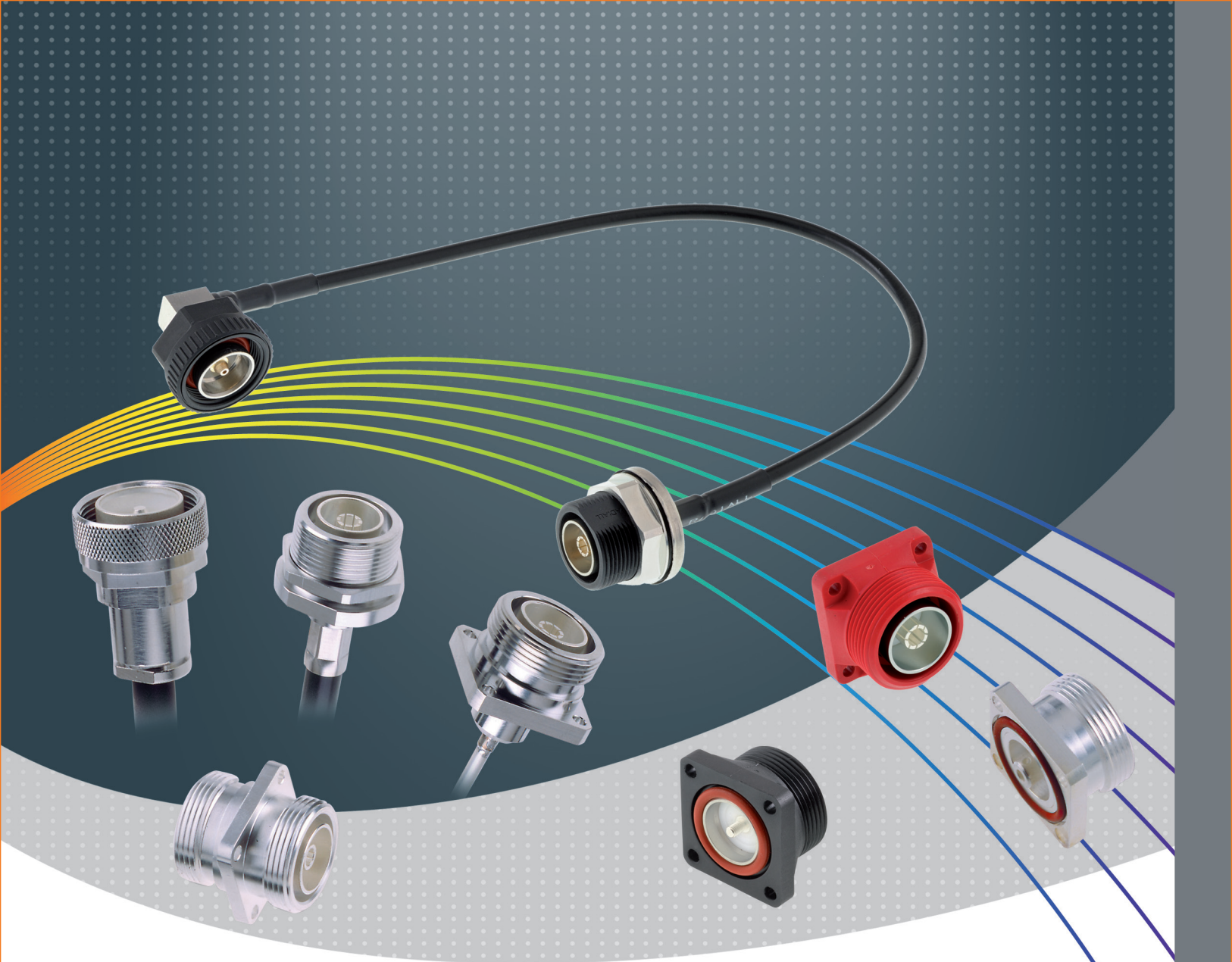




13

7/16 and Composite 7/16 series

R185 / R187

RADIAL 
The next conneXion

Pages

7/16

Introduction	13-4
Interface	13-6
Characteristics	13-7 to 13-8
Straight plugs	13-9
Right angle plugs	13-10
Straight jacks	13-11
Square flange jacks	13-11
Bulkhead jacks	13-12
Adapters	13-13

Composite 7/16

Introduction	13-4
Interface	13-6
Characteristics	13-8
Jacks and plugs	13-14
Square flange jacks	13-15

Panel drilling	13-16
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INTRODUCTION



50Ω

DC - 7.5 GHz

GENERAL

- Standard coaxial connectors
- Screw-on coupling
- High power rating
- Excellent RF performance

APPLICABLE STANDARDS

- IEC 169-4
- DIN 47223
- CECC 22 190

APPLICATIONS

- Mobile communication infrastructure networks: combiner, diplexer, filter...
- Jumper and feeder cables assemblies
- Radio links
- Indoor and outdoor applications

Radiall's 7/16 series has been developed using the latest technology advances in connector design. These connectors are easy to use, highly reliable, innovative and are designed to meet the needs of the telecommunications market. The complete connector series feature the following characteristics:

- An extensive range, with optimized component part design.
- An upgraded cross-knurled coupling nut allowing better manual tightening.

New Eco series

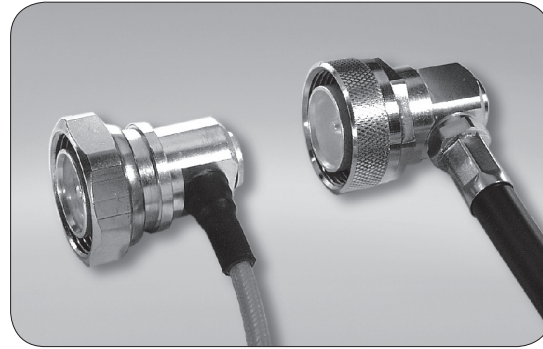
Radiall introduced a complete range of Eco 7/16 connectors designed to be installed in telecommunications equipment such as remote radio heads, antennas, and filters. The modular design of these Eco 7/16 connectors offers multiple termination possibilities to fit numerous additional applications. There are more than 20 different connector variations currently available.

New Composite 7/16

Radiall expanded its line of innovative 7/16 composite connectors with new plugs, jacks and receptacles as a lightweight, low cost, alternative to brass connectors. Manufactured with corrosion-proof, composite materials, these new single-piece connectors are UV resistant, meeting IEC 68-2-5 and IEC-68-2-9 to withstand all environments, including harsh outdoor installations. Radiall now offers over 20 different variations. The selection of the composite materials is a result of an in-depth competitive analysis of creeping speeds of zinc and aluminum alloys. Not only do the composite materials offer considerable performance advantages guaranteeing up to 500 matings; but with more than a 50% reduction in weight, this receptacle reduces the overall weight of the final module as well as transportation costs.

High performance range

- Frequency range: DC - 7.5 GHz
- 2 types of coupling nut:
 - cross-knurled and 6 flats 27 mm wide coupling nut (3 000 N.cm),
 - 6 flats coupling nut (32 mm wide), allowing high coupling torque (3 500 N.cm), when used with a torque wrench.
- Intermodulation performance: 2 levels
 - 125 dBm cable assemblies
 - 110 dBm connectors and cable assemblies.



2 types of coupling nut

RADIALl has developed its intermodulation measurement equipment following the IEC 46 D/292/NP standard proposal. It is aimed at third-order IMP measurements through the reflection method. The range of this test set-up is -132 dBm (-175 dBc) under 2 x 20 W.

- High performance non-magnetic material (brass) and plating (silver) with anti-tarnishing finish (strike of BBR).
- Non-slotted outer contact on standard products.
- The 7/16 connector series benefits from a complete easy-to-use range of tooling.

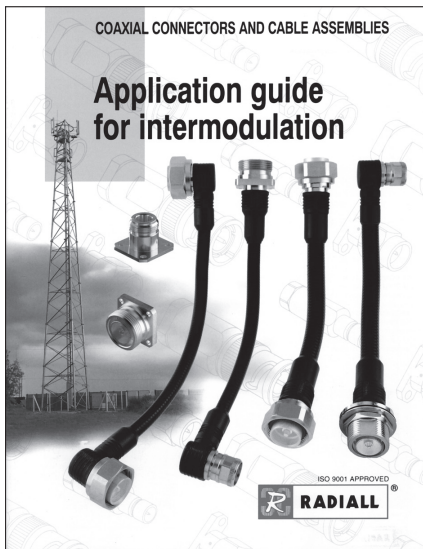


Custom models

To fulfill customer requirements, Radiall offers complete design of custom connectors according to the 7/16 series standard.

What is INTERMODULATION ?

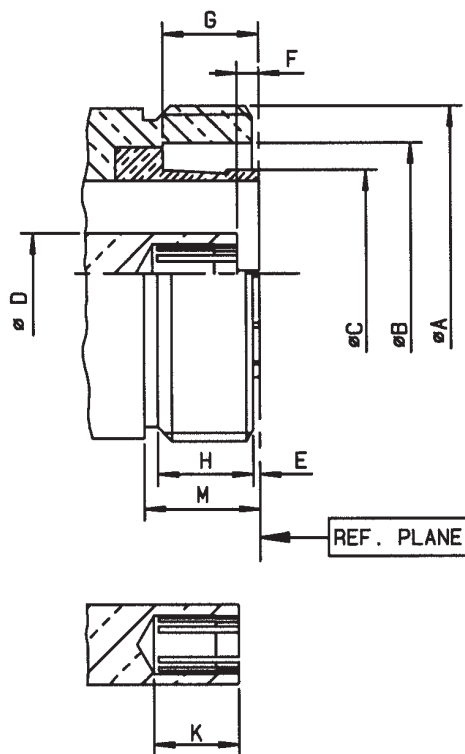
Intermodulation (IM) is an undesired modulation that leads to a distortion of the output high-frequency carrier. It is defined as the ratio of the 3rd order intermodulation products and the incident signal power because the most troublesome IM products are those of 3rd order.



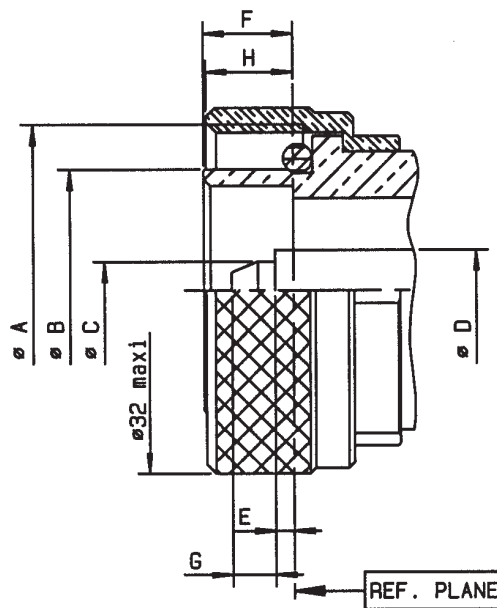
For more detailed information, including our intermodulation measurement system and our product range, please visit www.radiall.com

INTERFACE

JACK



PLUG



Letter	mm		inch	
	min.	max.	min.	max.
A DIA	M29 X 1.5		M29 X 1.5	
B DIA	22.5	22.7	.885	.893
C DIA	17.9	17.96	.704	.707
D DIA	6.95	7.00	.273	.275
E	0.50	0.70	.019	.027
F	1.77	2.07	.069	.081
G	8.20	8.40	.322	.330
H	8.25	8.75	.324	.344
K	7.25	7.55	.285	.297

Letter	mm		inch	
	min.	max.	min.	max.
A DIA	M29 X 1.5		M29 X 1.5	
B DIA	20.8	21.0	.818	.826
C DIA	4.97	5.03	.195	.198
D DIA	6.95	7.00	.273	.275
E	1.47	1.77	.057	.069
F	7.40	7.80	.291	.307
G	3.60	4.00	.141	.157
H	7.30	7.80	.287	.307

Test/characteristics	Standard reference	Values/remarks
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ELECTRICAL CHARACTERISTICS

Impedance		50Ω
Frequency range		DC - 7.5 GHz
Typical V.S.W.R.		1 GHz 2.5 GHz 5 GHz 7.5 GHz
• Straight models		1.10 max from DC to 3 GHz - 1.20 max from 3 to 7.5 GHz
RG213-RG214-RG393		1.04 1.06 1.08 1.10
.141"		1.04 1.07 1.08 1.20
.250"		1.03 1.05 1.11 1.13
1/2" superflexible corrugated		1.02 1.04 1.05 1.05
3/8" superflexible corrugated		1.03 1.03 1.12 1.20
1/4" superflexible corrugated		1.01 1.02 1.09 1.17
• Right angle models		1.15 max from DC to 3 GHz
RG213-RG214-RG393		1.02 1.04 1.12 1.50
1/2" superflexible corrugated		1.04 1.04 1.14 1.60
3/8" superflexible corrugated		1.05 1.08 1.12 1.80
1/4" superflexible corrugated		1.02 1.06 1.13 1.60
Intermodulation product (IMP ₃)		
• Connectors		-110 dBm typ. (- 153 dBc typ / 20 W)
• Home made cable assemblies		-125 dBm typ. (- 168 dBc typ. / 20 W)
Insertion loss (dB)	MIL	0.05 √F (GHz)
Straight connectors and right-angle connectors		
RF Leakage	CECC	130 dB at 1 GHz
Insulation resistance	CECC	10 000 MΩ min
Contact resistance		
• Center contact	CECC	< 0.4 mΩ
• Outer contact		≤ 1.5 mΩ
Working voltage in VRMS at sea level	CECC	2 700
Dielectric withstanding voltage in VRMS		
• at sea level	CECC	4 000
(at 70, 000 feet)		350

MECHANICAL CHARACTERISTICS

Durability	CECC	500 matings
Force to engage and disengage	CECC	15 N
Recommended coupling nut torque		
• Hex. coupling nut		3 500 Ncm (with torque wrench R 282 303 500)
• Hex. + cross knurl coupling nut		3 000 Ncm (with torque wrench R 282 303 520)
Proof torque	CECC	3 500 Ncm
Coupling nut retention force	CECC	1 000 N
Cable retention force		
Cable 5/50 & 10/50		250 N
Cable 1/4"	CECC	200 N
Cable 3/8"		250 N
Cable 1/2"		350 N
Cable 7/8"		500 N
Center contact retention force	CECC	200 N

ENVIRONMENTAL CHARACTERISTICS

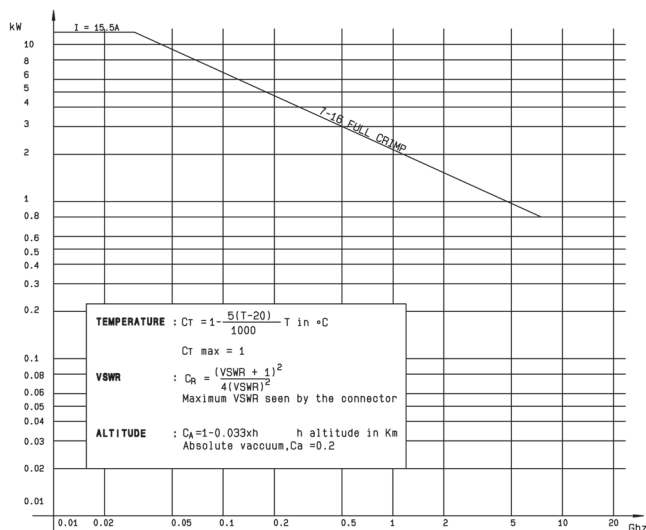
Temperature range		
• flexible cables and corrugated cables	CECC	- 55 °C + 155 °C
• semi-rigid cables		- 55 °C + 105 °C
Thermo cycling test	CECC	- 55 °C / + 155 °C / 56 days
Rapid change of temperature	IEC	- 55 °C / + 155 °C / 5 cycles
High temperature test	CECC	1000 hours / 155 °C
Corrosion salt spray	IEC	48 hours / Na Cl 5% / 35 °C
Vibration	CECC	98 m/s ² - 10 Hz at 500 Hz
Moisture resistance		
• clamp type	IEC 529	IP67
• crimp type		IP65 (with heatshrink sleeve)
• home made cable assemblies		IP68 (overmolding)
Hermetic test	IEC	5 Pa. cm ³ /s
Leakage	CECC	1 cm ³ /h max

CHARACTERISTICS 7/16

MATERIALS AND PLATINGS

		Materials	Plating
Bodies		Brass	Silver + BBR
Nut		Brass	BBR
Center contact	male	Brass	Silver
	female	Beryllium copper	
Insulator		PTFE	
Gasket		Silicon rubber	

POWER RANGE



CHARACTERISTICS COMPOSITE 7/16

ELECTRICAL CHARACTERISTICS

Frequency range	DC-7.5 GHz
VSWR	1.06@DC-3 GHz - 1.10@DC-3-7.5 GHz
High working voltage	> 2700 V
Very low intermodulation	IMP3 < -125 dBm under 2 carriers of +43dBm And typically < -130 dBm
Power handling	> 800 W@ 935 MHz

MECHANICAL CHARACTERISTICS

Longlife duration	up to 500 mating cycles
Coupling torque	35 Nm or less
Coupling strength	1000 N
Center contact retention / axial force	> 200 N
Center contact retention / torque	> 80 Ncm

ENVIRONMENTAL CHARACTERISTICS

Temperature range	-40°C / +85°C
Humidity	Up to 100% @ 20°C
Flammability rating	UL94-V0
UV resistance	IEC 68-2-5/IEC 68-2-9
Waterproof	IP67

Some connectors may feature different performance depending on the application they have been designed for, or according to the applicable cable.

STRAIGHT PLUGS, CRIMP AND CLAMP TYPE, FOR FLEXIBLE CABLES

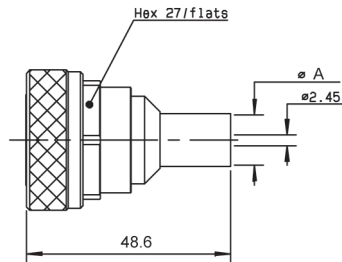
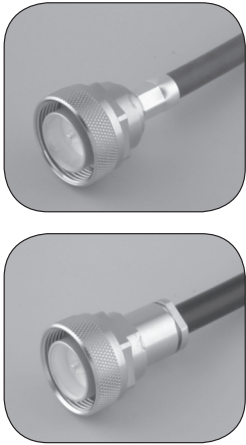


Fig. 1

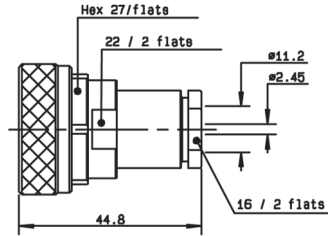


Fig. 2

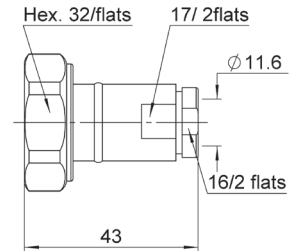


Fig. 3

Cable group	Cable group dia.	Part number	Fig.	Dimensions (mm) A	Captive center contact	Finish	Note
RG213/RG393	10/50/S + D	R185 074 000	1	11.05	yes	Silver + BBR	Crimp type
RG214	11/50/D	R185 077 000		11.4			Clamp type
RG213/RG393/RG214	10 + 11/50/S + D	R185 010 000	2			BBR	Clamp type ECO version
		R185A 010 000	3				

STRAIGHT PLUGS EZ FIT TYPE FOR CORRUGATED CABLES

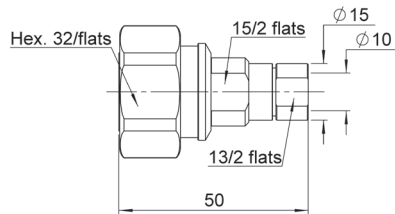


Fig. 1

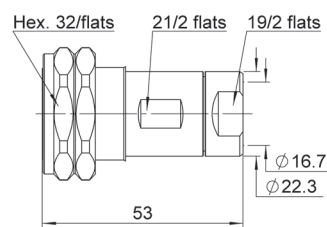


Fig. 2

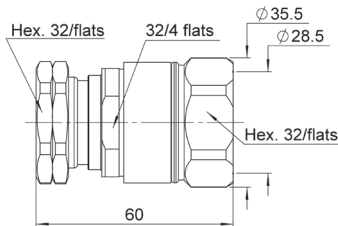


Fig. 3

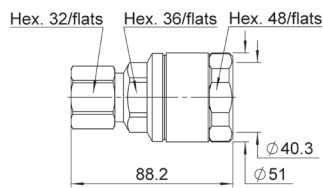


Fig. 4

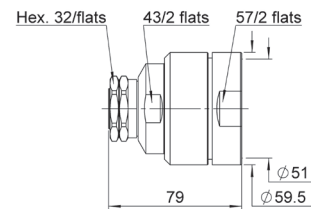


Fig. 5

Cable groupe dia.	Part number	Fig.	Captive center contact	Finish	Note
1/4" superflexible corrugated	R185A 030 200	1	yes	BBR	ECO version
1/2" flexible corrugated	R185A 031 020	2			
1/2" superflexible corrugated	R185A 031 200	2			
3/8" superflexible corrugated	R185A 032 200	1			
7/8" flexible corrugated	R185A 033 020	3			
1 1/4" flexible corrugated	R185A 035 020	4			
1 5/8" flexible corrugated	R185A 037 020	5			

To download data sheets and assembly instructions, visit www.radiall.com & enter the part number in the Search box.
Bold part numbers represent products typically in stock & available for immediate shipment.
 See page 8 and 9 for packaging information.

RIGHT ANGLE PLUGS

RIGHT ANGLE PLUGS CRIMP AND CLAMP TYPE FOR FLEXIBLE CABLES

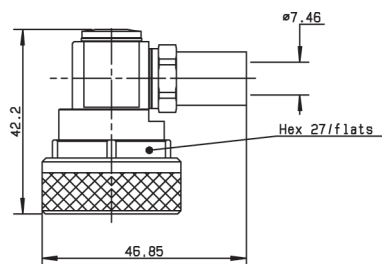


Fig. 1

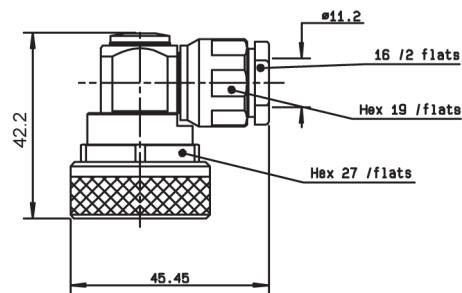


Fig. 2

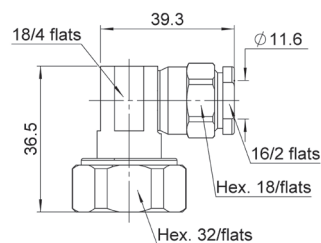


Fig. 3

Cable group	Cable group dia.	Part number	Fig.	Captive center contact	Finish	Note
RG213	10/50/S	R185 174 000	1	yes	Silver + BBR	Crimp type
		R185A 174 000	1			Crimp type ECO version
RG393/RG214	10+11/50/D	R185 160 000	2			Clamp type
		R185A 160 000	3			Clamp type ECO version

RIGHT ANGLE PLUGS EZ FIT TYPE

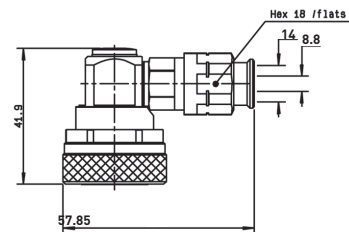


Fig. 1

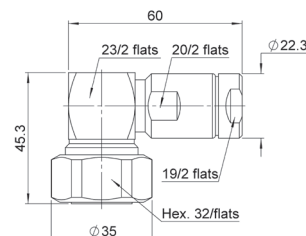


Fig. 2

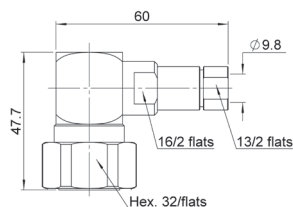


Fig. 3

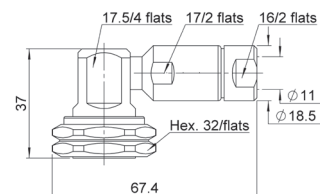


Fig. 4

Cable group dia.	Part number	Fig.	Captive center contact	Finish
1/2" superflexible corrugated	R185 165 200	1	yes	Silver + BBR
1/2" superflexible corrugated	R185A 165 200	2		Silver + BBR ECO version
1/4" superflexible corrugated	R185A 164 200	3		
3/8" superflexible corrugated	R185A 166 200	4		

STRAIGHT JACKS

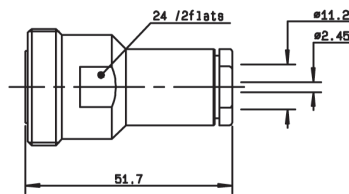


Fig. 1

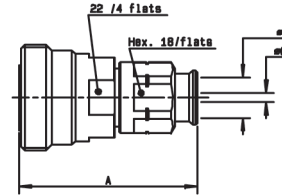


Fig. 2

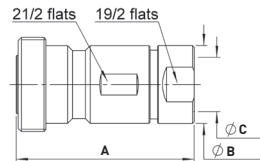


Fig. 3

Cable group	Cable group dia.	Part number	Fig.	Dimensions (mm)			Captive center contact	Finish	Note
				A	B	C			
RG393/RG214	10 + 11/50 D	R185 210 000	1				yes	Silver + BBR	clamp type
	1/4" superflexible corrugated	R185 215 200	2	49.45	7.95	4.7			
	1/2" superflexible corrugated	R185 216 200		50	14	8.8			
	3/8" superflexible corrugated	R185 217 200			11	7.1			
	1/2" flexible corrugated	R185A 216 020	3	54.5	22.3	16.7			Ez fit type ECO version
	7/8" flexible corrugated	R185A 218 020		55.5	35.5	28.5			
	1 1/4" flexible corrugated	R185A 220 020		65.5	49	40.2			
	1 5/8" flexible corrugated	R185A 222 020		76.5	59.5	51			

STRAIGHT SQUARE FLANGE JACKS

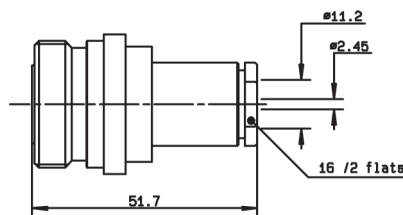


Fig. 1

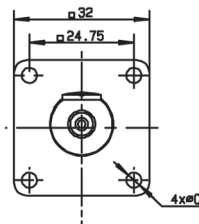
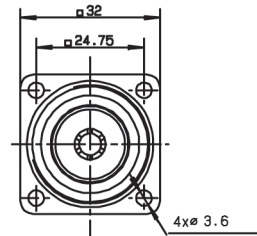
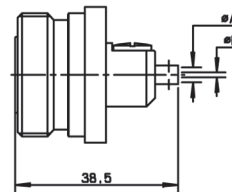


Fig. 2



Cable group	Cable group dia.	Part number	Fig.	Captive center contact	Dimensions (mm)			Panel drilling	Finish	Note
					A	B	C			
RG393/RG214	10 + 11/50 D	R185 260 000	1	yes				P01	Silver + BBR	Clamp type for flexible cables
RG402	.141"	R185 252 000	2	yes	3.65	0.996	3.6	P01		Solder type for semi-rigid cables
RG401	.250"	R185A 254 000		yes	6.45	1.68	3.6			

To download data sheets and assembly instructions, visit www.radiall.com & enter the part number in the Search box.
Bold part numbers represent products typically in stock & available for immediate shipment.
 See page 8 and 9 for packaging information.

BULKHEAD JACKS AND RECEPTACLES

STRAIGHT BULKHEAD JACKS FOR FLEXIBLE CABLES AND CORRUGATED CABLES

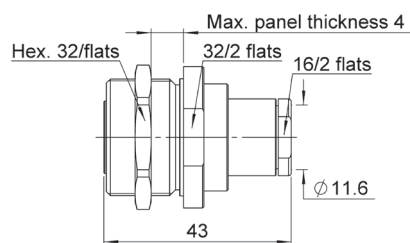


Fig. 1

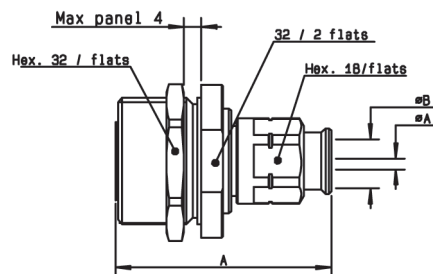


Fig. 2

Cable group	Cable group dia.	Part number	Fig.	Captive center contact	Panel drilling	Finish	Note
RG213/RG216/ Eco393/RG214	10+11/S+D	R185A 310 000	1	yes	P02	Silver + BBR	Clamp type for flexible cables ECO version
	1/4" superflexible corrugated	R185A 315 200	2				EZ FIT type for corrugated cables ECO version
	1/2" superflexible corrugated	R185A 316 200					
	3/8" superflexible corrugated	R185A 317 200					

STRAIGHT FLANGE FEMALE RECEPTACLES

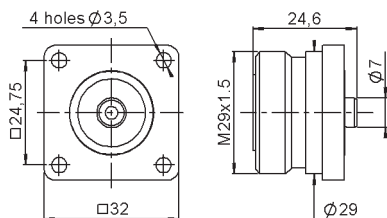
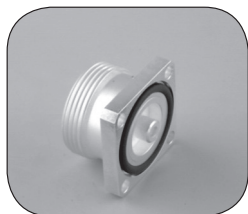


Fig. 1

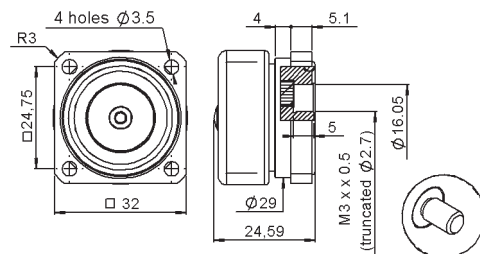


Fig. 2

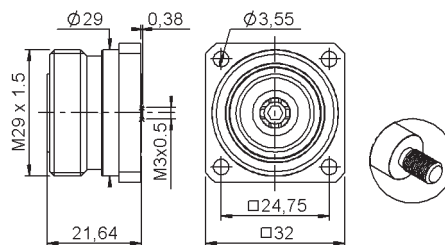


Fig. 3

Part number	Fig.	Captive center contact	Panel drilling	Finish	Slotted outer contact	Packaging	Note
R185 403 547	1	yes	P03	BBR	no	20	With solder pot contact
R185 405 200	2		P05	Silver + Copper	yes		Panel seal flange mount
R185 406 090	3			BBR	no	50	M3

To download data sheets and assembly instructions, visit www.radiall.com & enter the part number in the Search box.
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IN SERIES ADAPTERS

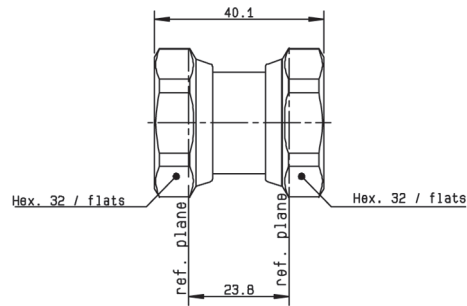


Fig. 1

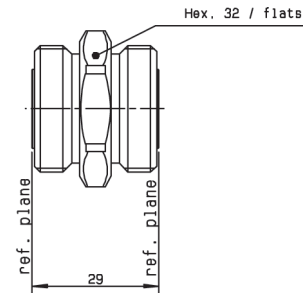


Fig. 2

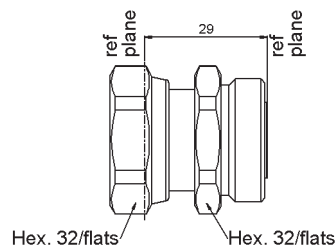


Fig. 3

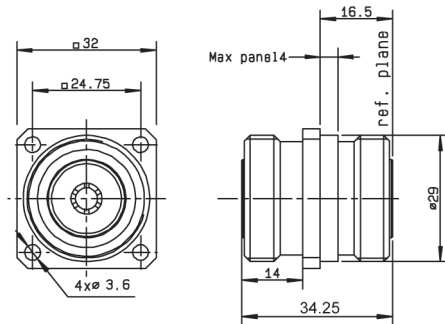


Fig. 4

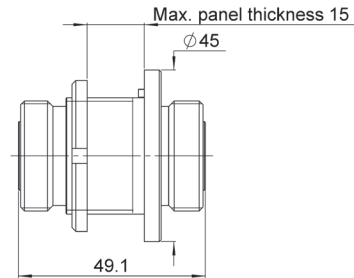


Fig. 5

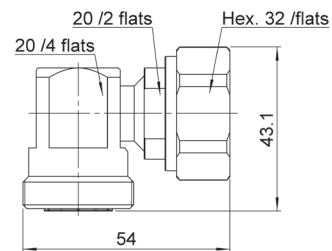


Fig. 6

Part number	Fig.	Captive center contact	Panel drilling	Finish	Note
R185 703 000	1	yes		Silver + Copper	male - male
R185 705 000	2				female - female
R185 707 000	3				male - female
R185 710 000	4		P01	Silver + BBR	female - female flange mount
R185 730 020	5		P06		female - female
R185A 770 000	6				ECO version

To download data sheets and assembly instructions, visit www.radiall.com & enter the part number in the Search box.
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 See page 8 and 9 for packaging information.

JACKS AND PLUGS

STRAIGHT BULKHEAD JACKS PANEL SEAL

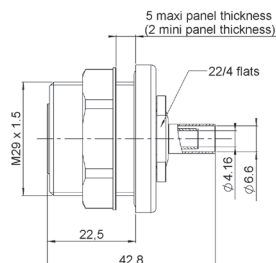


Fig. 1

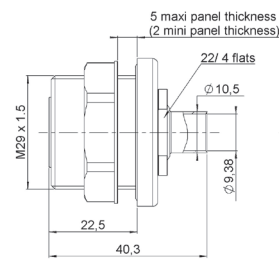


Fig. 2

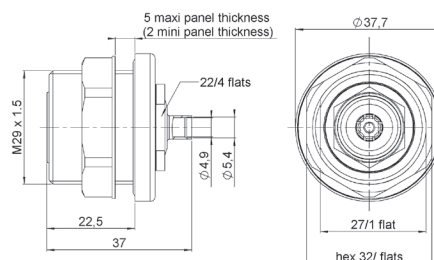


Fig. 3

Cable group	Cable group dia.	Part number	Fig.	Panel drilling	Note
EC0230	6/50/D	R187 100 000	1	P07	Crimp type
	3/8" superflexible corrugated	R187 110 010	2	P07	Solder type
	SHF 5LI	R187 110 020	3	P07	Solder type

RIGHT ANGLE PLUGS

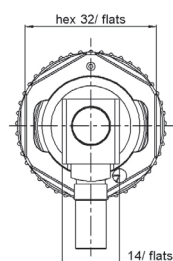
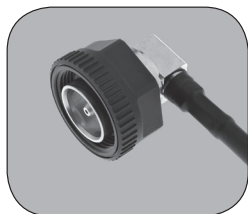


Fig. 1

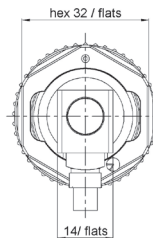


Fig. 2

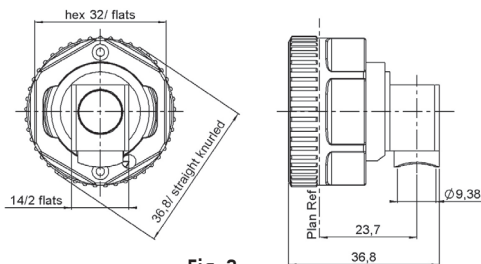


Fig. 3

Cable group	Cable group dia.	Part number	Fig.	Note
EC0230	6/50/D	R187 700 200	1	Crimp type
	SHF 5LI	R187 710 200	2	Solder type
	3/8" superflexible corrugated	R187 710 210	3	Solder type

SQUARE FLANGE JACK RECEPTACLE SOLDER TYPE, PANEL SEAL

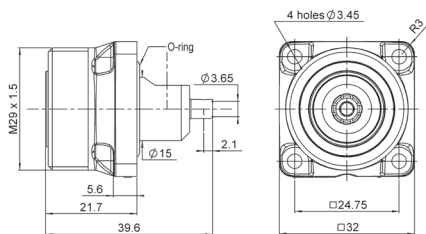


Fig. 1

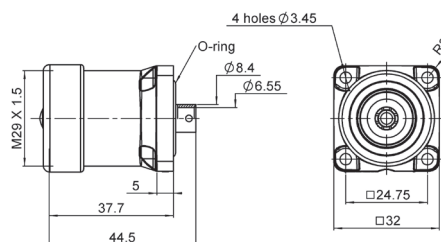


Fig. 2

Cable group	Cable group dia.	Part number	Fig.	Panel drilling
RG402	.141"	R187 403 010	1	P08
RG401	.250"	R187 130 000	2	P08

SQUARE FLANGE JACK RECEPTACLE PANEL SEAL

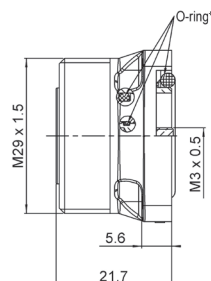
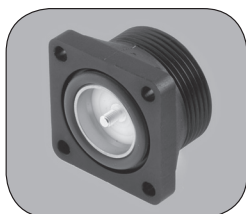


Fig. 1

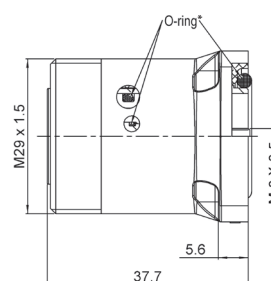


Fig. 2

Part number	Fig.	Captive center contact	Waterproof interface	Color	Panel drilling
R187 403 000	1	no	no	black	P08
R187 403 100			yes		
R187 406 000		yes	no		
R187 406 100			yes		
R187 413 000	2	no	no		
R187 413 100			yes		
R187 416 000		yes	no		
R187 416 100			yes		

Standard color is black however, other colors are proposed upon request. Packaging 20 pieces.

Other specific demands can be proceeded according to customer needs.

* O-ring inside, only on the waterproof models.

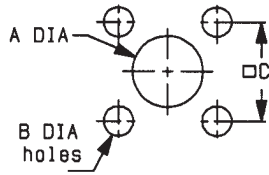
To download data sheets and assembly instructions, visit www.radiall.com & enter the part number in the Search box.

Bold part numbers represent products typically in stock & available for immediate shipment.

See page 8 and 9 for packaging information.

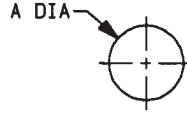
PANEL DRILLING

P01



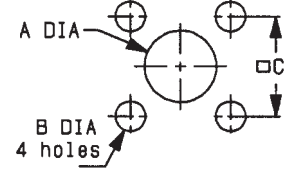
	MM		INCH	
	maxi	mini	maxi	mini
A	29.2	29.1	1.15	1.146
B	3.7	3.6	0.146	0.142
C	24.8	24.7	0.976	0.972

P02



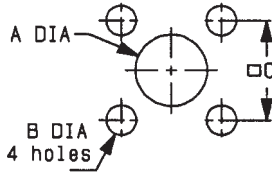
	MM		INCH	
	maxi	mini	maxi	mini
A	29.2	29.1	1.15	1.146

P03



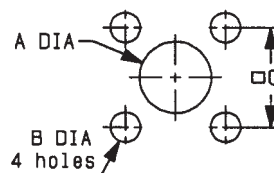
	MM		INCH	
	maxi	mini	maxi	mini
A (R. Mount)	16.2	16	0.638	0.63
A (F. Mount)	29.3	29.1	1.154	1.146
B	3.7	3.6	0.146	0.142
C	24.8	24.7	0.976	0.972

P04



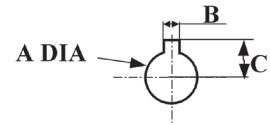
	MM		INCH	
	maxi	mini	maxi	mini
A	12.3	12.1	0.484	0.476
B	3.8	3.7	0.15	0.146
C	24.8	24.7	0.976	0.972

P05



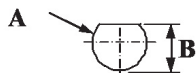
	MM		INCH	
	maxi	mini	maxi	mini
A	16.2	16	0.638	0.63
B	3.7	3.6	0.146	0.142
C	24.8	24.7	0.976	0.972

P06



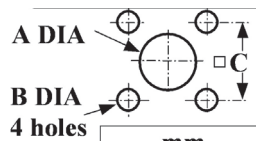
	mm	
	Maxi	mini
A	30.55	30.45
B	3.3	3.2
C	17.6	17.5

P07



	mm	
	Maxi	mini
A	29.4	29.2
B	27.5	27.3

P08



	mm	
	Maxi	mini
A	16.2	16
B	3.7	3.6
C	24.8	24.7



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