TestPro

Cable assemblies

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RADIALL
The next conneXion

COMPANY PROFILE

Radiall was founded in 1952 as a family owned company making coaxial plugs for the television industry. Today, Radiall is an international and global manufacturer of interconnect components including RF coaxial connectors and cable assemblies, antennas, fiber optic and microwave components, and multipin connectors. ***Radiall serves the Aerospace, Automotive, Defense, Industrial, Medical, Space, and Telecommunication industries.***

QSE (Quality Safety Environment) POLICY

Radiall maintains a quality management system that is highly recognized by its customers because it conforms to most international standards, including those for environmental protection.

ISO 9001 Certified
AS/EN/JISQ9100-ISOTS 16949-ISO-14001

Since 1994, all Radiall sites are **ISO9001** certified. As a result of Radiall's continuous improvement efforts, some dedicated activities are certified to either AS9100, or TS 16949 or ISO14001. Certain product lines are **MIL ESA/SCC** Qualified products.

Radiall also complies with other industry directives such as **RoHS** for hazardous substance restrictions and EuP for environmentally friendly designs for energy-consuming products.

A WORLDWIDE ENGINEERING & MANUFACTURING CAPABILITY

*Technical information and sales contacts are available at : **www.radiall.com***

With expertise centers and manufacturing locations in 3 continents and 12 industrial sites, Radiall offers its customers the proximity needed to provide the best quality, service and delivery performance.

Our facilities feature state of the art equipment for the many technologies involved in the design, manufacturing and assembly of interconnect solutions. Manufacturing plants based in low cost countries give Radiall the opportunity to offer quality at competitive prices.

TestPro

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INTRODUCTION

The TestPro product range is dedicated to **Test and Measurement applications** requiring excellent electrical performance, high mechanical endurance and excellent resistance to wear and corrosion. We offer 2 product categories to meet your needs:

- **TestPro 4.2 and TestPro 3 « Phase Stable »** are suitable for test benches in production or labs due to its long life and stab in dynamic use.
- **TestPro 5 & 8 « Ultra low loss »** allow the use of long length cables with remote test stations and anechoic chambers. Their high stability with temperature makes them easy to use in temperature chambers. They are also suitable for high power applications.

Our TestPro product range is designed to operate in the DC - 26.5 GHz frequency range depending on connector and cable choice.

Our optional protective jacket "ProJack" protect lab cable assemblies for greater life time. It is also dedicated for all defense systems tests running outdoors.
All components are designed and manufactured by RADIALL in facilities operated under ISO9001-V2000/ASN9100 quality standards.

ONLINE WEBTOOL FOR QUICK SERVICE

To access our online tools and build your desired cable assembly, go to **www.radiall.com/cableassembly**
Select our «Test & Measurement» tool for TestPro cable assemblies.
This tool enables you to select from a list of standard assembly lengths and part numbers or to build your own TestPro assembly by selecting cable and connectors that meet your needs. The TestPro tool also provides the performance of the desired cable assembly.

OPTION 1:
- Select standard assembly lengths
- View performance

OPTION 2:
- Build your assembly
- Calculate performance

TestPro

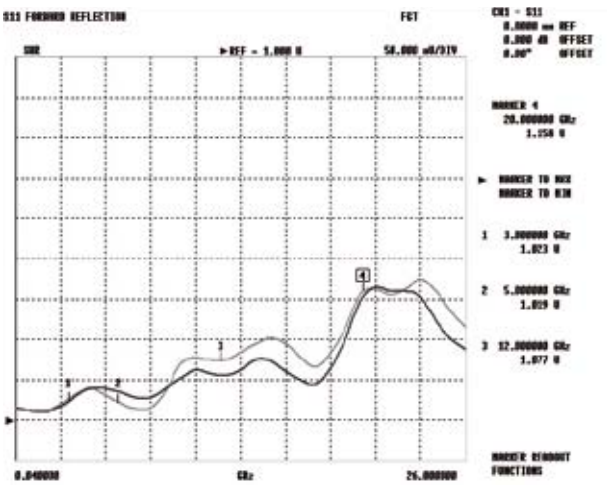
CABLE DESIGN and MANUFACTURING

The TestPro cable range benefits from Radiall's 30 years of experience in manufacturing high tech microwave cables for the military and aerospace markets. TestPro cables were designed to meet test and measurement specific requirements.
Radiall manufactures its own cable using proprietary braiding machines. Low density PTFE tape wrapping is the heart of our process. It elevates our Ultra Low Loss TestPro cable to a position of best performance in the market.
Our expertise in high precision multilayer braiding and wrapping makes the TestPro cable range stable over thousands of bending life cycles.

5000 MATING CYCLES GUARANTEED

TestPro cable assemblies for test applications were developped using new highly ruggedized stainless steel connectors. Our TestPro connectors are extremely robust. The combination of higher grade stainless steel and a unique attachment method offers a very reliable product over multiple matings.

Performance after 5,000 matings



- Low contact resistance variation
- < 0.3 mΩ
- VSWR 1.11 at 18 GHz

CONNECTOR ATTACHMENT

The connector attachment is the main weakness when using standard cable assemblies in test and measurement applications.
Radiall TestPro connectors are designed with a unique attachment process which elevates the assembly ruggedness, provides high electrical stability and a very long life.

CHARACTERICTICS

CONSTRUCTION / DIMENSIONS

	material	mm	inches
center conductor	solid SPCC[1]	-	-
dielectric	solid PTFE[2]	-	-
inner shield	flat SPC tape	-	-
interlayer	Aluminum-Polyimide tape	-	-
outer shield	round SPC braid	-	-
jacket	clear FEP[3]	max. 4.81	max. 0.190

[1] SPCC = Silver Plated Copper Clade Steel
[2] PTFE = Poly TetraFluoroEthylene
[3] FEP = Fluorinated Ethylene Propylene

Radiall P/N : F1100001

ELECTRICAL CHARACTERISTICS

characteristic impedance	50 ohms ± 2 ohms	
operating frequency range	DC - 20 GHz	
cut-off frequency	34 GHz	
screening effectiveness	> 100 dB (at 18 GHz)	
velocity of propagation	71 %	
propagation time	4.75 ns / m	4.75 ns / ft
capacitance	95 pF / m (at 1 GHz)	29 pF / ft (at 1 GHz)
insulation resistance	> 3 x 10^5 MOhm / m	
nominal phase	1645 ° / m / GHz	
phase stability with bending*	< 0.17° / 360° / GHz (at 18 GHz)	
attenuation stability with bending*	< 0.015 dB (at 18 GHz)	
attenuation stability with shaking	< 0.01 dB/m (at 18 GHz)	

* = the cable is coiled up 10 times onto a mandrel of 100 mm (3.94") diameter.

MECHANICAL CHARACTERISTICS

maximum weight	60g / m	18.3g / ft
recommend. min. bend radius	25 mm	0.98 inch
crush resistance	> 2300N / 100 mm	

ENVIRONMENTAL CHARACTERISTICS

operating temperature range	-55 / +200° C	-67 / +392° C
fire resistance	yes	
halogen free jacket	no	

APPLICATION NOTE

TestPro 4.2 is a high frequency microwave cable that delivers good attenuation characteristics. This low loss triple-shielded cable provides the best combination of low attenuation and VSWR/loss/phase stability when compared to similar size flexible cables. The TestPro 4.2 rugged structure is perfectly adapted for dynamic applications such as laboratory measurements when assembled with TestPro connectors.

FREQUENCY / ATTENUATION (typ.) / CW MAX POWER (sea level / 25° C)

GHz	dB / m	dB / ft	Watts
1.0	0.41	0.12	550
2.0	0.60	0.18	295
4.0	0.87	0.26	210
8.0	1.29	0.39	150
12.4	1.67	0.51	120
18.0	2.10	0.64	95
20.0	2.24	0.68	80
attenuation calculation (dB/m)	(0.384 x $\sqrt{F}$ GHz) + (0.026 x F GHz)		

Note: typical attenuation for two connectors (dB) = 0.0447 x $\sqrt{F}$ GHz + 0.04

CABLE CHARACTERISTICS

CONSTRUCTION / DIMENSIONS

	material
center conductor	SPCCS(1)
dielectric	PTFE(2)
electrical shield	SPC(3)
interlayer	Aluminum-polyimide
inner braid	SPC(3)
inner jacket	PFA(4)
crush protection	stainless steel
strength braid	stainless steel
braid jacket	PTFE(2)
outer diameter	7,04 mm (0,277 inches)

(1) SPCCS = Silver Plated Copper Clad Steel
(2) PTFE = PolyTetraFluoroEthylene
(3) SPC = Silver Plated Copper
(4) PFA = PerFluoroAlkoxy

ELECTRICAL CHARACTERISTICS

characteristic impedance	50 ohms ± 1 ohms	
operating frequency range	DC - 40 GHz	
cut-off frequency	44 GHz	
screening effectiveness	>100 dB at 1GHz; > 90 dB at 18 GHz	
velocity of propagation	76%	
propagation time	4.4 ns / m	1.3 ns / ft
capacitance	88 pF / m (at 1 GHz)	26.7 pF / ft (at 1 GHz)
insulation resistance	> 3 x 10^5 MOhm / m	
Corona extinction voltage	-	
nominal phase	1590 ° / m / GHz	
phase stability with temperature	< 4 ° / m / GHz ; <2820ppm (-55 / +125°C)	
phase stability with bending (**)	5° (at 40 GHz) Typ.	
attenuation stability with bending(**)	< 0.1 dB (at 40 GHz)	
attenuation stability with shaking	< 0.03 dB/m (at 40 GHz)	
atten. variation with temperature	Att. (at X° C) = att. (at 20° C) x (1 + (X - 20) x 0,002)	

(**) 9.5° Max according to IEC966-1, bending method n°2

MECHANICAL CHARACTERISTICS

maximum weight	150 g / m	46.3 g / ft
recommend. min. bend radius	25 mm	0.984 inch
crush resistance	> 4,400 N / 100 mm (260 lb per linear inch)	
Flex life cycle	20,000 (IEC 966-1 section 9.3)	
tensile strength	200 N	

ENVIRONMENTAL CHARACTERISTICS

operating temperature range (*)	-55 / +200 ° C	-67 / +392 ° F
fire resistance	yes (MIL C 87104)	
abrasion resistance	yes (SAE AS5756, edge 0.5 mm, load 2 pounds)	
halogen free jacket	no	
ROHS / REACH	yes	

(*) cable alone. Cable assembly operating temperature range is -55 / + 105 °C (-67 / +221°F)

APPLICATION NOTE

TestPro 3 is a 40GHz measurement cable. It combines electrical advantages and integrated protection system. These ruggedized assemblies offer excellent durability while remaining exceptionnaly flexible. Unique connector attachment system and strong cable structure prodide high tensile stress resistance to the whole assembly.

Key features & benefits

- Phase and loss stable with flexure
- Crush, torque and tensile resistant
- Flexible
- Long service life
- Longer calibration intervals
- Easy to configure to DUT

Typical applications include : test labs, production floor testing, anechoic chambers, thermal vaccum chambers and nearfield scanners.

FREQUENCY / ATTENUATION (typ) / CW MAX POWER (*)

GHz	(dB/m)	(dB/ft)	Watts
1,0	0,39	0,12	400
2,0	0,56	0,17	280
4,0	0,81	0,25	200
6,0	1,01	0,31	160
8,0	1,19	0,36	140
12,4	1,53	0,46	120
18,0	1,91	0,58	90
26,5	2,41	0,73	80
40,0	3,11	0,94	60
attenuation calculation (dB/m)	Typ: (0.365 x √FGHz) + (0.02 x F GHz)		

(*) = CW max power calculated at sea level / 40°C and VSWR 1:1
Power ratings may be limited by the connector type.Please contact us for specific needs)

Note : typical attenuation for a couple of connectors (dB) = 0,0447 x √F (GHz) + 0.04

TestPro 3 Low Profile

CABLE CHARACTERISTICS

CONSTRUCTION / DIMENSIONS

	material
center conductor	SPCCS[1]
dielectric	PTFE[2]
electrical shield	SPC[3]
interlayer	Aluminum-polyimide
stength braid	SPC[3]
outer jacket	PFA[4]
outer diameter	3,95 mm (0,156 inches)

[1] SPCCS = Silver Plated Copper Clad Steel
[2] PTFE = PolyTetraFluoroEthylene
[3] SPC = Silver Plated Copper
[4] PFA = PerFluoroAlkoxy

ELECTRICAL CHARACTERISTICS

characteristic impedance	50 ohms ± 1 ohms	
operating frequency range	DC - 40 GHz	
cut-off frequency	44 GHz	
screening effectiveness	>100 dB at 1GHz; > 90 dB at 18 GHz	
velocity of propagation	76%	
propagation time	4.4 ns / m	1.3 ns / ft
capacitance	88 pF / m (at 1 GHz)	26.7 pF / ft (at 1 GHz)
insulation resistance	> 3 x 10^5 MOhm / m	
Corona extinction voltage	-	
nominal phase	1590 ° / m / GHz	
phase stability with temperature	< 4 ° / m / GHz ; <2820ppm (-55 / +125°C)	
phase stability with bending (**)	5° (at 40 GHz) Typ.	
attenuation stability with bending(**)	< 0.1 dB (at 40 GHz)	
attenuation stability with shaking	< 0.03 dB/m (at 40 GHz)	
atten. variation with temperature	Att. (at X° C) = att. (at 20° C) x (1 + (X - 20) x 0,002)	

(**) 9,5° Max according to IEC966-1, bending method n°2

MECHANICAL CHARACTERISTICS

maximum weight	50 g / m	15.3 g / ft
recommend. min. bend radius	25 mm	0.984 inch
crush resistance	> 400 N / 100 mm (23 lb per linear inch)	
Flex life cycle	20,000 (IEC 966-1 section 9.3)	
tensile strength	200 N	

ENVIRONMENTAL CHARACTERISTICS

operating temperature range (*)	-55 / +200 ° C	-67 / +392 ° F
fire resistance	yes (MIL C 87104)	
halogen free jacket	no	
ROHS / REACH	yes	

(*) cable alone. Cable assembly operating temperature range is -55 / + 105 °C (-67 / +221°F)

APPLICATION NOTE

TestPro 3 is a 40GHz measurement cable. It combines electrical advantages and small form factor. These assemblies offer excellent durability while remaining exceptionnaly flexible. It is dedicated to connect to high density connectors panel. Unique connector attachment system and strong cable structure prodide high tensile stress resistance to the whole assembly.

Key features & benefits

- Phase and loss stable with flexure
- Low Profile (assemblies max dia < 9 mm)
- Flexible
- Longer calibration intervals
- Easy to configure to DUT

Typical applications include : test labs, production floor testing, anechoic chambers, thermal vaccum chambers and nearfield scanners.

FREQUENCY / ATTENUATION (typ) / CW MAX POWER (*)

GHz	(dB/m)	(dB/ft)	Watts
1,0	0,39	0,12	400
2,0	0,56	0,17	280
4,0	0,81	0,25	200
6,0	1,01	0,31	160
8,0	1,19	0,36	140
12,4	1,53	0,46	120
18,0	1,91	0,58	90
26,5	2,41	0,73	80
40,0	3,11	0,94	60
attenuation calculation (dB/m)	Typ: (0.365 x √FGHz) + (0.02 x F GHz)		

(*) = CW max power calculated at sea level / 40°C and VSWR 1:1
Power ratings may be limited by the connector type.Please contact us for specific needs)
Note : typical attenuation for a couple of connectors (dB) = 0,0447 x √ F (GHz) + 0.04

CHARACTERICTICS

CONSTRUCTION / DIMENSIONS

	material	mm	inches
center conductor	solid SPC(1)	-	-
dielectric	low density PTFE(2)	-	-
inner shield	SPC tape	-	-
outer shield	SPC braid	-	-
jacket	green FEP(3)	max. 5.85	max. 0.230

(1) SPC = Silver Plated Copper
(2) PTFE = Poly TetraFluoroEthylene
(3) FEP = Fluorinated Ethylene Propylene

Radiall P/N : F1703159GR

ELECTRICAL CHARACTERISTICS

characteristic impedance	50 ohms ± 1 ohms	
operating frequency range	DC - 26.5 GHz	
cut-off frequency	31 GHz	
screening effectiveness	> 90 dB (at 18 GHz)	
velocity of propagation	85 %	
propagation time	3.9 ns / m	1.2 ns / ft
capacitance	79 pF / m (at 1 GHz)	23.9 pF / ft (at 1 GHz)
insulation resistance	> 3 x 10^5 MOhm / m	
Corona extinction voltage	> 2.3 kV	
nominal phase	1400 ° / m / GHz	
phase stability with temperature	< 1° / m / GHz (-55 / +100°C)	
phase stability with bending	< 0.4° / 360° / GHz	
attenuation stability with bending	< 0.05 dB (at 18 GHz) / < 0.1 dB (at 26.5 GHz)	
attenuation stability with shaking	< 0.01 dB/m (at 18 GHz) / < 0.015 dB/m (at 26.5 GHz)	
atten. variation with temperature	Att. (at X° C) = att. (at 20° C) x 1 + (X - 20) x 0,002	

MECHANICAL CHARACTERISTICS

maximum weight	73g / m	22.1g / ft
recommend. min. bend radius	25 mm	0.984 inch
crush resistance	> 700N / 100 mm	

ENVIRONMENTAL CHARACTERISTICS

operating temperature range	-70 / +200° C	-94 / +392° C
fire resistance	yes (MIL C 87104)	
halogen free jacket	no	

APPLICATION NOTE

This Ultra-low loss cable is fully adapted to laboratory applications. It can be reinforced with "ProJack" protective jacket for high mechanical stress applications.

Main benefits:

- ultra-low loss
- high electrical stability with bending and temperature
- high phase stability with temperature
- strain relief
- high mechanical strength and crush resistance
- broad range of connectors available

FREQUENCY / ATTENUATION (typ.) / CW MAX POWER (*)

GHz	dB / m	dB / ft	Watts
1.0	0.23	0.07	850
2.0	0.32	0.10	600
4.0	0.46	0.14	420
6.0	0.57	0.17	340
8.0	0.66	0.20	300
10.0	0.75	0.23	270
12.4	0.84	0.25	240
18.0	1.02	0.31	200
26.5	1.27	0.38	190
attenuation calculation (dB/m)	(0.22 x √F GHz) + (0,005 x F GHz)		

(*) = CW max power calculated at sea level / 40°C and VSWR 1:1 (Cable-assembly power ratings may be limited by the connector type. Please contact us for specific needs).
Note: typical attenuation for two connectors (dB) = 0.045 x √F GHz + 0.04

CHARACTERICTICS

CONSTRUCTION / DIMENSIONS

	material	mm	inches
center conductor	solid SPC[1]	-	-
dielectric	low density PTFE[2]	-	-
inner shield	SPC tape	-	-
outer shield	SPC braid	-	-
jacket	green FEP[3]	max. 8.50	max. 0.335

[1] SPC = Silver Plated Copper
[2] PTFE = Poly TetraFluoroEthylene
[3] FEP = Fluorinated Ethylene Propylene

Radiall P/N : F1703160GR

ELECTRICAL CHARACTERISTICS

characteristic impedance	50 ohms ± 1 ohms	
operating frequency range	DC - 18 GHz	
cut-off frequency	20 GHz	
screening effectiveness	> 90 dB (at 18 GHz)	
velocity of propagation	85 %	
propagation time	3.9 ns / m	1.2 ns / ft
capacitance	79 pF / m (at 1 GHz)	23.9 pF / ft (at 1 GHz)
insulation resistance	> 3 x 10^5 MOhm / m	
Corona extinction voltage	> 3.3 kV	
nominal phase	1400 ° / m / GHz	
phase stability with temperature	< 1° / m / GHz (-55 / +100°C)	
phase stability with bending	< 0.4° / 360° / GHz	
attenuation stability with bending	< 0.05 dB (at 18 GHz)	
attenuation stability with shaking	< 0.01 dB/m (at 18 GHz)	
atten. variation with temperature	Att. (at X° C) = att. (at 20° C) x 1 + (X - 20) x 0,002	

MECHANICAL CHARACTERISTICS

maximum weight	155g / m	47.0g / ft
recommend. min. bend radius	40 mm	1.575 inch
crush resistance	> 1000N / 100 mm	

ENVIRONMENTAL CHARACTERISTICS

operating temperature range	-70 / +200° C	-94 / +392° C
fire resistance	yes (MIL C 87104)	
halogen free jacket	no	

APPLICATION NOTE

This Ultra-low loss cable is fully adapted to laboratory applications. It can be reinforced with "ProJack" protective jacket for high mechanical stress applications.

Main benefits:

- ultra-low loss
- high electrical stability with bending and temperature
- high phase stability with temperature
- strain relief
- high mechanical strength and crush resistance
- broad range of connectors available

FREQUENCY / ATTENUATION (typ.) / CW MAX POWER (*)

GHz	dB / m	dB / ft	Watts
1.0	0.15	0.04	1600
2.0	0.21	0.06	1100
3.0	0.26	0.08	920
4.0	0.30	0.09	800
5.0	0.34	0.10	710
6.0	0.37	0.11	650
8.0	0.44	0.13	560
10.0	0.49	0.15	500
12.4	0.55	0.17	450
18.0	0.68	0.21	380
attenuation calculation (dB/m)	(0.14 x $\sqrt{F}$ GHz) + (0,005 x F GHz)		

(*) = CW max power calculated at sea level / 40°C and VSWR 1:1 (Cable-assembly power ratings may be limited by the connector type. Please contact us for specific needs).
Note: typical attenuation for two connectors (dB) = 0.0447 x $\sqrt{F}$ GHz + 0.04

STANDARD ASSEMBLY LENGTHS

PHASE STABLE TEST BENCH CABLE ASSEMBLIES

TestPro 4.2 standard assemblies meet the most common requested configurations suitable for test benches in production or labs due to their very long life and great stability in dynamic use.

In order to receive optimized service and price, select from the list of existing part numbers.

Part Number	Model		Length		Attenuation-Nom at 2GHz - at 18GHz	VSWR-Nom at 18GHz
R288940034	SMA male	SMA male	24 in.		0.47 dB - 1.51 dB	1.20
R288940001	SMA male	SMA male	36 in.		0.65 dB - 2.15 dB	1.20
R288940002	SMA male	SMA male	48 in.		0.83 dB - 2.79 dB	1.20
R288940003	SMA male	SMA male	72 in.		1.19 dB - 4.06 dB	1.20
R288940035	SMA male	N Type (*)	24 in.		0.47 dB - 1.51 dB	1.20
R288940004	SMA male	N Type (*)	36 in.		0.65 dB - 2.15 dB	1.25
R288940005	SMA male	N Type (*)	48 in.		0.83 dB - 2.79 dB	1.25
R288940006	SMA male	N Type (*)	72 in.		1.19 dB - 4.06 dB	1.25
R288940007	N Type (*)	N Type (*)	36 in.		0.65 dB - 2.15 dB	1.25
R288940008	N Type (*)	N Type (*)	48 in.		0.83 dB - 2.79 dB	1.25
R288940009	N Type (*)	N Type (*)	72 in.		1.19 dB - 4.06 dB	1.25
R288940010	PC7	PC7	36 in.		0.65 dB - 2.15 dB	1.30
R288940011	PC7	PC7	48 in.		0.83 dB - 2.79 dB	1.30
R288940012	PC7	PC7	72 in.		1.19 dB - 4.06 dB	1.30
R288940013	PC7	SMA male	36 in.		0.65 dB - 2.15 dB	1.30
R288940014	PC7	SMA male	48 in.		0.83 dB - 2.79 dB	1.30
R288940015	PC7	SMA male	72 in.		1.19 dB - 4.06 dB	1.30
R288940016	PC7	N Type (*)	36 in.		0.65 dB - 2.15 dB	1.30
R288940017	PC7	N Type (*)	48 in.		0.83 dB - 2.79 dB	1.30
R288940018	PC7	N Type (*)	72 in.		1.19 dB - 4.06 dB	1.30

All TestPro cable assemblies are delivered in individual packaging with attached test report.
* One turn precision N Type connector

VSWR AND POWER HANDLING

VSWR max	0-4 GHz		4-8 GHz		8-12.4 GHz		12.4-18 GHz		18-20 GHz	
	VSWR	dB	VSWR	dB	VSWR	dB	VSWR	dB	VSWR	dB
2 x SMA	1.12	25	1.20	21	1.20	21	1.25	19	1.27	18
2 x N	1.15	23	1.25	19	1.25	19	1.30	18	-	-
2 x PC7	1.25	19	1.30	18	1.30	18	1.35	16	-	-

This table gives values for assembly lengths between 200 to 5000 mm (8 to 196 in.)

MAXIMUM POWER HANDLING	VHF/UHF	L Band	S Band	C Band	X Band	Ku Band	K Band	
20°C, SEA LEVEL (W)	1 GHz	2 GHz	4 GHz	8 GHz	12,4 GHz	18 GHz	20 GHz	26,5 GHz
2 x SMA	550	295	210	150	115	80	70	-
2 x N	550	295	210	150	115	80	-	-
2 x PC7	550	295	210	150	115	80	-	-

TEMPERATURE DERATING

Attenuation at X°C = Attenuation (20°C) x (1 + (X - 20) x q). Ex: q = 0.002 for copper and silver

STANDARD ASSEMBLY LENGTHS

ULTRA LOW LOSS TEST AND MEASUREMENT CABLE ASSEMBLIES

TestPro 5 and TestPro 8 standard assemblies are required when loss become an issue. Their high stability with temperature make them easy to use in temperature chambers. They are also suitable for high power applications.

In order to receive optimized service and price, select from the list of existing part numbers.

Part Number	Model		Length		Attenuation-Nom at 2GHz - at 18GHz	VSWR-Nom at 18GHz
TestPro 5						
R288931001	SMA male	SMA male	39.4 in.		0.42 dB - 1.25 dB	1.20
R288931002	N Type	N Type	39.4 in.		0.42 dB - 1.25 dB	1.25
R288931003	N Type	SMA male	39.4 in.		0.42 dB - 1.25 dB	1.25
TestPro 8						
R288931004	SMA male	SMA male	39.4 in.		0.31 dB - 0.91 dB	1.25
R288931005	N Type	N Type	39.4 in.		0.31 dB - 0.91 dB	1.25
R288931006	N Type	SMA male	39.4 in.		0.31 dB - 0.91 dB	1.25

All TestPro cable assemblies are delivered in individual packaging with attached test report.

VSWR AND POWER HANDLING

VSWR max	0-4 GHz		4-8 GHz		8-12.4 GHz		12;4-18 GHz		18-26.5 GHz	
TestPro 5	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**
2 x SMA	1.15	23	1.20	21	1.20	21	1.25	19	1.27	18
2 x TNC	1.20	21	1.30	18	1.30	18	1.35	17	-	-
2 x N	1.20	21	1.25	19	1.25	19	1.30	18	-	-
Testpro 8	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**	**VSWR**	**dB**
2 x SMA	1.15	23	1.20	21	1.20	21	1.25	19	-	-
2 x TNC	1.20	21	1.30	18	1.30	18	1.35	17	-	-
2 x N	1.20	21	1.25	19	1.25	19	1.30	18	-	-

This table gives value for assembly lengths between 200 to 5000 mm (8 to 196 in.)

MAXIMUM POWER HANDLING, 20°C, SEA LEVEL (W)		VHF/UHF	L Band	S Band	C Band	X Band	Ku Band	K Band	
		1 GHz	2 GHz	4 GHz	8 GHz	12,4 GHz	18 GHz	20 GHz	26,5 GHz
Testpro 5	2 x SMA	450	330	240	180	145	130	120	105
	2 x N	495	360	270	200	160	140	-	-
	2 x PC7	750	520	360	250	200	160	-	-
TestPro 8	2 x SMA	520	390	280	210	170	145	-	-
	2 x N	585	430	315	235	195	160	-	-
	2 x PC7	870	610	420	300	235	200	-	-

TEMPERATURE DERATING

Attenuation at X°C = Attenuation (20°C) x (1 + (X - 20) x q). Ex: q = 0.002 for copper and silver

Many applications require specific assemblies. The Radiall TestPro range is available in custom lengths and configurations.
Use the following pages to select cable and connectors to meet your needs and send us your request for quotation.

HOW TO ORDER

Select the right TestPro cable.

- TestPro 4.2 "Phase Stable" is suitable for test benches in production or labs due to its long life and great stability in dynamic use.
- TestPro 5 & 8 "Ultra Low Loss" allows the use of long length cables with remote test stations and anechoic chambers.
  Their high stability with temperature makes them easy to use in temperature chambers. They are also suitable for high power applications.

Properties	TestPro 4.2	TestPro 5	TestPro 8
	Phase Stable	Ultra Low Loss	
Frequency range	DC - 20GHz	DC - 26.5GHz	DC - 18GHz
Impedance	50 Ω ± 2 Ω	50 Ω ± 1 Ω	50 Ω ± 1 Ω
IL (dB/m at 2 GHz - at 18 GHz)	0.54 - 1.90	0.32 - 1.02	0.21 - 0.68
IL (dB/ft at 2 GHz - at 18 GHz)	0.16 - 0.58	0.10 - 0.31	0.06 - 0.21
Phase with flexure stability	2° at 18 GHz	7° at 18 GHz	7° at 18 GHz
Amplitude stability (dB at 18GHz)	< 0,02	< 0,05	< 0,05
Shielding Effectiveness (at 1GHz)	-110 dB min	-110 dB min	-110 dB min
Crush resistance (N/100 mm)	2300	700	1000
Minimum bend radius	25 mm (1 in.)	25 mm (1 in.)	40 mm (1.57 in.)
Temperature (°C)	-55 / + 105 °C	-70 / + 125 °C	-70 / + 125 °C
Phase matching	-	By set, with master or per absolute phase, available with a typical phase matching of +/-0.4°/GHz	
Connectors	SMA, N, PC7	SMA, N, TNC	SMA, N, TNC
Flexure life cycle	10,000	5,000	5,000
Mating cycles durability	5,000	5,000	5,000
Armor	Available	Available	Available

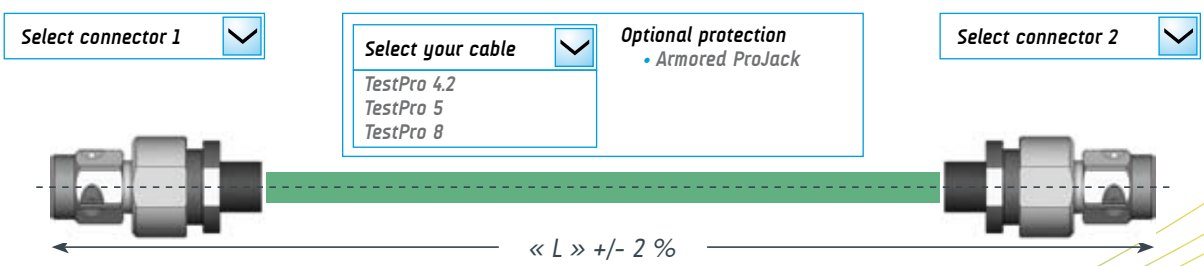
See details cable characteristics on page 6 to 8.

Select armor option for reinforced cable assemblies.
"ProJack" protect lab cable assemblies for greater life time. It is also dedicated for all defense systems tests running outdoors.
See details protective jacket characteristics on page 12.

Select connectors.
Select the right connectors compatible with your choice of TestPro cable on page 13 to 17.

Send quote requests to your Radiall sales contact.

You may also use our cable assembly builder at www.radiall.com/cableassembly



PROJACK

CONSTRUCTION

	Material
Spring	Stainless steel
Braid	Stainless steel
Jacket	Black PU

MECHANICAL CHARACTERISTICS

	For TestPro 4.2 and TestPro 5	For TestPro 8
Outer dia. (max)	11 mm (0.433 in.)	15 mm (0.590 in.)
Maximum weight	340 g/m (103 g/ft)	190 g/m (57.6 g/ft)
Recommend. min. bend radius	25 mm	38 mm
Crush resistance	2 500 N / 100 mm	
Tensile strength	900 N	

ENVIRONMENTAL CHARACTERISTICS

Operating temperature range	-55 / +100 °C (-67 / +212° F)
Fire resistance	yes (FAR 25 853)
Halogen free jacket	no

APPLICATION NOTE

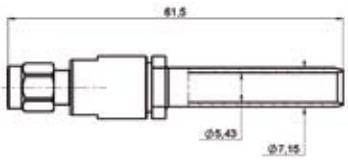
Main benefits:
- high mechanical protection (resistance to crush, traction, abrasion, ...)
- high flexibility
- anti-torque
- strain relief
- anti-kinking action
- secured watertightness when used with compound chamber

Radiall P/N : G940RP10 - G941RP10

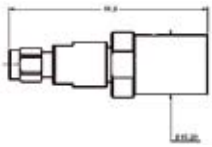
CONNECTORS COMPATIBLE WITH

Connector part numbers are for reference only. Connectors and cables cannot be ordered separately.

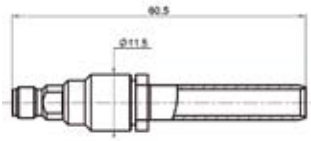
SMA SERIES



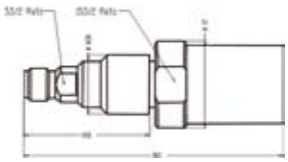
Designation	Straight Plug
Item	M125064C00
Max. Freq	20 GHz
VSWR ≤ 18 GHz	1.25



Designation	Straight Plug For ProJack
Item	M125064C01
Max. Freq	20 GHz
VSWR ≤ 18 GHz	1.25



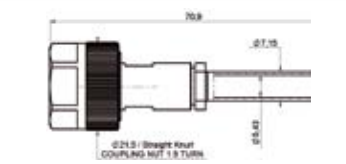
Designation	Straight Jack
Item	M125207C00
Max. Freq	20 GHz
VSWR ≤ 18 GHz	1.25



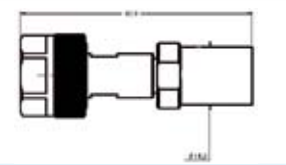
Designation	Straight Jack For ProJack
Item	M125207C01
Max. Freq	20 GHz
VSWR ≤ 18 GHz	1.25

SMA Series characteristics.
Voltage withstanding 750 Vrms
Connector material is stainless steel.
Finish is passivated
Temperature range with TestPro cables = -55 / +105 °C
Nominal coupling nut torque si 110 N (recommended torque wrench for plugs: R282320000 / 8 mm / 80-120 Ncm)

N SERIES



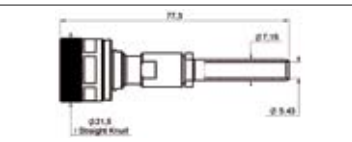
Designation	Straight Plug
Item	M163064C00
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



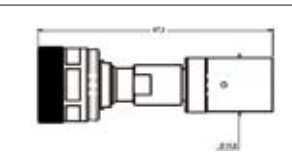
Designation	Straight Plug For ProJack
Item	M163064C01
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30

N Series characteristics.
Voltage withstanding 750 Vrms
Connector material is stainless steel.
Finish is passivated
Temperature range with TestPro cables = -55 / +105 °C
Nominal coupling nut torque si 400 N (recommended torque wrench for plugs: R282 303 000 / 19 mm / 160 Ncm)

PC7 SERIES



Designation	Straight Plug
Item	M151064C00
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



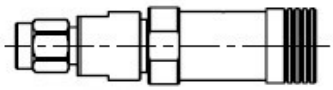
Designation	Straight Plug For ProJack
Item	M151064C01
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30

PC7 Series characteristics.
Voltage withstanding 750 Vrms
Connector material is stainless steel.
Finish is passivated
Temperature range with TestPro cables = -55 / +105 °C

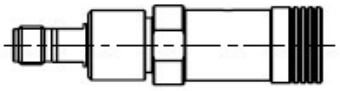
CONNECTORS COMPATIBLE WITH

Connector part numbers are for indication only. Connectors and cables cannot be ordered separately.

SMA 2.9 series

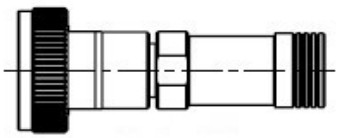


Designation	Straight Plug
Item	R127801321
Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40



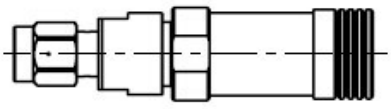
Designation	Straight Jack
Item	R127822111
Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40

SMA 2.9 Series characteristics.
Voltage withstanding 750 Vrms
Connector material is stainless steel.
Finish is passivated
Temperature range = -55 / +105 °C
Nominal coupling nut torque si 110 N
Recommended torque wrench for plugs :
R282 320 000 / 8 mm / 80-120 Ncm

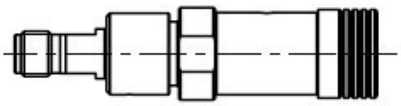


Designation	NMD 2.9 port femal
Item	R299776101
Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40

SMA 2.9 series Vented connectors



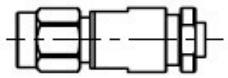
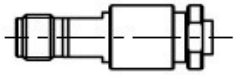
Designation	Straight Plug
Item	R127801311
Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40



Designation	Straight Jack
Item	R127822101
Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40

Connector part numbers are for indication only. Connectors and cables cannot be ordered separately.

SMA 2.9 series

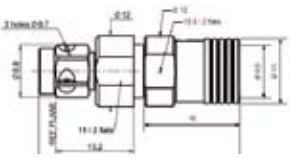
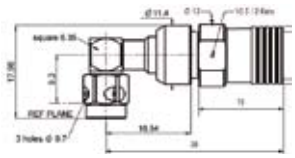
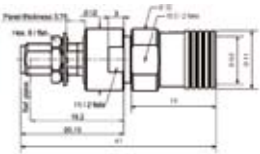
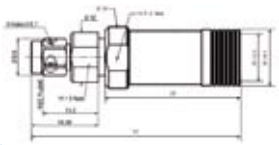
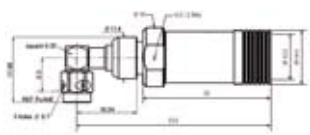
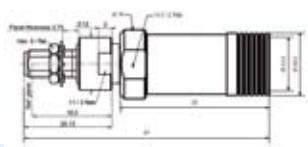
			
Designation	Straight Plug	Designation	Straight Jack
Item	R127801311	Item	R127822121
Max. Freq	40 GHz	Max. Freq	40 GHz
VSWR ≤ 40 GHz	1.40	VSWR ≤ 40 GHz	1.40

SMA 2.9 Series characteristics.
Voltage withstanding 750 Vrms
Connector material is stainless steel.
Finish is passivated
Temperature range = -55 / +105 °C
Nominal coupling nut torque si 110 N
Recommended torque wrench for plugs :
R282 320 000 / 8 mm / 80-120 Ncm

CONNECTORS COMPATIBLE WITH

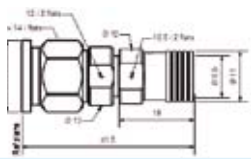
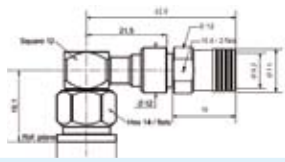
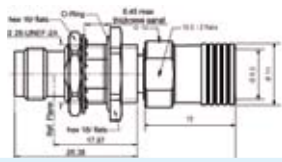
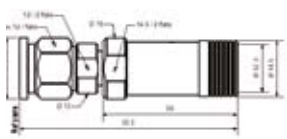
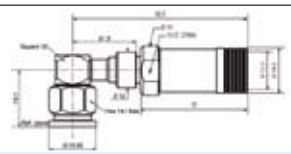
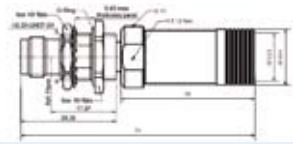
Connector part numbers are for reference only. Connectors and cables cannot be ordered separately.

SMA SERIES

		
Designation **Straight Plug** Item **M125065L02** Max. Freq 26.5 GHz VSWR ≤ 18 GHz 1.25 ≤ 26.5 GHz 1.30	**Designation** **Right Angle Plug** Item **M125195L02** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	**Designation** **Straight Jack** Item **M125330L02** Max. Freq 26,5 GHz VSWR ≤ 18 GHz 1.25 ≤ 26.5 GHz 1.30 Miscellaneous Panel sealed panel nut torque 200N
		
Designation **Straight Plug For ProJack** Item **M125065L03** Max. Freq 26.5 GHz VSWR ≤ 18 GHz 1.25 ≤ 26.5 GHz 1.30	**Designation** **Right Angle Plug For ProJack** Item **M125195L03** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	**Designation** **Straight Plug For ProJack** Item **M125330L03** Max. Freq 26.5 GHz VSWR ≤ 18 GHz 1.25 ≤ 26.5 GHz 1.30 Miscellaneous Panel sealed panel nut torque 200N

SMA Series characteristics.
Voltage withstanding 1000 Vrms. Connector material is stainless steel 316L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 110 N (recommended torque wrench for plugs: R282320000 / 8 mm / 80-120 Ncm)

TNC SERIES

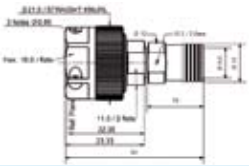
		
Designation **Straight Plug** Item **M143065L02** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	**Designation** **Right Angle Plug** Item **M143195L02** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	**Designation** **Straight Jack** Item **M143330L02** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30 Panel sealed panel nut torque 200N Miscellaneous
		
Designation **Straight Plug For ProJack** Item **M143065L03** Max. Freq 26.5 GHz VSWR ≤ 18 GHz 1.25 ≤ 26.5 GHz 1.30	**Designation** **Right Angle Plug For ProJack** Item **M143195L03** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	**Designation** **Straight Plug For ProJack** Item **M125330L03** Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30 Miscellaneous Panel sealed panel nut torque 370N

TNC Series characteristics.
Voltage withstanding 1500 Vrms. Connector material is stainless steel 316 L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 330 N (recommended torque wrench for plugs: R282300000 / 14 mm / 265 Ncm)

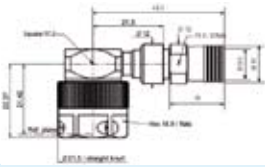
CONNECTORS COMPATIBLE WITH

Connector part numbers are for reference only. Connectors and cables cannot be ordered separately.

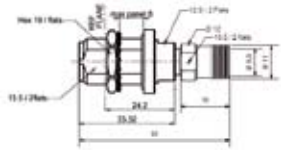
N 18 SERIES



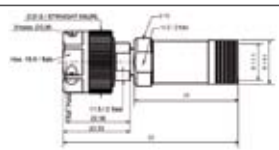
Designation	Straight Plug
Item	**M163065L02**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



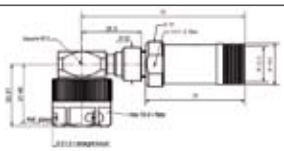
Designation	Right Angle Plug
Item	**M163195L02**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



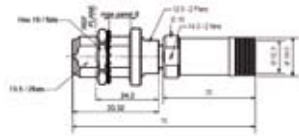
Designation	Straight Jack
Item	**M163325L02**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25
Miscellaneous	Panel sealed panel nut torque 500N



Designation	Straight Plug For ProJack
Item	**M163065L03**
Max. Freq	26.5 GHz
VSWR ≤ 18 GHz	1.25



Designation	Right Angle Plug For ProJack
Item	**M163195L03**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



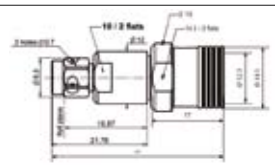
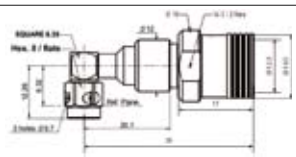
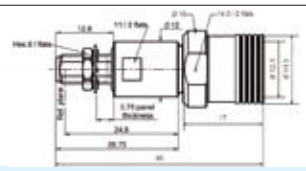
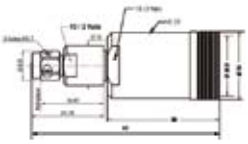
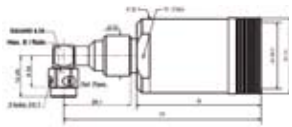
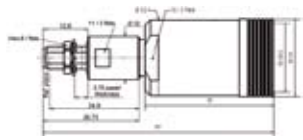
Designation	Straight Plug For ProJack
Item	**M163325L03**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25
Miscellaneous	Panel sealed panel nut torque 500N

N 18 Series characteristics.
Voltage withstanding 1500 Vrms. Connector material is stainless steel 316L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 400 N (recommended torque wrench for plugs: R282303000 / 19 mm / 160 Ncm)

CONNECTORS COMPATIBLE WITH

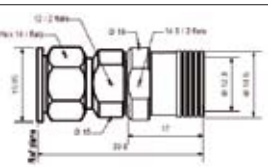
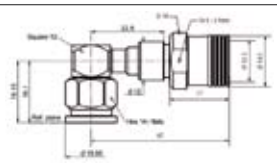
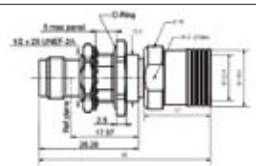
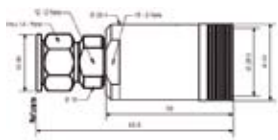
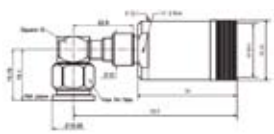
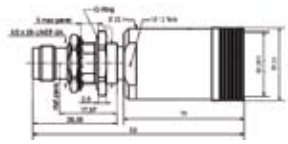
Connector part numbers are for reference only. Connectors and cables cannot be ordered separately.

SMA SERIES

		
Designation **Straight Plug**	**Designation** **Right Angle Plug**	**Designation** **Straight Jack**
Item M125068L04 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.25	Item M125199L04 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M125338L04 Max. Freq 26,5 GHz VSWR ≤ 18 GHz 1.25 Miscellaneous Panel sealed panel nut torque 250N
		
Designation **Straight Plug For ProJack**	**Designation** **Right Angle Plug For ProJack**	**Designation** **Straight Plug For ProJack**
Item M125068L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.25	Item M125199L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M125338L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.25 Miscellaneous Panel sealed panel nut torque 250N

SMA Series characteristics.
Voltage withstanding 1000 Vrms. Connector material is stainless steel 316L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 110 N (recommended torque wrench for plugs: R28220000 / 8 mm / 80-120 Ncm)

TNC SERIES

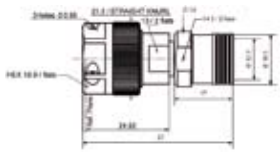
		
Designation **Straight Plug**	**Designation** **Right Angle Plug**	**Designation** **Straight Jack**
Item M143068L04 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M143198L04 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M143338L04 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30 Miscellaneous Panel sealed panel nut torque 370N
		
Designation **Straight Plug For ProJack**	**Designation** **Right Angle Plug For ProJack**	**Designation** **Straight Plug For ProJack**
Item M143068L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M143198L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30	Item M143338L05 Max. Freq 18 GHz VSWR ≤ 18 GHz 1.30 Miscellaneous Panel sealed panel nut torque 370N

TNC Series characteristics.
Voltage withstanding 1500 Vrms. Connector material is stainless steel 316 L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 330 N (recommended torque wrench for plugs: R282300000 / 14 mm / 265 Ncm)

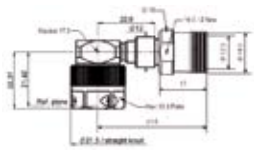
CONNECTORS COMPATIBLE WITH

Connector part numbers are for reference only. Connectors and cables cannot be ordered separately.

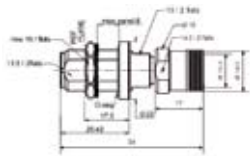
N 18 SERIES



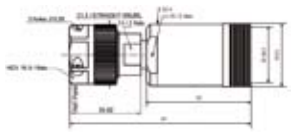
Designation	Straight Plug
Item	**M163068L04**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25



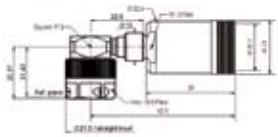
Designation	Right Angle Plug
Item	**M163198L04**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



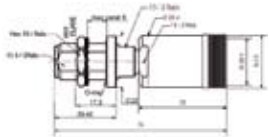
Designation	Straight Jack
Item	**M163328L04**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25
Miscellaneous	Panel sealed panel nut torque 500N



Designation	Straight Plug For ProJack
Item	**M163068L05**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25



Designation	Right Angle Plug For ProJack
Item	**M163198L05**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.30



Designation	Straight Plug For ProJack
Item	**M163328L05**
Max. Freq	18 GHz
VSWR ≤ 18 GHz	1.25
Miscellaneous	Panel sealed panel nut torque 500N

N 18 Series characteristics.
Voltage withstanding 1500 Vrms. Connector material is stainless steel 316L. Finish is passivated. Temperature range with TestPro cables = -55 / +130 °C. Nominal coupling nut torque si 400 N (recommended torque wrench for plugs: R282303000 / 19 mm / 160 Ncm)

IN-SERIES ADAPTORS (DC-18 GHZ)

Interface	Male - Male	Male - Female	Female - Female	Miscellaneous
SMA	R125703000 R125703001	R125704000 R125704001	R125705000 R125705001	Gold plated stainless steel Passivated stainless steel
TNC 18	R143703700	R143705700	R143704700 R143710700 R143730700	Square flange Bulkhead
N 18	R163703701	R163708701	R163705701	
	R163703001	R163708001	R163705001	silicon gasket

BETWEEN SERIES ADAPTORS (DC-18 GHZ)

Interface		Part Number	N 18		
			Male	Female	Female bulkhead panel sealed
SMA	Male Female	R191009000 R191011000			
PC 3,5	Male Female	R191010000 R191012000	R191324000 R191328000	R191326000 R191330000	R191333000
TNC	Male Female	R191017000 R191019000			
TNC 18	Male Female	R191017700 R191019700			

ATTENUATORS (DC-18GHZ)

Interface	Part Number	Attenuation (dB)	Power (W)	Miscellaneous
SMA	R4118XX121 R4138XX000 R4161XX000	0 to 30 0 to 60 3 to 20	2 2 10 to 15	Flat frequency response Flat frequency response Flat frequency response
TNC	R4145XX161 R4168XX000	0 to 20 3 to 20	2 10 to 15	
N	R4147XX161 R4160XX000	0 to 20 3 to 20	2 10 to 15	

LOADS (DC-18 GHZ)

Interface	Part Number	Gender	Power (W)	Miscellaneous
SMA	R404210000 R404210120 R404215000 R404523000 R404523500 R404573000 R404573500 R404589000 R404589500	Male Male Female Male Female Male Female Male Female	2 2 2 6 6 12 12 20 20	With cord
TNC	R404370000 R404370120 R404375000 R404521000 R404521500 R404571000 R404571500 R404586000 R404586500	Male Male Female Male Female Male Female Male Female	2 2 2 6 6 12 12 20 20	With chain
N	R404340000 R404340120 R404355000 R404522000 R404522500 R404572000 R404572500 R404588000 R404588500	Male Male Female Male Female Male Female Male Female	2 2 2 6 6 12 12 20 20	With chain

PART NUMBER INDEX

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