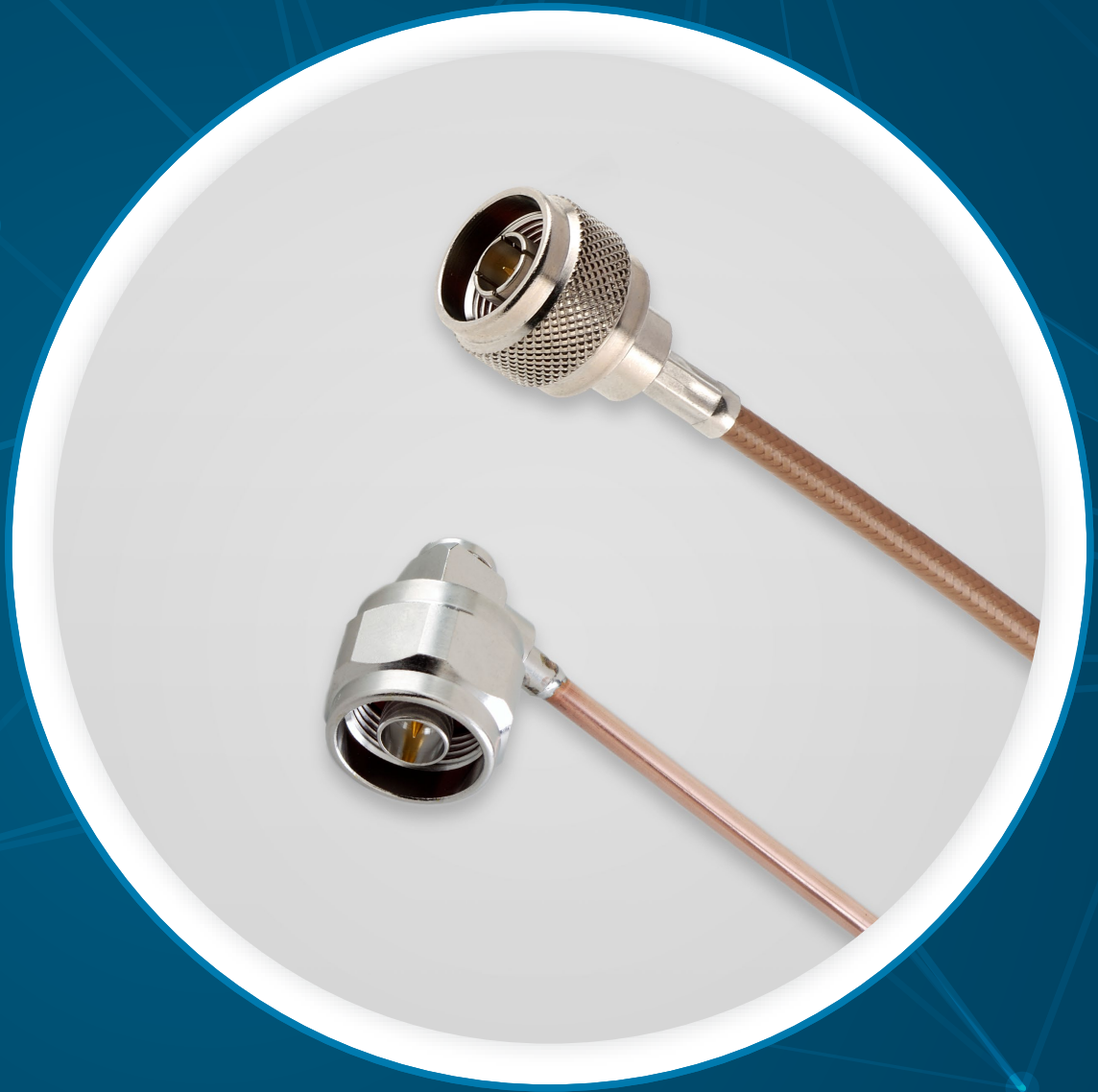


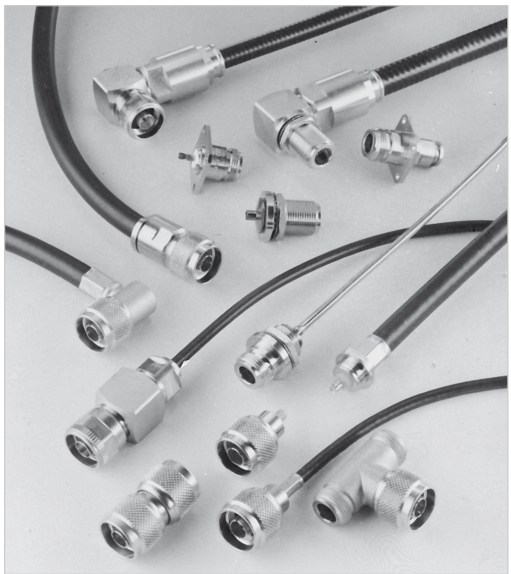
N SERIES

R161

Contents

N

Introduction



50Ω	DC - 11 GHz (standard N) DC - 18 GHz (N 18 GHz)

GENERAL

- Standard coaxial connectors
- Screw-on coupling
- High durability and proven strength
- High power rating
- Excellent RF performance

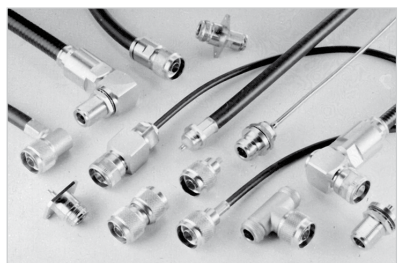
APPLICATIONS

- Wireless communications
- Civil and military radio-telecommunication equipment
- Countermeasure
- Navy equipment
- Industrial applications

APPLICABLE STANDARDS

- MIL-C-39012 / MIL STD 348-304
- CEI 169-16
- CECC 22210
- NF-C-93566
- DS 8811

COMPOSITE AND SWITCHING CONNECTORS



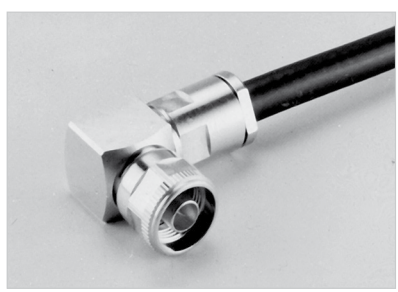
FULL CRIMP MODELS

This reliable attachment system can be easily installed in a field environment, with easy-to-use tooling (including models for 2 and 2.6 mm dia cables). All our full crimp connectors are single piece body.

18 GHz PRECISION CONNECTORS

These connectors are suitable for medium to high power applications and precision microwave test equipment. They have long life duration and enhanced electrical performance in severe environmental conditions. N18 series mate with all 50 ohms N connectors.

LOW INTERMODULATION CONNECTORS



Radiall extensive knowledge in this field led to the development of N series connectors that are specially designed for base stations of applications where the elimination of intermodulation products is of the utmost importance. Features:

- Optimized for 900 - 1800 MHz bands (and able to work up to 11 GHz like the standard models)
- IMP_3 performance = -110 dBm (- 153 dBc)
- New models for corrugated and low loss flexible cables
- High performance non magnetic materials and platings (silver and BBR)
- New 6 flats coupling nut (18 mm), allowing high coupling torque (170 Ncm) thanks to torque wrench
- Non slotted outer contact

Introduction

Radiall offers a wide range with a standard plating finish: **BBR** (**B**right **B**ronze **R**adiall) a high performance non-magnetic alloy.

VERY LOW INTERMODULATION CABLE ASSEMBLIES

For severe intermodulation conditions, we propose a range of low intermodulation cable assemblies IMP3 ≤ 125 dBm.

For further details, reference:
- Intermodulation application guide **(D1 032 DE)**
- BBR plating application guide **(D1 030 DE)**

IMPORTANT: The 50Ω and the 75Ω connectors are NOT INTERMATEABLE and results in the destruction of the interface.

Features and benefits:
Intermateable with standard N connectors for backward compatibility

Evenly distributed contact pressure for a better intermodulation

Composite material to remove any potential corrosion in outdoor applications

Color coding (optional)

Light material for weight saving for cost sensitive equipments

Best material selection for outstanding torque resistance

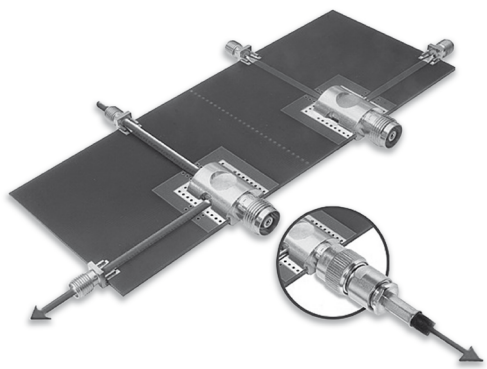
Many center contact options available for an easy adaptation to customers' applications

COMPOSITE RECEPTACLES

Radiall introduces its new composite N receptacles. Composite N connectors offer outstanding electrical performance and are the best compromise in terms of weight, cost and mechanical characteristics to replace existing brass technology.

POWER SWITCHING CONNECTORS

This "two-in-one" solution replaces the existing standard RF switches by integrating the switch function into a receptacle connector. This solution provides a unique means of switching between two RF signal paths. As user friendly as a standard connector, the switch is mechanically activated by mating and unmating the connector.



Advantages

- Reliable
- Increases the density
- Excellent electrical and mechanical performance
- Reduction of the cost of ownership
- Betty RF adaptation
- Good isolation
- Available in right or left versions

Applications

- Telecom applications
- RF power amplifiers

PLATING

Radiall offers a wide range with a standard plating finish: BBR (Bright Bronze Radiall) a high performance non-magnetic alloy.

Characteristics

Test / Characteristics	Standard reference	Values / Remarks

ELECTRICAL CHARACTERISTICS

Impedance		50Ω			
Frequency range		DC - 11 GHz			
Typical V.S.W.R. **Frequency** • Straight models cable group: .085" .141" .250" 5/S+5/D 10/S+11/D • Right angle models: 5/S+D 10/S+11/D		1 GHz 1.03 1.03 1.03 1.05 1.04 1.04 1.04	2.5 GHz 1.03 1.05 1.03 1.06 1.05 1.05 1.1	5 GHz 1.05 1.05 1.05 1.1 1.09 1.18 1.20	11 GHz 1.08 1.08 1.07 1.16 1.2
Intermodulation product (IMP_3) • Standard connectors • Intermodulation connectors • Home made intermodulation cable assemblies		- 90 dBm typ. (- 133 dBc typ. / 20W) - 110 dBm typ. (- 153 dBc typ / 20W) - 125 dBm typ. (- 165 dBc typ. / 20W)			
Insertion loss • Straight connector • Right-angle connector	MIL	< 0.15 dB max at 10 GHz ~ < 0.05 √F (GHz) < 0.15 dB max at 10 GHz ~ < 0.1 √F (GHz)			
RF leakage	MIL	-90 dB min from 2 to 3 GHz (interface)			
Insulation resistance	MIL	5000 MΩ min			
Contact resistance • Center contact • Outer contact	MIL	Initial 1 mΩ 0.2 mΩ		After tests 1.5 mΩ -	
Working voltage in VRMS • At sea level (at 70, 000 feet)	CECC	Cable 5/50 Cable .085"/.141" Cable 10+11/50 Cable LMR 400/600 Cable .250"		850 (250) 350 (250) 1400 (400) 1400 (400) 1400 (400)	
Dielectric withstanding voltage in VRMS • At sea level (at 70, 000 feet)	CECC	Cable 5/50 Cable .085"/.141" Cable 10/50 Cable LMR 400/600 Cable .250"		1500 (350) 1000 (350) 2500 (600) 2500 (600) 2500 (600)	
RF testing voltage **Sea level**	CECC	1500 VRMS (5 MHz sine wave)			

MECHANICAL CHARACTERISTICS

Durability	CECC	500 matings
Engagement and separation torque	CECC	6.6 Ncm max (.58 Inch-pounds)
Recommended coupling nut torque		40 to 60 Ncm (manual) 130 Ncm (11.45 inch pounds) (with pliers R 282 202 000) 170 Ncm (14.96 inch pounds) (with torque wrench R 282 303 020)
Proof torque	CECC	170 Ncm (14.96 inch pounds)
Coupling nut retention force	CECC	450 N (101.25 Lbs)
Cable retention force	CECC	Cable 5/50/S 150N (33.75 Lbs) Cable 5/50/D 200N (48 Lbs) Cable 10/50 300N (67.5 Lbs) Cable 11/50 400N (90 Lbs) Cable .141" 270N (60.75 Lbs)
Center contact retention force **Axial**	MIL	27 N (6.08 Lbs) cables < 8 mm 68 N (15.30 Lbs) cables > 8 mm

Characteristics

Test / Characteristics	Standard reference	Values / Remarks
ENVIRONMENTAL CHARACTERISTICS		
Temperature range • Standard models • Semi-rigid cables	CECC	- 55°C + 155°C - 55°C + 105°C
Thermo cycling test	CECC	- 55°C/+ 155°C/21 j
Thermal shock	CECC	- 40°C/+ 155°C or - 40°C/+ 85°C – 5 cycles
High temperature test	CECC	125°C/1000 H
Corrosion salt spray	CECC	48H (Possible 720H with HEP2R*)
Vibration	CECC	Sinus 10g/10 – 500 Hz
Shock	CECC	1/2 Sinus 50g/11 ms
Moisture resistance • Clamp type • Crimp type	IEC 529	IP 67 IP 65 (with heatshrink sleeve)
Hermetic test	CECC	10^{-5} bar. cm^3/s
Leakage	CECC	Differential pressure 100 to 110 KPa: 1 bar cm^3 / H
MATERIALS		
Body / nut / center male contact / outer contact		Brass
Center female contact		Treated beryllium copper
Ferrule		Brass
Insulator		PTFE
Gasket		Silicon elastomer

	Standard	Intermodulation models + COAXI-KIT
PLATING		
Body • Crimp + clamp type • Solder type	BBR Gold	Silver + BBR Silver
Outer contacts / design	BBR/cross knurled	BBR/hex.
Center contacts	Gold	Silver
Outer contacts / design	BBR/slotted	Silver + BBR/non slotted

PACKAGING	
Packaging	50 pieces bulk Unit packaging

*Contact us

STRAIGHT PLUGS, CRIMP TYPE, FOR FLEXIBLE CABLES (single piece body)

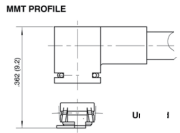


Fig. 1

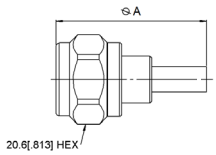


Fig. 2

Cable group	Cable group dia.	Part number		Fig.	Dimensions (mm) A	Captive center contact
RG174 / RG316 / RD316 /AEP-100FR	2.6/50/S+D & LMR® 100	R161 072 000		1	39.7	Yes
AEP-195FR	LMR® 195	R161 082 120		2	38.5	
AEP-200FR	LMR® 200	R161 082 200		1	38.5	
AEP-240FR	LMR® 240	R161 075 030		2	38.5	
AEP-400FR	LMR® 400	R161 088 180			40.1	

STRAIGHT PLUGS, FOR SEMI-RIGID CABLES

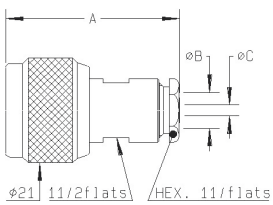


Fig. 1

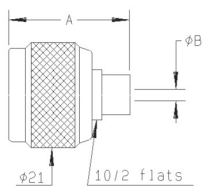


Fig. 2

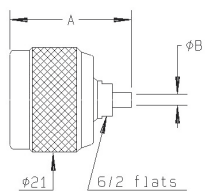
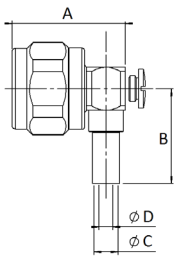


Fig. 3

Cable group	Cable group dia.	Part number		Fig.	Dimensions (mm) A	B dia.	C dia.	Captive center contact	Note
RG405	.085"	R161 050 300		3	24.4	2.25		No	Solder type
RG402	.141"	R161 051 000				3.65			
		R161 052 000		1	35	5.6	3.65		Clamp type
RG401	.250"	R161 053 000			35.4	6.6			
		R161 054 000		2	24.4	6.45			Solder type

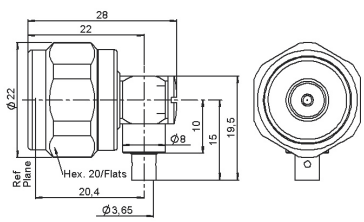
Plugs

RIGHT ANGLE PLUGS, CRIMP TYPE, FOR FLEXIBLE CABLES



Cable group	Cable group dia.	Part number		Dimensions (mm)				Captive center contact
				A	B	C dia.	D dia.	
AEP-200FR	LMR® 200	R161 182 080		26.3	22	5.55	3.25	Yes
AEP-240FR	LMR® 240	R161 183 310		26.3	24	6.6	4.05	
AEP-400FR	LMR® 400	R161 184 080		27	33	11.05	7.46	
AEP-600FR	LMR® 600	R161 188 200		31.7	39.1	15.88	11.96	

RIGHT ANGLE PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLES



Cable group	Cable group dia.	Part number		Captive center contact
RG402	.141"	R161 152 107		Yes

STRAIGHT JACKS

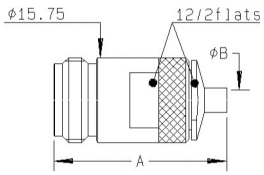


Fig. 1

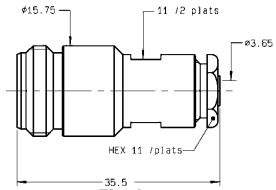


Fig. 2

Cable group	Cable group dia.	Part number		Fig.	Dimensions (mm) A	Dimensions (mm) B dia.	Captive center contact	Note
RG402	.141"	R161 226 020		1	32	3.65	No	Solder type
		R161 227 000		2				Clamp type

SQUARE FLANGE, STRAIGHT JACKS

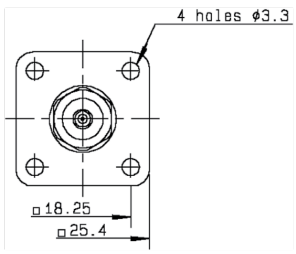


Fig. 1 and 2

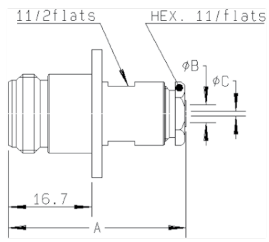


Fig. 2

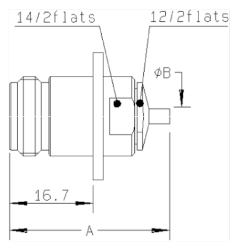
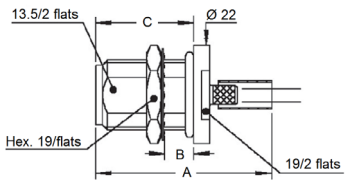


Fig. 2

Cable group	Cable group dia.	Part number		Fig.	Dimensions (mm) A	Dimensions (mm) B dia.	Dimensions (mm) C dia.	Captive center contact	Panel drilling	Note
RG402	.141"	R161 277 000		1	35.5	5.6	3.65	No	P11	Clamp type
		R161 277 300		2	32	3.65				Solder type
RG401	.250"	R161 278 000		1	35.9	6.6				Clamp type

Jacks

BULKHEAD STRAIGHT JACKS, FULL CRIMP TYPE, FOR FLEXIBLE CABLES (panel sealed) (single piece body)



Cable group	Cable group dia.	Part number		Dimensions (mm) A	B	C	Captive center contact	Panel drilling	Note
AEP-200FR	LMR® 200	R161 329 130		39.8	6.5	22.2	Yes	P01	Rear mount
AEP-240FR	LMR® 240	R161 329 140		37.8					
AEP-400FR	LMR® 400	R161 331 060		40.6		22			
AEP-600FR	LMR® 600	R161 331 400		49.9		23.7			

BULKHEAD STRAIGHT JACKS, FOR SEMI-RIGID CABLES (panel sealed)

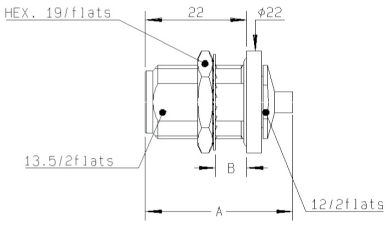


Fig. 1

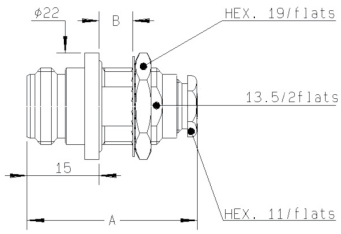


Fig. 2

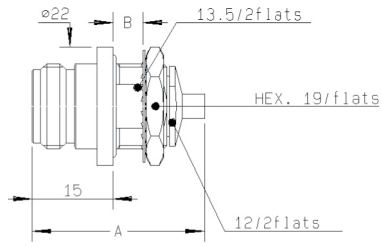


Fig. 3

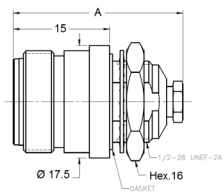


Fig. 4

Cable group	Cable group dia.	Part number		Fig.	Dimensions (mm)		Captive center contact	Panel drilling	Note
					A	B			
RG405	.085"	R161 335 200		1	32	6.5			Solder type/ Rear mount
RG402	.141"	R161 323 000		2	35.5	8			Clamp type/ Front mount
		R161 336 000		1	32	6.5	No	P11	Solder type/ Rear mount
		R161 336 200		3					Solder type/ Front mount
RG401	.250"	R161 337 200		1					Solder type/ Rear mount
RG405	.085"	4502-7041-010		4	26.56				Solder type/ Front mount
RG402	.141"	4502-7041-009							
		4501-9543-009		1	33.52		Yes		Solder clamp/ Rear mount

FLANGE, STRAIGHT FEMALE RECEPTACLES

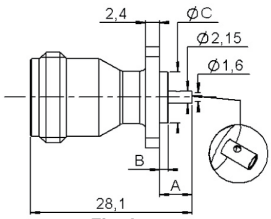


Fig. 1

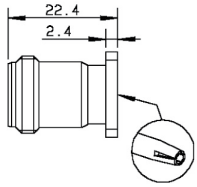


Fig. 2

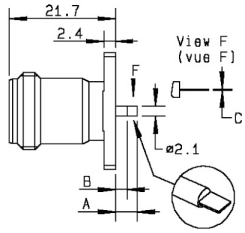


Fig. 3

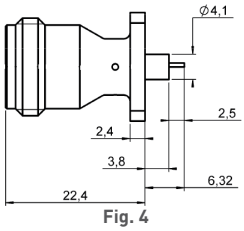


Fig. 4

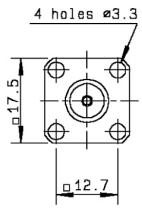


Fig. A

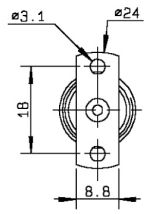


Fig. B

Part number		Fig.	Dimensions (mm)			Captive center contact	Panel drilling	Note
			A	B	C			
R161 410 000		1 + A	5.7	1.5	8.9	Yes	P03	
R161A 410 000								ECO version
R161 410 130		4 + A					P12	Solder pot contact
R161 418 000		2 + A					P03	Universal/See contacts page 12-22
R161 461 000		3 + B	6.2	3.9	0.6		P09	2 hole flange/Flat tab contact

STRAIGHT MALE AND FEMALE RECEPTACLES

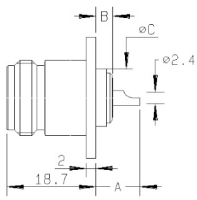


Fig. 1

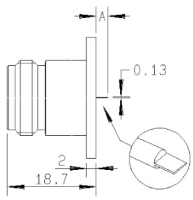


Fig. 2

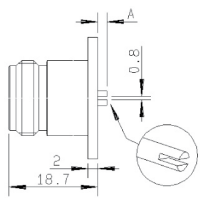


Fig. 3

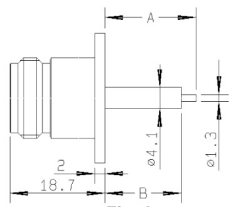


Fig. 4

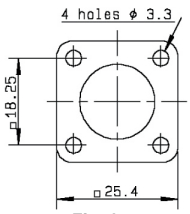


Fig. A

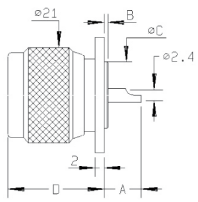


Fig. 5

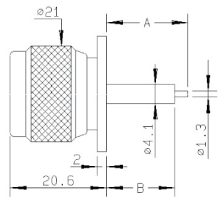
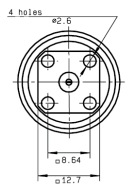


Fig. 6



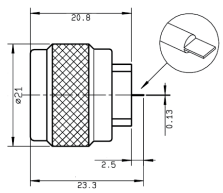
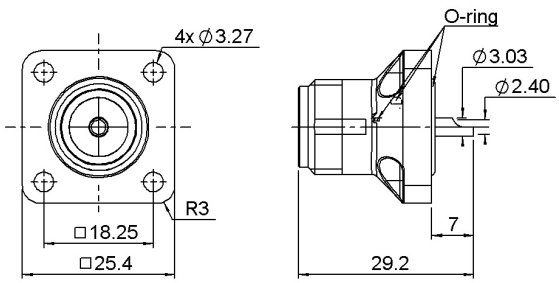


Fig. 7

Part number		Fig.	Dimensions (mm)				Captive center contact	Panel drilling	Note
			A	B	C dia	D			
R161 404 000		1 + A	9.3	0.8	14.6		Yes	P05	Solder pot
R161A 404 000									Solder pot/ECO version
R161 404 137									For intermodulation application/ Center contact brass
R161 416 130		4 + A	17.9	15				P06	Extended dielectric
R161 419 020		2 + A	2.5					P07	Flat tab contact
R161 419 300		3 + A	2					P01	Slotted contact
R161 441 000		5 + A	8.7	0.8	14.6	20.6		P02	Male/Solder pot
R161 441 400		6 + A	17.9	15				P04	Male/Extended dielectric
R161 438 200		7						P08	

Receptacles

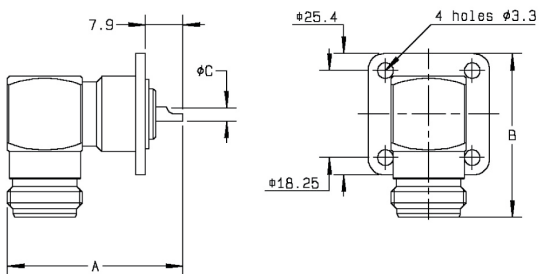
COMPOSITE FEMALE RECEPTACLES

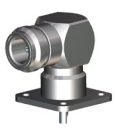


Part number		Captive center contact	Description	Color	Packaging
R161 404 C01		Yes	-	Black	50 pieces
R161 404 C02			Combination seal		
R161 404 C03			Panel seal		

Available upon request. Processed according to customer needs.

RIGHT ANGLE FEMALE RECEPTACLE



Part number		Dimensions (mm)			Captive center contact	Panel drilling	Note
		A	B	C dia			
R161 653 000		36.9	34.4	2.5	Yes	P02	Solder pot

BULKHEAD STRAIGHT RECEPTACLES (fully sealed or panel hermetic)

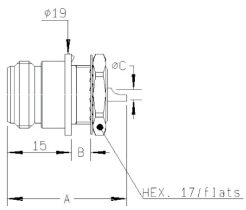


Fig. 1

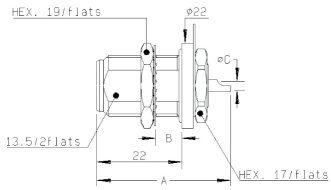


Fig. 2

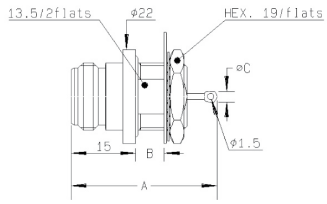


Fig. 3

Part number		Fig.	Dimensions (mm)			Captive center contact	Panel drilling	Note
			A	B	C			
R161 570 000		1	28	4.5	2.4	Yes	P10	Front mount
R161 606 000		2	34.6	6.5	2.4		P11	Rear mount/Fully sealed
R161 625 000		3	34	6.5	2.5			Front mount/Panel hermetic

Accessories

PROTECTIVE CAPS

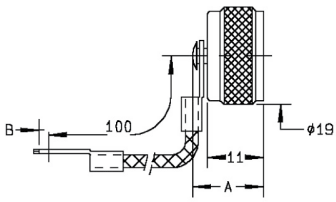


Fig. 1

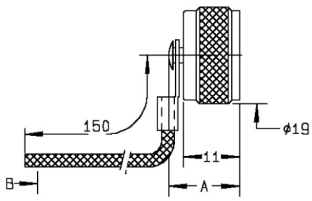


Fig. 2

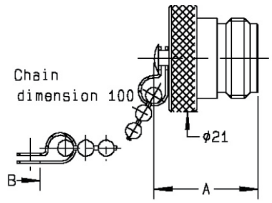


Fig. 3

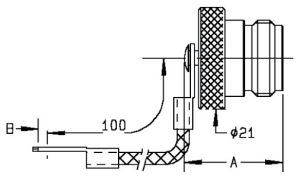


Fig. 4

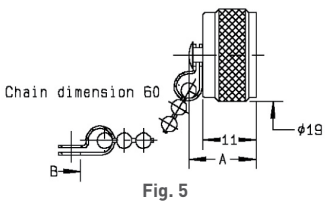


Fig. 5

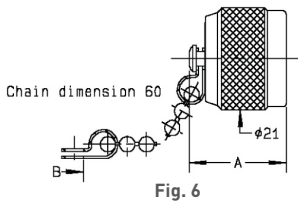


Fig. 6

Part number		Fig.	Dimensions (mm)		Note
			A	B	
R161 804 000		1	13.9	3.8	Male with cord
R161 805 410		2	13.9	2	Male with cord
R161 841 000		3	20.4	3.9	Female with chain
R161 844 000		4	20.4	3.8	Female with cord
R161 853 000		5	13.9	3.9	Male with chain
R161 862 000		6	20.1		Male short circuit with chain

Tools

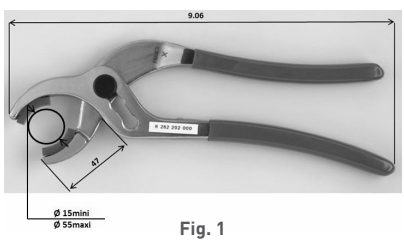
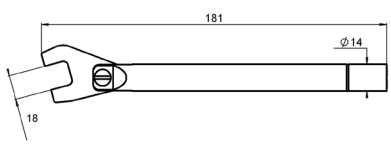


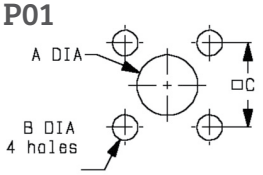
Fig. 1



Part number		Fig.	Description
R282 202 000		1	Pump pliers
R282 303 020		2	Torque wrench 18.0mm 170cm.N

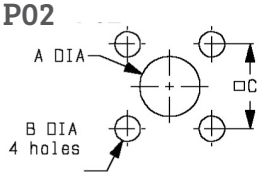
Panel Drilling

P01



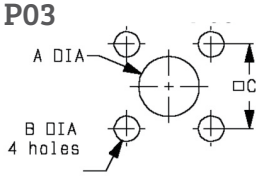
	MM		INCH	
	maxi	mini	maxi	mini
A	16.3	16.1	0.642	0.634
B	3.30	3.20	0.13	0.126
C	18.35	18.15	0.722	0.715

P02



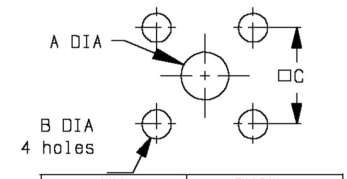
	MM		INCH	
	maxi	mini	maxi	mini
A	15.1	14.9	0.594	0.587
B	3.30	3.20	0.13	0.126
C	18.35	18.15	0.722	0.715

P03



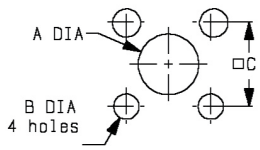
	MM		INCH	
	maxi	mini	maxi	mini
A	9.40	9.20	0.37	0.362
B	3.30	3.20	0.13	0.126
C	12.8	12.6	0.504	0.496

P04



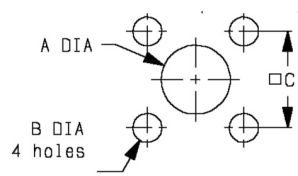
	MM		INCH	
	maxi	mini	maxi	mini
A	4.2	4.1	0.165	0.161
B	3.3	3.2	0.13	0.126
C	18.35	18.15	0.722	0.715

P05



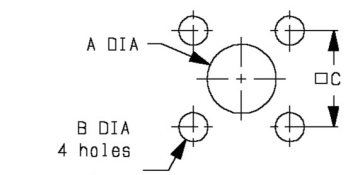
		MM		INCH	
		maxi	mini	maxi	mini
A	Front	16.3	16.1	0.642	0.634
	Rear	15.1	14.9	0.594	0.587
B		3.30	3.20	0.13	0.126
C		18.35	18.15	0.722	0.715

P06



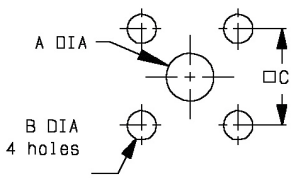
		MM		INCH	
		maxi	mini	maxi	mini
A	Front	16.3	16.1	0.642	0.634
	Rear	4.2	4.1	.165	0.161
B		3.3	3.2	0.13	0.126
C		18.35	18.15	0.722	0.715

P07



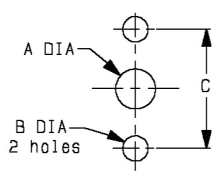
		MM		INCH	
		maxi	mini	maxi	mi
A	Front	16.3	16.1	0.642	0.6
	Rear	12.5	12.3	0.492	0.4
B		3.3	3.2	0.13	0.1
C		18.35	18.15	0.722	0.7

P08



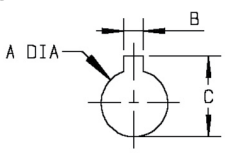
	MM		INCH	
	maxi	mini	maxi	mini
A	4.2	4.1	0.165	0.161
B	2.7	2.6	0.106	0.102
C	8.69	8.59	0.342	0.338

P09



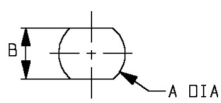
	MM		INCH	
	maxi	mini	maxi	mini
A	5	4.80	0.197	0.189
B	3.30	3.20	0.13	0.126
C	18.1	17.9	0.713	0.705

P10



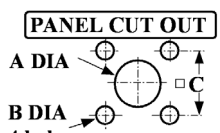
	MM		INCH	
	maxi	mini	maxi	mini
A	14.3	14.1	0.563	0.555
B	2.30	2.20	0.091	0.087
C	17	16.8	0.669	0.661

P11



	MM		INCH	
	maxi	mini	maxi	mini
A	16.1	16	0.634	0.63
B	13.7	13.6	0.539	0.535

P12



	mm		inch	
	Maxi	mini	Maxi	mini
A	4.25	4.15	0.167	0.163
B	3.4	3.2	0.133	0.125
C	12.8	12.6	0.503	0.496

Low Power Terminations

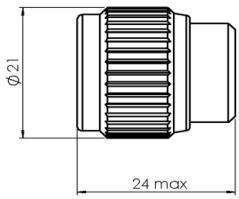


Fig. 1

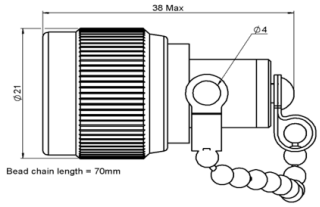


Fig. 2

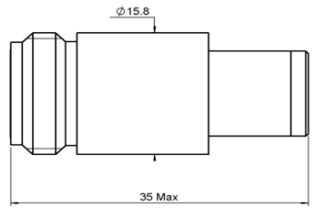


Fig. 3

Frequency DC to (GHz)	VSWR max.	Return loss min. (dB)	Power rating (W)		Impedance (Ω)	Gender	Part number		Fig.
			average	peak					
4	1.2	20.8	1	500	50±2%	Male	R404 131 000		1
4	1.2	20.8	1	500	50±2%	Male	R404 131 120[1]		2
4	1.2	20.8	1	500	50±2%	Female	R404 132 000		3

(1) with bead chain

Medium Power Terminations

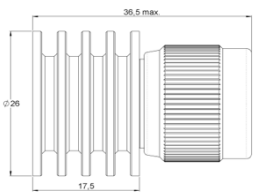


Fig. 1

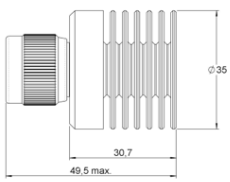


Fig. 2

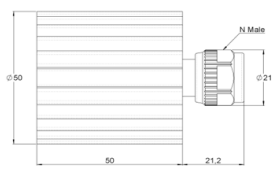


Fig. 3

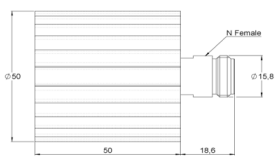


Fig. 4

Frequency DC to (GHz)	VSWR max.	Return loss min. (dB)	Power rating (W)		Impedance (Ω)	Gender	Part number		Fig.
			average	peak					
2	1.1	26.4	6	4000	50±5%	Male	R404 507 000		1
2	1.1	26.4	12	4000	50±5%	Male	R404 557 000		2
6	1.3	17.7	30	2000	50±5%	Male	R404 750 000		3
6	1.3	17.7	30	2000	50±5%	Female	R404 751 000		4

Low Power Attenuators

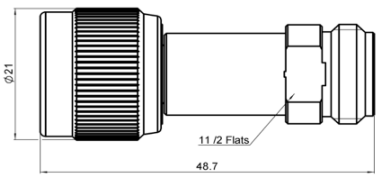


Fig. 1

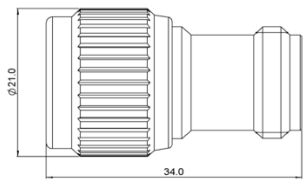


Fig. 2

Frequency DC to (GHz)	VSWR max.	Return loss min. (dB)	Power rating (W)		Nom. Attenuation (dB)	Max dev.	Part number		Fig.
			average	peak					
2	1.15	23.1	2	100	xx	± 0,35 (1)	R412 700 000		1
Available attenuation value: xx = 00 to 15 step 1, 20, 30, 40 and 50 dB									
6	1.4	15.6	1	100	xx	± 0,5 (1)	R412 700 124		2
Available attenuation value: xx = 00 to 20 dB step 1									

(1) up to xx = 15

Medium Power Attenuators

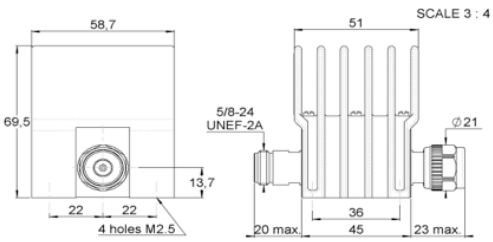


Fig. 1

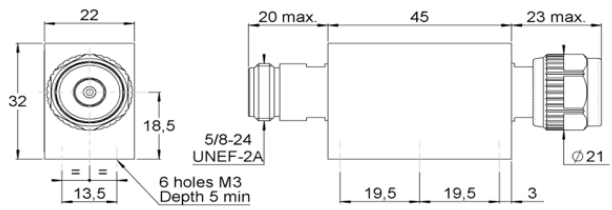


Fig. 2

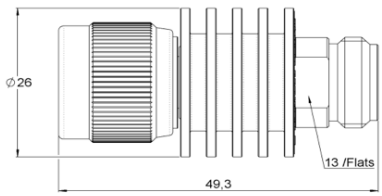


Fig. 3

Frequency DC to (GHz)	VSWR max.	Return loss min. (dB)	Power rating (W)		Nom. Attenuation (dB)	Max dev.	Part number		Fig.
			average	peak					
4	1.35	16.5	25	5000	xx	± 0,6 (1)	R417 303 110		1
Available attenuation value: xx = 03, 06, 10, 20 and 30 dB									
4	1.35	16.5	30	5000	xx	± 0,6 (1)	R417 303 130		2
Available attenuation value: xx = 03, 06, 10, 20 and 30 dB									
8	1.25	19.1	15 (2)	250	xx	± 0,3	R415 703 000		3
Available attenuation value: xx = 03, 06, 10 and 20 dB									

(1) up to xx = 10

(2) 12 for xx = 06 , 10 for xx = 10 and 20