following information on the product:

— Manufacturer’s monogram;

— Manufacturer’s part number;

— Production date (YY.WW).

9 Packaging

The connectors shall be delivered complete.

10 Packing

The connectors shall be packed in an inert plastic bag with at least the following information indicated on the individual bag.

— Identity block of designation;

— Manufacturer’s part number;

— Batch-Nr. or production date (YY.WW).

11 Storage

The storage shall be protected from ultra violet radiation. Every five years an inspection shall be made according to test EN 2591-101: visual examination. The date of the inspection shall be marked and the connector repacked in accordance with Clause 10.

Bibliography

[1] EN 4652-002[4], *Aerospace series — Connectors, coaxial, radio frequency — Part 002: Specification performances*

4) In preparation at the date of publication of this standard.

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