

# Manual Step, Ruggedized SMA Connectors



#### **Features**

- Broadband: choice of frequency ranges, DC-4 and DC-18 GHz
- Wide Choice of Attenuation Ranges: 5 standard attenuation ranges available, see Standard Incremental Attenuation Range
- Environmental: designed to meet most environmental requirements of MIL-A-24215 (vibration, shock, relative humidity to 95%, and altitude)
- In-line Configuration: passivated stainless steel SMA connector is set parallel with the control shaft (except units with right-angle connector) to reduce volume for applications where space is critical; all models are bidirectional
- Precise Incremental Attenuation Accuracy: model 9000 series has a flat frequency response and small deviation from nominal attenuation at all settings (e.g., the deviation is only +2.5 dB at 99 dB setting at 18 GHz)
- Excellent Repeatability and Long Switch Life
- Custom Configurations Available Upon Request
- Highly Accurate Detent Stepping: direct drive of attenuator drums eliminates gears and provides for excellent repeatability
- Safety Mechanical Stop: a mechanical stop between maximum and 0 attenuation positions on all models except 0-9 dB unit is provided to prevent large power changes at attenuator output from damaging sensitive equipment

Models: 9003, 9004, 9009, 9010, 9011 DC to 18 GHz, 2 Watt

### **Description**

The Model 9000 series Step Attenuators are broadband miniature step attenuators that provide excellent performance characteristics suitable for use in high-reliability 50 ohm systems and applications requiring extra-small components to precisely control signal levels. The Model 9000 series can be used as input or output attenuators in signal sources, receivers, field strength meters, spectrum analyzers, etc.

The SMA connector furnished on all models is available in either standard or right-angle configuration. The sex of the front and rear connector is optional (refer to connector specification for specific combinations available). A knob(s), marked appropriately, is supplied with each unit.

# **Specifications**

Nominal Impedance:  $50 \Omega$ 

Frequency Range: model no. prefix to designate range:

DC to 4.0 GHz (AC) – 9009 & 9010 only DC to 18.0 GHz (AF) – all models

#### Standard Incremental Attenuation Range:

 Model 9009:
 0 to 9 dB in 1 dB steps

 Model 9003:
 0 to 69 dB in 1 dB steps

 Model 9004:
 0 to 99 dB in 1 dB steps

 Model 9010:
 0 to 60 dB in 10 dB steps

 Model 9011:
 0 to 90 dB in 10 dB steps

Maximum SWR			
Freq. Range (GHz)	9009, 9010, 9011	9003, 9004	
DC – 4 DC – 18	1.25 1.60	1.35 1.75	

**Power Rating**: 2 watts average to 25°C ambient temperature, derated linearly to 1 watt @ 54°C. 200 watts peak (5 µsec pulse width; 0.5% duty cycle)

Power Coefficient: < 0.005 dBm/dB/watt

Temperature Coefficient: < 0.0004 dBm/dB/°C

Temperature Range:

Operating: 0 to +54°C Non- Operating: -54 to +54°C





# Specifications (con't)

**Test Data**: Insertion Loss data is supplied as follows, other test data can be supplied at an additional cost

DC to 4 GHz: at 50 MHz and 4 GHz

DC to 4 GHz: at 50 MHz and 4 and 18 GHz

Incremental Phase Shift: ~0.5° per dB per GHz

Repeatability: better than 0.05 dB across frequency band

for switch life

Switch Life: over 1,000,000 steps

Shaft Rotation: clockwise for increasing attenuation

Construction:

Drum Assembly: Aluminum alloy

Housing: Phenolic or aluminum

Control Shaft: Stainless steel
Connector: Stainless steel

Knob: Supplied with control knob

Indexing: 36°

**Drum Configuration**:

Single Drum: 9009, 9010, 9011 Dual Drum: 9003, 9004

Insertion Loss					
Freg. Range	Model				
(GHz)	9009	9003	9004	9010	9011
DC – 4 DC – 18	0.3 1.0	0.6 1.5	0.6 1.5	0.4 1.0	0.5 1.0

**Connectors**: SMA connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Front and rear SMA connectors are available in either standard or right-angle configuration, connector sex is optional as follows:

Type Description

Connector Options	Typo Booonplion
1	SMA, Female
2	SMA, Male*
3	SMA, Female, right angle
4	SMA, Male, right angle

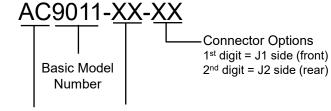
\*Standard male SMA connector not available as J1 connector

Weight:

9009:	680 g (2.4 oz)
9010:	160 g (5.7 oz)
9011:	200 g (7.1 oz)
9003:	260 g (9.0 oz)
9004:	290 g (10.4 oz)

Incremental Insertion Loss			
Model	dB Range	nge Freq. Range (GI	
Number		DC-4	DC-18
9009	1-9	0.3	0.5
9003	1-9 10-19 20-29 30-39 40-49 50-59 60-69	- - - - -	0.5 1.0 1.2 1.4 1.5 1.7
9004	1-9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80-89 90-99	- - - - - - - -	0.5 1.0 1.2 1.4 1.5 1.7 1.9 2.1 2.3 2.5
9010	10 20 30 40 50	0.3 0.3 0.4 0.5 0.7	1.0 1.0 1.0 1.2 1.5
9011	10 20 30 40 50 60 70 80	- - - - - -	1.0 1.0 1.0 1.2 1.5 1.8 2.1 2.3

#### **How To Order**



Freq. Range Max. Attenuation (GHz)\*\* Value (dB)

 \*\* Freq. Range
 Available Models

 DC-4.0 GHz (AC)
 AC9010

 DC-18 GHz (AF)
 AF9003, AF9004

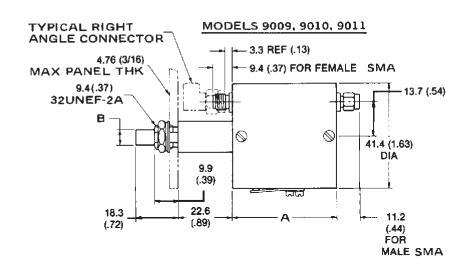
AF9003, AF9004, AF9009, AF9010, AF 9011

Connector Options

sales@am.spectrumcontrol.com



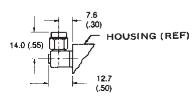
## **Physical Dimensions**

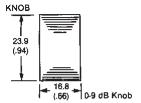


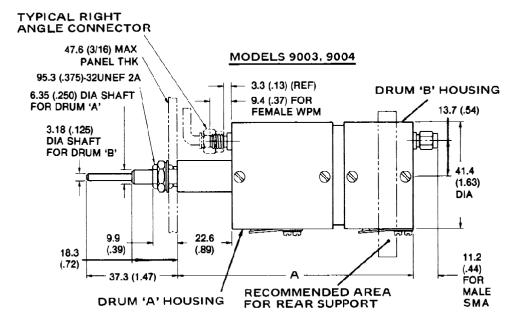
# RIGHT ANGLE FEMALE SMA 7.6 (.30) HOUSING (REF)

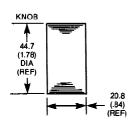
(.50)

#### RIGHT ANGLE MALE SMA









MOUNTING HOLE
(.375 +.005) 000) 9.53 +0.127 -0.00
(.340 +.005 ) +0.127 8.74 -0.00

Model No.	DIM A	DIM B
9003	96.3 (3.79)	-
9004	106.4 (4.19)	-
9009	28.7 (1.13)	3.25 (0.125)
9010	41.4 (1.63)	6.35 (0.250)
9010	51.6 (2.03)	6.35 (0.250)

<sup>\*\*</sup>Dimensions are given in mm (inches) and are max. unless otherwise specified.