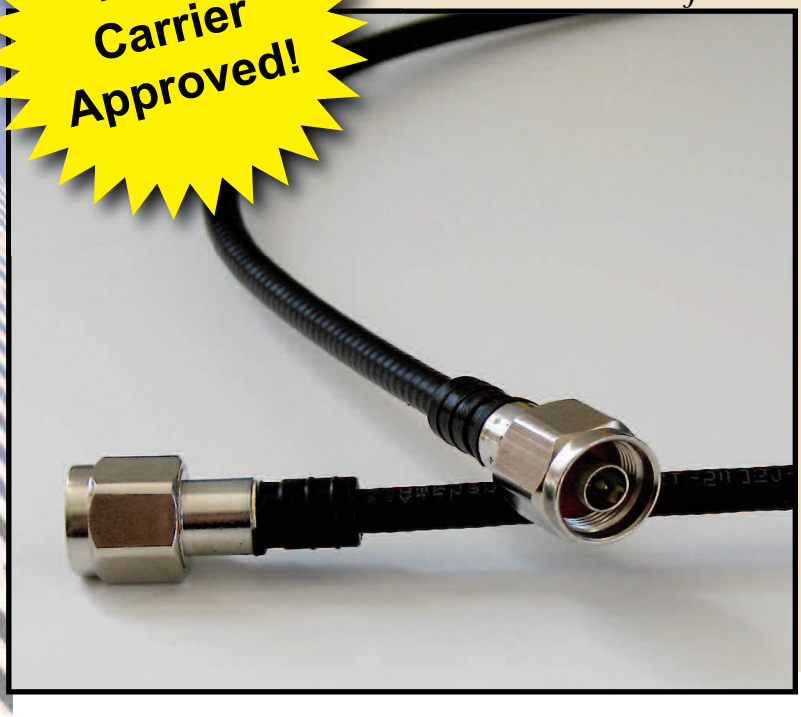
SPO™ Low Loss, Low PIM Coaxial Cables

ISO 9001 Certified

Major Carrier Approved!

Flexible, Low PIM, Jumper Cables

- *-160dBc PIM for optimal system performance*
- *Super flexible for ease of installation*
- *Corrugated copper outer conductor providing greater than 100dB Shielding*
- *Durable black polyethelene outer jacket suitable for outdoor use*

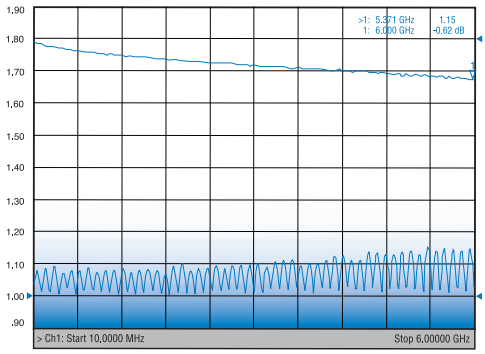


SPO-250, SPO-375, SPO-500 50 Ohm low loss, low PIM cable assemblies

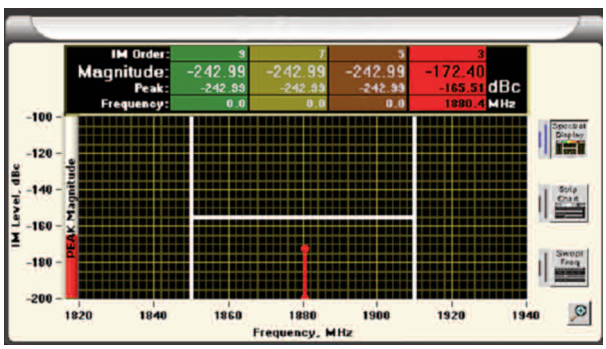
- Available in any required connector configuration and length
- Large selection of standard configurations for quick delivery
- Check inventory at StockCheck on our website
- 100% tested for static and dynamic PIM, VSWR and insertion loss
- Serial marker band includes PIM, VSWR and IL test data which is retained and accessible on the Times website
- 10 year Times Microwave warranty

SPO250NMNM1.0M

Typical VSWR



Dynamic PIM Test Results



TIMES MICROWAVE SYSTEMS
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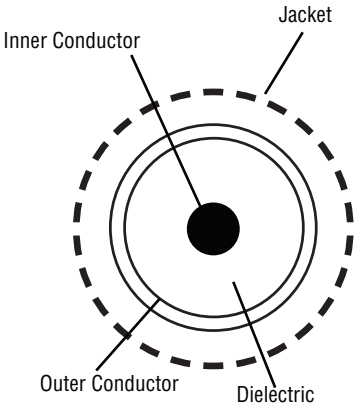
SPO™ Coaxial Cables



Cable Construction

Inner Conductor:
- SPO-250: Solid bare copper
- SPO-375: BCCAL
- SPO-500: BCCAL

Dielectric: Foam Polyethylene

Outer Conductor: Seam welded corrugated copper tube

Jacket: UV and sunlight resistant black polyethylene

Physical Specifications	SPO-250		SPO-375		SPO-500	
Jacket: Extruded Polyethylene; OD: in(mm)	0.300	(7.7)	0.425	(10.8)	0.525	(13.4)
Outer Conductor: Corrugated Copper Tube; OD: in(mm)	0.250	(6.3)	0.380	(9.6)	0.472	(12.1)
Dielectric: Foam PE; OD: in(mm)	0.190	(4.8)	0.285	(7.1)	0.370	(9.4)
Center Conductor: Solid BCCAl; OD: in(mm)	0.075	(1.9)	0.110	(2.8)	0.142	(3.6)
Bend Radius: in(mm)	1.0	(25)	1.7	(2.3)	2.0	(51)
Bending Moment: ft-lbs (N-m)	1.84	(2.5)	2.07	(2.8)	3.25	(4.4)
Tensile Strength: lb (kg)	150	(68.2)	175	(79.5)	210	(95.5)
Flat Plate Crush Strength: lb/in (kg/mm)	100	(1.8)	100	(1.8)	110	(2.0)
Weight: lbs/1000 ft (kg/km)	46	(67)	78	(120)	140	(210)
Environmental Specifications						
Installation Temperature Range °F/°C	-25/+60°C		-25/+60°C		-25/+60°C	
Storage Temperature Range °F/°C	-70/+85°C		-70/+85°C		-70/+85°C	
Operating Temperature Range °F/°C	-40/+85°C		-40/+85°C		-40/+85°C	
Electrical Specifications						
Velocity of Propagation: %	84		84		84	
Impedance: Ohms	50		50		50	
Capacitance: pF/ft (pF/m)	24.2	(79.4)	24.3	(79.7)	25.2	(82.7)
Inductance: µH/ft (uH/m)	0.61	(0.200)	0.61	(0.200)	0.63	(0.205)
Shielding Effectiveness: dB	>100		>100		>100	
Center Conductor DC Resistance: Ohms/1000 ft/(km)	3.00	(9.84)	1.30	(4.26)	0.82	(2.70)
Shield DC Resistance: Ohms/1000 ft (km)	2.00	(6.56)	1.52	(4.98)	1.00	(3.28)
Attenuation & Average Power @ MHz	dB/100 ft	(dB/100m) kW	dB/100 ft	(dB/100m) kW	dB/100 ft	(dB/100m) kW
450	4.1	(13.3) 1.01	2.8	(9.1) 2.11	2.2	(7.2) 2.63
700	5.1	(17.1) 0.81	3.5	(11.5) 1.67	2.8	(9.1) 2.07
850	5.7	(18.7) 0.73	3.9	(12.8) 1.50	3.1	(10.2) 1.87
1900	8.9	(29.2) 0.47	6.0	(21.0) 0.97	4.8	(15.7) 1.20
2100	9.4	(30.8) 0.45	6.4	(21.0) 0.92	5.2	(17.1) 1.14
2300	9.9	(32.5) 0.43	6.7	(22.0) 0.87	5.6	(18.4) 1.08
2400	10.1	(33.1) 0.42	6.9	(22.6) 0.85	5.7	(18.7) 1.05
4900	15.0	(49.2) 0.28	10.5	(34.4) 0.57	9.6	(31.5) 0.70
5800	16.5	(54.1) 0.26	11.6	(38.0) 0.52	10.9	(35.8) 0.63

Connectors (solder body) (connectors with BLK suffix packed 100 pieces per bulk pack)			
N Male Straight	TC-SPO250-NM-LP (3190-6053BLK)	TC-SPO375-NM-LP (3190-6059BLK)	TC-SPO500-NM-LP (3190-6004BLK)
N Male Right Angle	TC-SPO250-NM-RA-LP (3190-6055BLK)	TC-SPO375-NM-RA (3190-6061BLK)	TC-SPO500-NM-RA-LP (3190-6065BLK)
N Female	TC-SPO250-NF-LP (3190-6054BLK)	TC-SPO375-NF-LP (3190-6060BLK)	TC-SPO500-NF-LP (3190-6005BLK)
7-16 DIN Male Straight	TC-SPO250-716M-LP (3190-6056BLK)	TC-SPO375-716M-LP (3190-6062BLK)	TC-SPO500-716M-LP (3190-6066BLK)
7-16 DIN Male Right Angle	TC-SPO250-716M-RA-LP (3190-6058BLK)	TC-SPO375-716M-RA-LP (3190-6064BLK)	TC-SPO375-716M-RA-LP (3190-6068BLK)
7-16 DIN Female Straight	TC-SPO250-716-F-LP (3190-6057BLK)	TC-SPO375-716F-LP (3190-6063BLK)	TC-SPO500-716F-LP 3190-6067BLK
SMA Male Straight	TC-SPP250-SM-LP (3190-6182BLK)	N/A	N/A

- ***Jumpers available in any length with most popular connector combinations***
- ***iBwave VEX files available at www.iBwave.com***

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Smart Part Number Key for Low PIM Jumpers

Cable Size

250 = SPO250
375 = SPO375
500 = SPO500

Length (2 OR 3 characters) (YY.Y or Y.Y)

Feet: 0.5 increments only
Meters: 0.5 increments only

SPOXXXYYYXXXYY.YX

F= Feet M= Meters

ex. SPO250NMNMR2.0M
(N Male to N Male right angle, 2 meters)

Connector Codes (2 or 3 Characters)

DF =	7/16 DIN Female
DFB =	7/16 DIN Female bulkhead
DM =	7/16 DIN Male
DMR =	7/16 DIN Male right angle
NF =	N Female
NFB =	N Female bulkhead
NM =	N Male
NMR =	N Male right angle
SM =	SMA Male
41M =	4.1/9.5 mini DIN Male

First Connector

Second Connector

Electrical:

- Insertion Loss should not exceed (1.1 x published attenuation + 2 x 0.15dB)
- VSWR
  Maximum of 1.25:1 up to 3 GHz
  Maximum of 1.35:1 up to 6 GHz

PIM: (measured using two +43 dBm carriers)

- IM_3: < -160dBc (static and dynamic)
- IM_3: SMA's < -155dBc (static and dynamic)
- IM_3: QMA's < -140dBc (static only)

Many assembly configurations are available from stock.
Refer to the on-line StockCheck for specific configurations.

About TIMES MICROWAVE SYSTEMS

Times Microwave Systems, was founded in 1948 as the Times Wire and Cable Company. Today, the company specializes in the design and manufacture of high performance flexible, semi-flexible and semi-rigid coaxial cable, connectors and cable assemblies. With over 60 years of leadership in the design, development, and manufacture of coaxial products for defense microwave systems, Times Microwave Systems is the acknowledged leader, offering high tech solutions for today's most demanding applications.

Cable assemblies from Times Microwave Systems are used as interconnects for microwave transmitters, receivers, and antennas on airframes, missiles, ships, satellites, and ground based communications systems, and as leads for test and instrumentation applications.

As a highly specialized and technically focused company, Times Microwave Systems has been able to continually meet the challenges of specialty engineered transmission lines for both the military and commercial applications, drawing upon our:

- Thousands of unique cable and connector designs
- Exceptional RF and microwave design capability
- Precise material and process controls
- Unique in-house testing capabilities including RF shielding/leakage, vibration, moisture/vapor sealing, phase noise and flammability
- Years of MIL-T-81490, MIL-C-87104, and MIL-PRF-39012 experience
- ISO 9001 Certification

In 2010, Times Microwave Systems introduced its Times-Protect™ line of lightning and surge protection solutions to address the challenging needs of wireless systems in the 21st century.

With over 60 years of Times Microwave Systems aerospace cable and connector technology experience and unparalleled design expertise, Times Microwave Systems' staff of Field Applications Engineers can help to provide the right solution for your interconnect applications.

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