RF COAXIAL BLIND-MATE SLIDE-ON CONNECTORS WITH FEMALE CONTACT

BASED ON TYPE SMP

ESCC Detail Specification No. 3402/025

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DCR No.	CHANGE DESCRIPTION
1441	Specification updated to incorporate changes per DCR.

TABLE OF CONTENTS

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 3402.

(b) MIL-STD-348, Department of Defence Interface Standard: Radio Frequency Connector Interfaces.

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 340202501

- Detail Specification Reference: 3402025
- Component Type Variant Number: 01 (as required)

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

Variant Number	Description (Note 1)
01	SMP Straight Plug, Solder Type, for Semi-rigid Cable Ø1.19mm
02	SMP Straight Plug, Solder Type, for Semi-rigid Cable Ø2.16mm
03	SMP Straight Plug, Solder Type, for Semi-rigid Cable Ø3.58mm
04	SMP Straight Plug, Crimp Type
05	SMP Straight Plug, Crimp Type
06	SMP Straight Plug, Crimp Type
07	SMP Straight Plug, Crimp Type
08	SMP Right Angle Plug, Solder Type, for Semi-rigid Cable Ø1.19mm
09	SMP Right Angle Plug, Solder Type, for Semi-rigid Cable Ø2.18mm
10	SMP Right Angle Plug, Solder-crimp Type
11	SMP Right Angle Plug, Solder-crimp Type
12	SMP Right Angle Plug, Solder-crimp Type
13	SMP Right Angle Plug, Solder-crimp Type
14	SMP Panel Receptacle

NOTES:

1. See Para. 3 for details.

1.5 MAXIMUM RATINGS

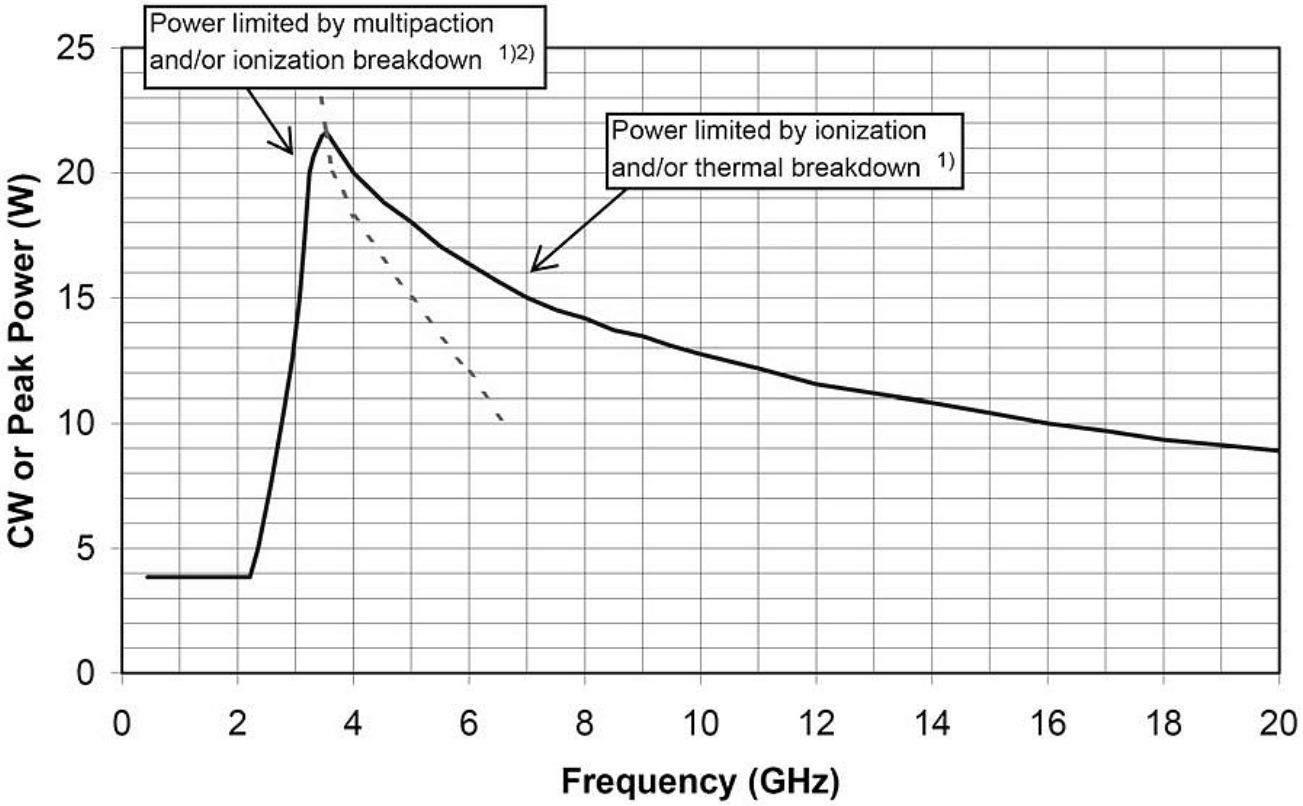
The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbol	Maximum Ratings	Unit	Remarks
Power	P	21.5	W	Note 1
DC Power	P_{DC}	1000	W	Note 2
Nominal Impedance	Z	50	Ω	-
Operating Frequency Range	f	See Para. 3	GHz	-
Operating Voltage	V_{op}	335	Vrms	-
Operating Temperature Range	T_{op}	-65 to +155	°C	T_{amb}
Storage Temperature Range	T_{stg}	-65 to +155	°C	-

NOTES:

1. Maximum Power (CW or peak) varies with frequency and it is limited by multipaction, ionization
breakdown and thermal breakdown as shown below. The maximum operating frequency is given in Para. 3:

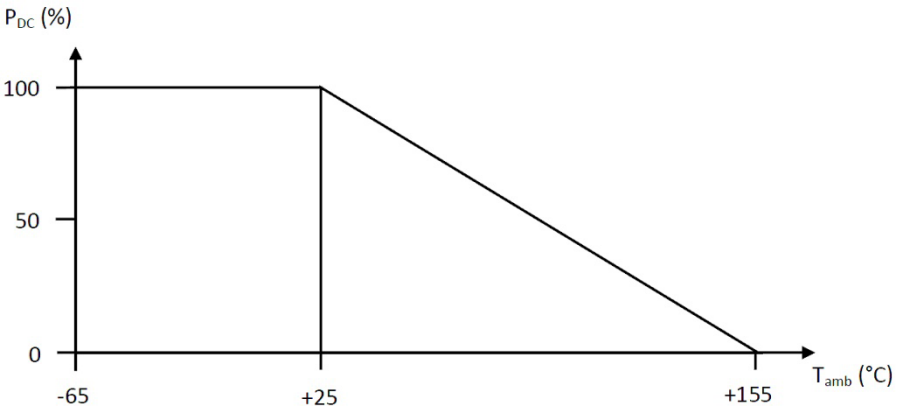


Maximum Power Handling in Space Vacuum at +25°C

a) Load VSWR is better than 1.3:1.

b) The part of the curve limited by multipaction takes into account a 6dB margin as recommended by ESA.

2. Derate DC Power with respect to Operating Temperature as follows:



1.6 PHYSICAL DIMENSIONS (SEE ALSO PARA. 3)

1.6.1 Connector Interface Dimensions

(a) SMP Female Connector Interface: compatible with series SMP socket contact interface (uncabled connector and cabled connector) as specified in MIL-STD-348.

(b) SMP Male Gauge Interface: compatible with series SMP pin contact interface (full detent, limited detent, smooth bore, catchers mit) as specified in MIL-STD-348.

1.7 MATERIALS AND FINISHES

Materials and finishes shall be as follows (as applicable, see Para. 3):

(a) Shell: beryllium copper, with copper underplate 1.5µm minimum, electroless nickel underplate 2µm minimum, and gold plating 1.27µm minimum.

(b) Centre Contact: beryllium copper, with copper underplate 1.5µm minimum, electroless nickel underplate 2µm minimum, and gold plating 1.27µm minimum.

(c) Insulator: PTFE, PEEK or LCP.

(d) Ferrule, Crimping Sleeve, Solder Sleeve: brass or copper, with copper underplate 1.5µm minimum, electroless nickel underplate 2µm minimum, and gold plating 0.15µm minimum.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Deviations from the Generic Specification

2.1.1.1 Deviations from Screening Tests – Chart F3

(a) Coupling Proof Torque: Not applicable.

2.1.1.2 Deviations from Qualification and Periodic Tests – Chart F4

(a) Coupling Proof Torque: Not applicable.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component or the primary package shall be:

(a) The ESCC qualified components symbol (for ESCC qualified components only).

(b) The ESCC Component Number (see Para. 1.4.1).

(c) Traceability information.

2.3 ENVIRONMENTAL AND MECHANICAL TESTS

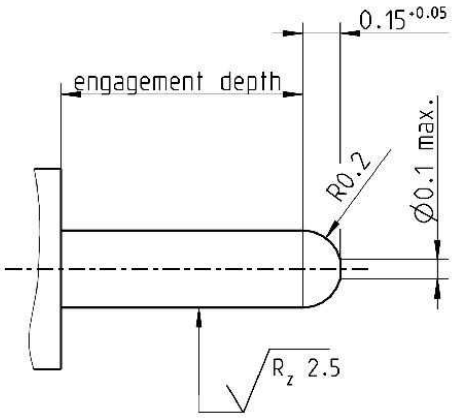
The following requirements apply to tests performed on the connector (and contact) lot as specified in the ESCC Generic Specification:

(a) Contact Engagement and Separation Forces:

	Maximum Diameter Test Pin Test (1)	Minimum Diameter Test Pin Test
Test Pin Diameter (mm) (2)	0.408 to 0.412	0.348 to 0.352
Engagement Depth (mm) (2)	1.2 to 1.3	1.2 to 1.3
Engagement Force (N)	6 maximum	-
Separation Force (N)	-	0.1 minimum

NOTES:

1. The Maximum Diameter Test Pin and the Oversize Test Pin are the same.
2. Test Pins details:



(b) Mating and Unmating Forces:

	Insertion Force (N)	Retention Force (N)
Smooth Bore or Catchers Mitt:	9 maximum	2.2 minimum
Limited Detent:	45 maximum	9 minimum
Full Detent:	68 maximum	22 minimum

(c) Centre Contact Retention: See Para. 3.

(d) Endurance: The number of mating and unmating cycles shall be as follows:

- During Qualification Testing:
  - For mating with Full Detent counterparts (see Para. 1.6.1): 40 cycles
  - For mating with Limited Detent counterparts (see Para. 1.6.1): 100 cycles
  - For mating with Smooth Bore and Catchers Mitt counterparts (see Para. 1.6.1): 200 cycles
- During Periodic Testing:
  - For mating with Full Detent counterparts (see Para. 1.6.1): 20 cycles
  - For mating with Limited Detent counterparts (see Para. 1.6.1): 50 cycles
  - For mating with Smooth Bore and Catchers Mitt counterparts (see Para. 1.6.1): 100 cycles

2.4 ROOM TEMPERATURE ELECTRICAL MEASUREMENTS

The measurements shall be performed at T_{amb} = +22 ±3°C.

Characteristics	Symbols	Test Method and Conditions	Limits		Units
			Min	Max	
Insulation Resistance	R_I	ESCC No. 3402	5	-	GΩ
Voltage Proof Leakage Current (Voltage Proof)	I_L	ESCC No. 3402 See Para. 3 Note 1	-	2	mA

NOTES:

1. Between centre contact and shell.

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

Unless otherwise specified, the test methods and test conditions shall be as per the corresponding test defined in Para. 2.4 Room Temperature Electrical Measurements.

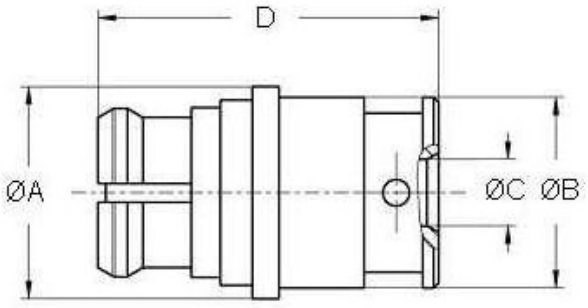
Test Reference per ESCC No. 3402	Characteristics and Test Conditions Ref. ESCC No. 3402	Symbols	Limits		Units
			Min	Max	
Random Vibration	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
Mechanical Shock	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
Temperature Cycling	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Voltage Proof Leakage Current:	I_L	Note 1		
Electrical Measurements at Room Temperature	Insulation Resistance:	R_I	Note 1		
	Voltage Proof Leakage Current:	I_L	Note 1		
	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Shell:	R_{cts}	-	2	mΩ
	VSWR (Note 3):	VSWR	Note 2		
	Insertion Loss:	LI	Note 2		
Endurance	Contact Resistance: I_T = 10mA, V_T = 6V				
	Centre contact:	R_{ctc}	-	6	mΩ
	Shell:	R_{cts}	-	2	mΩ

NOTES:

1. As specified in Para. 2.4.
2. As specified in Para. 3.
3. Measured with suitable low level RF power applied.

3 COMPONENT TYPE VARIANTS – DETAIL REQUIREMENTS

3.1 VARIANTS 01 AND 02 – SMP STRAIGHT PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLES Ø1.19MM AND Ø2.16MM



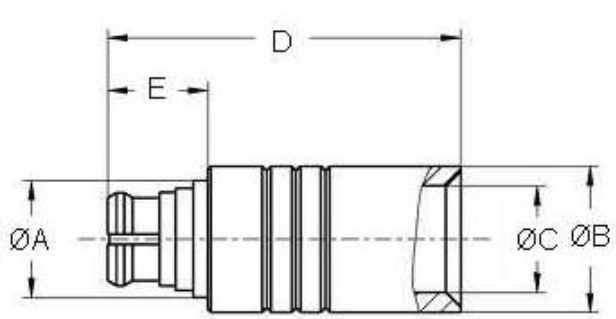
Symbols	Dimensions mm		Notes
	Min	Max	
A	3.9	4.1	
B	3.5	3.7	
ØC	1.15	1.35	Variant 01
	2.15	2.35	Variant 02
D	6.2	6.6	

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	DC to 40	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: Variant 01: DC to 10GHz: ≥ 26 10 to 30GHz: ≥ 18 30 to 40GHz: ≥ 15 Variant 02: DC to 20GHz: ≥ 31 20 to 30GHz: ≥ 24 30 to 40GHz: ≥ 15	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	Not applicable	
Minimum centre contact retention torque	Not applicable	
Maximum weight	Variant 01: 0.3 Variant 02: 0.22	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Applicable	
Cables used	Variant 01: UT 47 and similar Variant 02: UT 85-M17, RG 405/U	

3.2 VARIANT 03 – SMP STRAIGHT PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLE Ø3.58MM



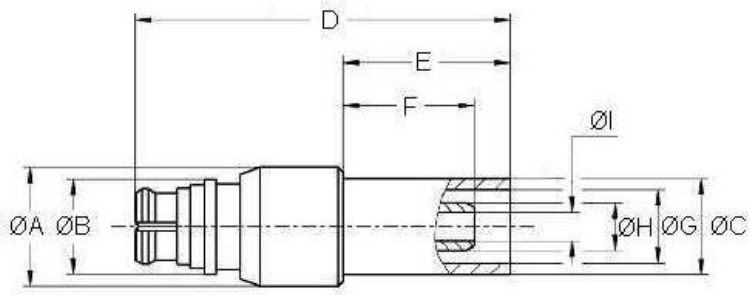
Symbols	Dimensions mm	
	Min	Max
ØA	3.9	4.1
ØB	4.9	5.1
ØC	3.55	3.75
D	11.8	12.2
E	3.3	3.5

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	DC to 26.5	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: DC to 4GHz: ≥ 32 4 to 8GHz: ≥ 30 8 to 18GHz: ≥ 20 18 to 26.5GHz: ≥ 13	dB
Maximum insertion loss	0.05√f(GHz)	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	Not applicable	
Minimum centre contact retention torque	Not applicable	
Maximum weight	0.25	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Applicable	
Cables used	UT 141-HA-M17, RG 402/U	

3.3 VARIANTS 04, 05, 06, 07 – SMP STRAIGHT PLUG, CRIMP TYPE



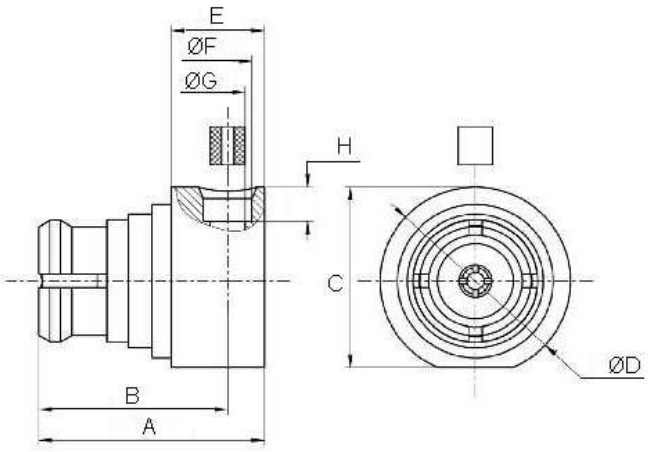
Symbols	Dimensions mm		Remarks
	Min	Max	
ØA	4.9	5.1	
ØB	3.9	4.1	
ØC	3.75	3.95	Variant 04
	4.2	4.4	Variant 05
	3.95	4.15	Variants 06, 07
D	16.2	16.8	Variants 04, 05
	15.4	16	Variants 06, 07
E	7.6	8	Variants 04, 05
	6.8	7.2	Variants 06, 07
F	5.3	5.7	
ØG	3.1	3.3	Variant 04
	3.48	3.68	Variant 05
	2.45	2.65	Variant 06
	3	3.2	Variant 07
ØH	2.6	2.8	Variants 04, 05
	1.9	2.1	Variants 06, 07
ØI	1.55	1.75	Variants 04, 05
	1.1	1.3	Variants 06, 07

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	Variants 04, 05: DC to 12 Variants 06, 07: DC to 4	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: Variants 04, 05: DC to 1GHz: ≥ 20 1 to 2GHz: ≥ 15 2 to 4GHz: ≥ 10 Variants 06, 07: DC to 1GHz: ≥ 20 1 to 2GHz: ≥ 15 2 to 4GHz: ≥ 10	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	Not applicable	
Minimum centre contact retention torque	Not applicable	
Maximum weight	Variant 04: 1 Variants 05, 07: 1.1 Variant 06: 1.2	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Not applicable	
Cables used	Variant 04: RG 316/U, RG 174 A/U, RG 188 A/U Variant 05: RG 316/U-d, K02252d Variant 06: RG 196 A/U, RG 178 B/U Variant 07: RG 178 B/U-d and similar	

3.4 VARIANT 08 – SMP RIGHT ANGLE PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLE Ø1.19MM



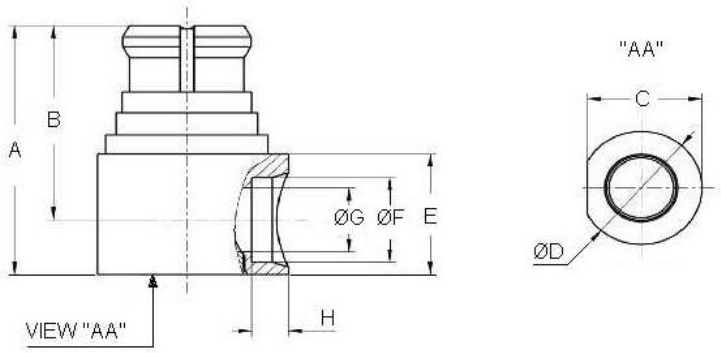
Symbols	Dimensions mm	
	Min	Max
A	-	5.85
B	4.75	4.95
C	4.6	4.8
ØD	4.8	5
E	2.3	2.5
ØF	1.15	1.35
ØG	0.7	1
H	0.7	1

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	DC to 26.5	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: DC to 12GHz: ≥ 30 12 to 18GHz: ≥ 20 18 to 26.5GHz: ≥ 18	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	7	N
Minimum centre contact retention torque	Not applicable	
Maximum weight	0.3	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Applicable	
Cables used	UT 047 and similar	

3.5 VARIANT 09 – SMP RIGHT ANGLE PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLE Ø2.18MM



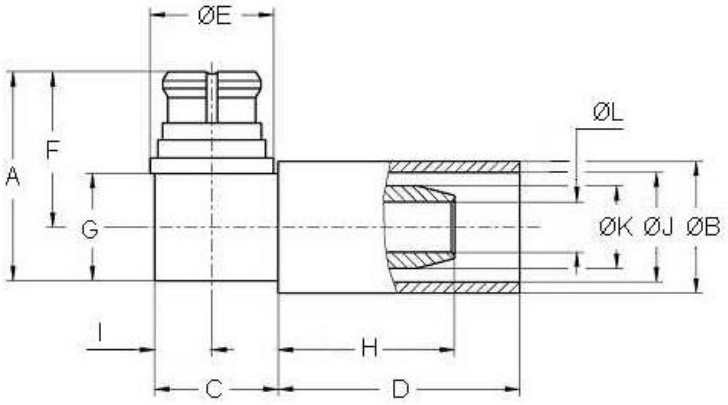
Symbols	Dimensions mm	
	Min	Max
A	6.4	6.8
B	5.05	5.25
C	4.6	4.8
ØD	4.9	5.1
E	3.1	3.3
ØF	2.15	2.35
ØG	1.6	1.8
H	0.8	1

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	DC to 26.5	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: DC to 12GHz: ≥ 30 12 to 18GHz: ≥ 20 18 to 26.5GHz: ≥ 18	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	7	N
Minimum centre contact retention torque	Not applicable	
Maximum weight	0.5	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Applicable	
Cables used	UT 086 and similar	

3.6 VARIANTS 10, 11, 12, 13 – SMP RIGHT ANGLE PLUG, SOLDER-CRIMP TYPE



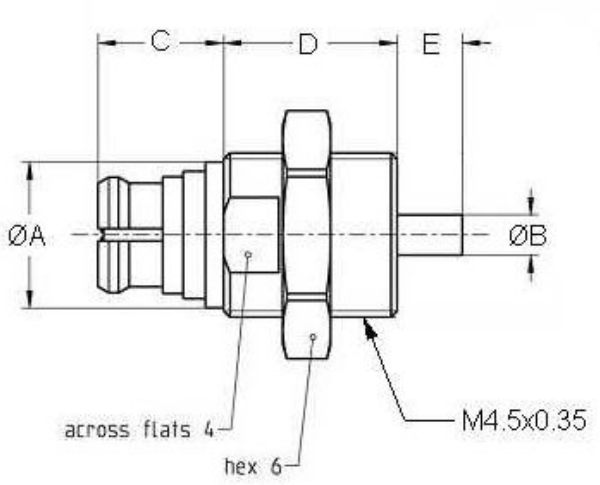
Symbols	Dimensions mm		Remarks
	Min	Max	
A	6.7	7.1	Variants 10, 11, 12
	7.2	7.6	Variant 13
ØB	3.95	4.15	Variants 10, 13
	3.75	3.95	Variant 11
	4.2	4.4	Variant 12
C	3.9	4.1	
D	6.8	7.2	Variants 10, 13
	7.6	8	Variants 11, 12
ØE	3.9	4.1	
F	5.05	5.25	Variants 10, 11, 12
	5.55	5.75	Variant 13
G	3.4	3.6	
H	4.7	5.1	Variants 10, 13
	5.5	5.9	Variants 11, 12
I	1.75	1.95	
ØJ	2.45	2.65	Variant 10
	3.1	3.3	Variant 11
	3.48	3.68	Variant 12
	3	3.2	Variant 13
ØK	1.9	2.1	Variants 10, 13
	2.6	2.8	Variants 11, 12
ØL	0.8	1	Variants 10, 13
	1.55	1.75	Variants 11, 12

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	Variants 10, 13: DC to 4 Variants 11, 12: DC to 12	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: Variant 10: DC to 2GHz: ≥ 24 2 to 4GHz: ≥ 19 Variants 11, 12: DC to 8GHz: ≥ 22 8 to 12GHz: ≥ 20 Variant 13: DC to 2GHz: ≥ 18 2 to 4GHz: ≥ 13	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	7	N
Minimum centre contact retention torque	Not applicable	
Maximum weight	Variant 10: 1.1 Variants 11, 12, 13: 0.9	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	Applicable	
Cables used	Variant 10: RG 196 A/U, RG 178 B/U Variant 11: RG 316/U, RG 174 A/U, RG 188 A/U Variant 12: RG 316/U-d, K02252d Variant 13: RG 178 B/U-d and similar	

3.7 VARIANT 14 – SMP PANEL RECEPTACLE



Symbols	Dimensions mm	
	Min	Max
ØA	3.9	4.1
ØB	1	1.2
C	3.3	3.5
D	4.6	4.8
E	1.69	1.85

ELECTRICAL CHARACTERISTICS	VALUES	UNITS
Frequency range	DC to 33	GHz
Maximum voltage standing wave ratio (VSWR)	Return Loss: DC to 6GHz: ≥ 26 6 to 33GHz: ≥ 15	dB
Maximum insertion loss	$0.05\sqrt{f(GHz)}$	dB
Voltage proof	500	Vrms

MECHANICAL CHARACTERISTICS	VALUES	UNITS
Minimum centre contact retention force (axial)	10	N
Minimum centre contact retention torque	Not applicable	
Maximum weight	0.58	g

OTHER CHARACTERISTICS	VALUES	UNITS
Solderability	On centre contact only	
Cables used	Not applicable	

APPENDIX A
AGREED DEVIATIONS FOR ROSENBERGER (D)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 1.4.1, The ESCC Component Number	The ESCC Component Number may include the additional Manufacturer's code 'B' as indicated in the following example: Example: 340202501**B**
Para. 2.1.1.1 Deviations from Screening Tests – Chart F3	Temperature Cycling: For Variants 01 to 13 (i.e., Cable connectors), the following alternative temperature extremes may be applied during Temperature Cycling: • Minimum temperature: -20 ±5°C • Maximum temperature: +70 ±5°C