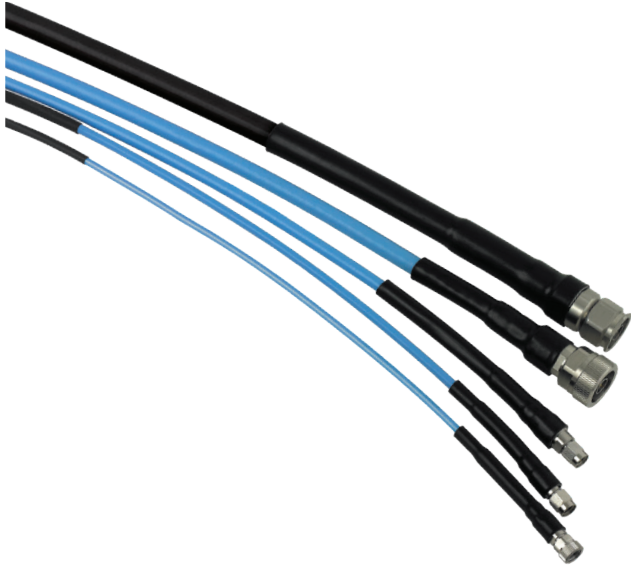


Lab-Flex® S Series

High Performance Coaxial Cable Assemblies



Smiths Interconnect's Lab-Flex S product portfolio provides customers with a robust high performance solution for multiple applications and markets. The combination of repeatable, consistent performance and high reliability products translates to lower cost of ownership while improving system performance. The benefits enable customers to be more competitive with support of an established technology partner.

The Lab-Flex S series was developed for high dynamic flexure applications using precision grade low loss PTFE and stranded center conductors designed for Test & Measurement, Defense, Commercial and other markets which need the ultimate in performance requirements.

This cable series has a very long heritage in high shock and vibration applications such as missile technology as well as repeatable performance in the Test & Measurement environment. The Lab-Flex S cable has a low loss PTFE insulator for minimum attenuation and a stranded silver plated copper center conductor for maximum flexure capability. The 160S, 180SP, 235SP, 335SP and 490S products represent the most common sizes needed for today's applications. These Lab-Flex S cables are an excellent choice for use in SatCom, Radar, Missile Guidance and Test & Measurement applications. Test data is available on request.

Lab-Flex® S Series,
precision cable for
dynamic applications.

Features and Benefits

- Up to 40GHz
- Low Loss (30% less than solid PTFE dielectrics)
- Superior EMI Shielding >90dB
- Phased Matched Pairs and Sets Available (standard tolerance is +/- one degree per GHz or +/-2.8 picoseconds)

Applications

- Ground SatCom
- Missile Guidance
- Radar
- Test & Measurement
- Communication Systems
- Point to Point Radio

Technical Characteristics

Lab-Flex Series	160S	180SP	235SP	335SP	490S
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Electrical

Frequency, Max (GHz)	40	40	26.5	18	10
Impedance, nominal (Ω)	50	50	50	50	50
Velocity of Propagation (%)	77	78	78	78	80
Shielding Effectiveness, 18 GHz (dB/ft)	>100	>90	>90	>90	>90
Capacitance (pF/ft)	26.2	26.9	26.9	26.9	25.5
Delay (ns/ft), (ns/meter)	1.32 (4.33)	1.30 (4.27)	1.30 (4.27)	1.30 (4.27)	1.27 (4.16)
Attenuation k1 (db/100ft) @ 23°C	0.287	0.522	0.3440	0.154	0.116
Attenuation k2 (db/100ft) @ 23°C	0.00049	0.000594	0.000525	0.000743	0.000179

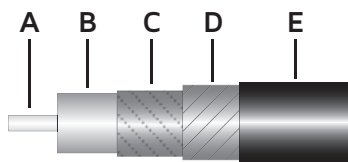
Attenuation (Typical) at any Frequency = k1 x SqRt (FMHz) + k2 x (FMHz)

Mechanical & Environmental

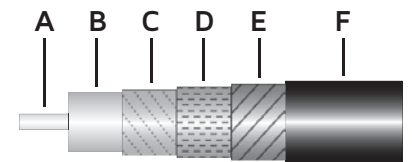
Weight (lbs/100ft), (Kg/100m)	3.4 (5.00)	2.7 (4.06)	5.1 (7.67)	9.0 (13.39)	19.20 (28.57)
Temperature Range (°C)	-55/+135	-65/+85	-65/+85	-65/+85	-55/+200
Minimum Bend Radius (inch), (mm)	0.750 (19.05)	0.470 (11.94)	1.20 (30.48)	1.6 (40.64)	2.5 (63.50)

Construction

Inner Conductor	A	Stranded SPC	Stranded SPC	Stranded SPC	Stranded SPC	Stranded SPC
Dielectric	B	ePTFE	ePTFE	ePTFE	ePTFE	PTFE Tape
First Outer Shield	C	SPC Spiral	SPC Flat	SPC Flat	SPC Flat	SPC Flat
Second Outer Shield	D	SPC Round	Metalized Foil	Metalized Foil	Metalized Foil	Metalized Foil
Third Outer Shield	E	-	SPC Round	SPC Round	SPC Round	SPC Round
Jacket (inch O.D.)	F	FEP (.160)	Polyurethane (.180)	Polyurethane (.235)	Polyurethane (.335)	FEP (.490)



Lab-Flex® 160S



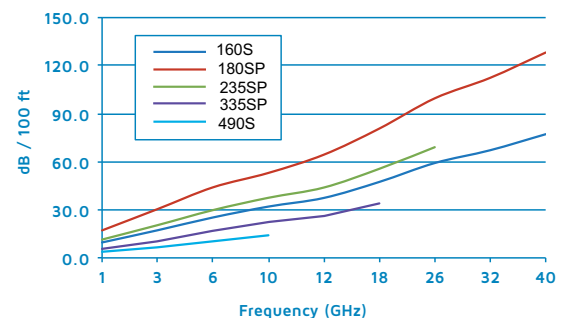
Lab-Flex® S

Attenuation (dB/100ft)

GHz	160S	180SP	235SP	335SP	490S
1	9.6	17.1	11.4	5.6	3.8
3	17.2	30.4	20.4	10.7	6.9
6	25.2	44.0	29.8	16.4	9.9
10	32.0	53.0	37.5	22.5	14.1
12	37.4	64.4	43.9	25.8	
18	47.4	80.7	55.6	34.0	
26	59.2	99.6	69.1		
32	67.2	112.4			
40	77.2	128.2			

Typical Cable Loss at +25° C & Sea Level

Attenuation vs Frequency



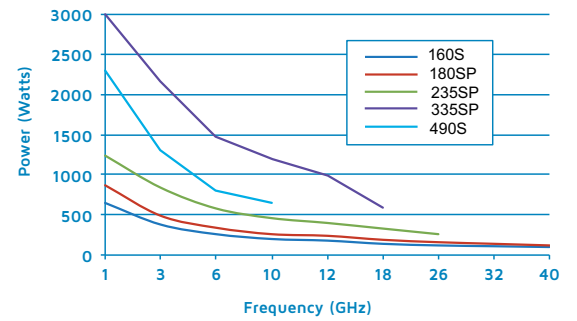
Technical Characteristics

Average Power Rating (Watts)

GHz	160S	180SP	235SP	335SP	490S
1	650	870	1240	3002	2300
3	380	490	840	2160	1300
6	260	340	580	1470	800
10	200	260	460	1200	650
12	180	240	400	990	
18	140	190	330	590	
26	120	160	260		
32	110	140			
40	100	120			

Cable Power handling at +25° C & Sea Level

Average Power Rating

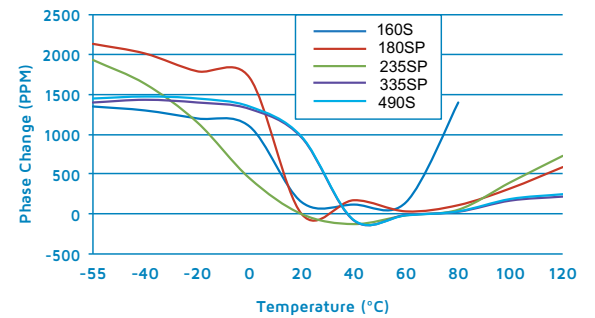


Phase vs. Temperature (PPM)

Temp	160S	180SP	235SP	335SP	490S
-55	1350	2135	1933	1400	1450
-40	1300	2013	1633	1434	1475
-20	1200	1791	1150	1400	1450
0	1100	1712	450	1320	1350
20	150	0	0	960	970
40	120	174	-125	-80	-75
60	150	34	-15	-10	-15
80	1400	112	55	30	35
100		323	400	170	190
120		589	730	220	250

Typical Values

Phase vs Temperature (°C)

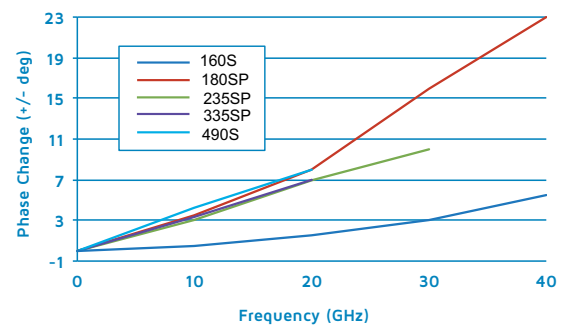


Phase vs. Flexure

Freq.	160S(+/-deg)	180SP(+/-deg)	235SP(+/-deg)	335SP(+/-deg)	490S(+/-deg)
0	0	0	0	0	0
10	0.5	3.5	3.1	3.4	4.2
20	1.5	8	7	7	8
30	3	16	10		
40	5.5	23			

Typical Values +25°C

Phase vs Flexure



Technical Characteristics

Cable Code	Connector Code	Series	Gender	Type	C-Nut Style ¹	Body Material ²	Body Finish ³	Loss per GHz	Frequency Max GHz
160S, 180SP, 235SP, 335SP	SMS	SMA	Male	Straight	H	SS	P	0.01	18
235SP	SFS	SMA	Female	Straight	N/A	SS	P	0.015	18
180SP, 235SP	SMR	SMA	Male	R/A	H	SS	P	0.02	18
235SP	SFBS	SMA	Female	Straight	N/A	SS	P	0.015	18
160S, 180SP, 235SP	KMS	2.92mm	Male	Straight	H	SS	P	0.01	40
180SP	KFS	2.92mm	Female	Straight	N/A	SS	P	0.015	40
160S, 180SP	MMS	2.4mm	Male	Straight	H	SS	P	0.01	50
180SP	MFS	2.4mm	Female	Straight	N/A	SS	P	0.015	50
160S, 180SP, 235SP, 335SP, 490S	NMS	Type-N	Male	Straight	H	SS	P	0.01	18
180SP, 235SP, 490S	NMR	Type-N	Male	R/A	N/A	SS	P	0.02	18
180SP, 235SP	NFBS	Type-N	Female	Straight	N/A	SS	P	0.015	18
180SP, 235SP, 335SP, 490S	TMS	TNC	Male	Straight	H	SS	P	0.01	18
335SP	7/16MS	7/16	Male	Straight	H	B	WB	0.01	6

¹ C-Nut Style: H=Hex, K=Knurled, HK=Hex Nut & Knurled

² Body Materials: B=Brass, SS=Stainless, Be=Beryllium Copper

³ Body Finish: N=Nickel, S=Silver, G=Gold, P=Passivated, WB=White Bronze
Connector gender is determined by center conductor

Cable Code	Option Code	Option Description	Option Details
160S, 180SP, 235SP, 335SP	A	Armorized Protection	SS Interlock Armor
160S, 180SP	W	Weatherized	Extruded PVC cover
160S, 180SP, 235SP, 335SP	AW	Armorized/Weatherized Covering	SS Interlock Armor with Extruded PVC Cover
160S, 180SP, 235SP, 335SP	Z	Water Tight	Cable to Connector junction "Sealed"
160S, 180SP, 235SP, 335SP	D	Dust Caps	Dust Cap with Tether
160S, 180SP, 235SP, 335SP	+/-2.8 ps ⁴	Phase Match	Standard Tolerance of +/-2.8ps
160S, 180SP, 235SP, 335SP	E	Extended Boots	Layered Adhesive lined Shrink Tubing
160S, 180SP, 235SP, 335SP	RoHS ⁵	RoHS Compliant	Per EU Directive 2002/95/EC

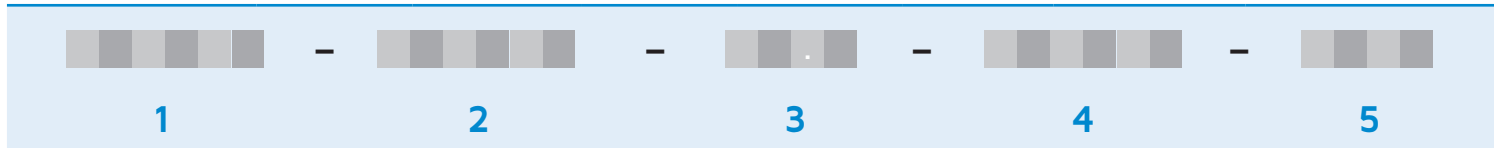
⁴for phase matched assemblies (+/-2.8ps) is required to be added to the end of standard part number
example: NMS-235SP-120.0-NMS +/-2.8ps

⁵for RoHS assemblies (RoHS) is required to be added to the end of standard part number
example: NMS-235SP-120.0-NMS - RoHS

Custom Options:

The above connectors and options represent the most common types used. Smiths Interconnect offers a wide range of cables, connectors and options. If you do not see an option you require please consult the sales department.

How To Order



1 Connector #1

S M S SMA Male Straight	K F S 2.92mm Female Straight	N F B S Type-N Female Bulkhead Str
S F S SMA Female Straight	M M S 2.4 Male Straight	T M S TNC Male Straight
S M R SMA Male R/A	M F S 2.4 Female Straight	7 / 1 6 M S 7/16 Male Straight
S F B S SMA Female Bulkhead Str	N M S Type-N Male Straight	
K M S 2.92mm Male Straight	N M R Type-N Male R/A	

2 Cable (fixed)

1 6 0 S Lab-Flex 160S	2 3 5 S P Lab-Flex 235SP	4 9 0 S Lab-Flex 490S
1 8 0 S P Lab-Flex 180SP	1 9 0 S Lab-Flex 190S	

3 Length (inches);

3 6 . 0 Example: 36 in.

4 Connector #2

S M S SMA Male Straight	M M S 2.4mm Male Straight	T M S TNC Male Straight
S M R SMA Male R/A	N M S Type-N Male Straight	7 / 1 6 M S 7/16 Male Straight
K M S 2.92mm Male Straight	N M R Type-N Male R/A	

5 Assembly Option

+/- 2.8 ps +/-2.8ps Phase Matched Electrical Length

R o H S RoHS Compliant Per EU Directive 2002/95/EC

Worldwide Support

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