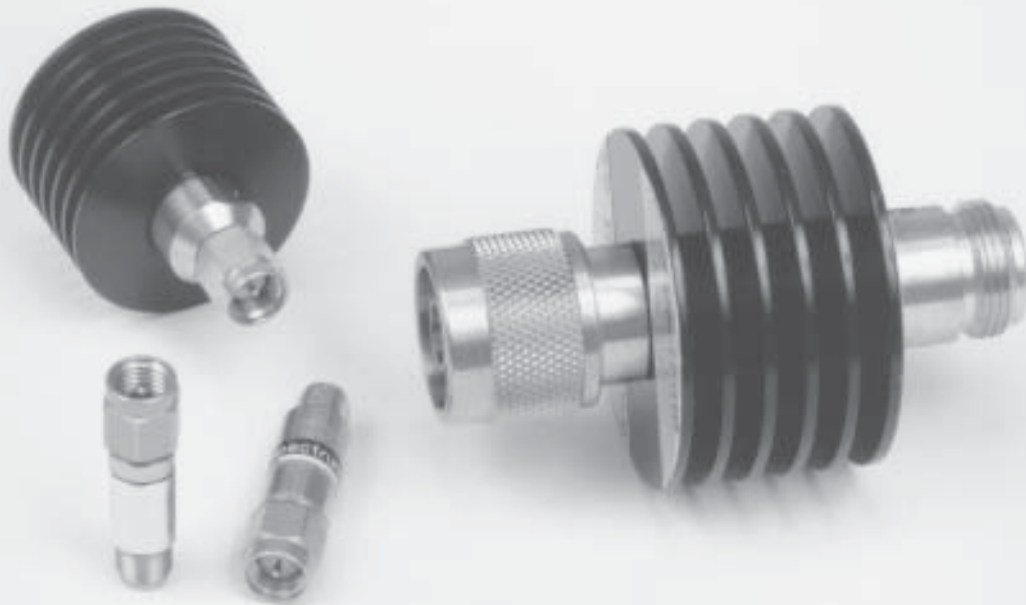


# Section IV



# Coaxial Attenuators

**INTRODUCTION:** Attenuators are passive linear components, being used to reduce the input power in a system by a certain amount. The ratio of input power versus output power is generally expressed in Decibels (dB).

**Applications:** Attenuators are needed to control the microwave energy, mainly during measurement. They are also used to protect systems from excess energy, to extend the dynamic range of measuring equipment, such as power meters, spectrum analyzers, amplifiers, receivers, etc.

**Attenuation:** The attenuation or insertion loss of an attenuator is the ratio of input power versus output power, providing that the input power is generated by a matched generator and the output of the attenuator is delivered into a perfectly matched load.

**Attenuation Values:** The standard attenuation values are available from 0 dB to 60 dB. In the range of 0 dB to 20 dB, smaller attenuation ranges are available, e.g. in steps of 1/2 dB. Above 20 dB and up to 30 dB, step sizes of 1 dB are standard, while the higher attenuation values are then usually specified by the customer.

**Average Power Handling:** This is the maximum allowable CW power to which the unit can be subjected to without suffering permanent damage, or without changing permanently the specified characteristics of the device. The power handling of absorptive units is a function of temperature. High temperature units are supplied with cooling fins or heat sinks or both for better power dissipation.

**Connectors:** Attenuators are available with a large variety of connectors, meeting the appropriate standard interface specifications, such as MIL-Standards, DIN- or IEC-Specifications, etc.

**Custom Designs:** In addition to the standard terminations shown in this section, Spectrum Elektrotechnik GmbH has been designing and supplying special models to suit particular requirements, such as unique mechanical outline, unusual mounting or special connector requirements, extended frequency operation, special attenuation values, or in between attenuation values, higher power dissipation, harsh environment, etc.

**Frequency and Bandwidth:** Coaxial Attenuators do usually operate over a multi-octave bandwidth. In special applications they may be tuned to certain criteria in narrower bands.

**High Reliability Components:** Most of the attenuators can also be supplied to Customers High Reliability Specifications, environmental, military or governmental requirements, and/or to customer specified test procedures.

**Peak Power Handling:** This is the maximum allowable Peak power to which the unit can be subjected to without suffering permanent damage, or without changing permanently the specified characteristics of the device. The peak power is transmitted using a certain pulse width and pulse repetition rate. The percentage of transmitted power, compared to CW power is called Duty Cycle

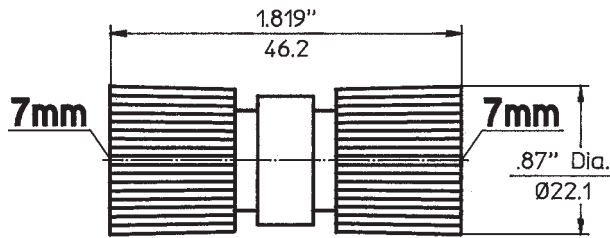
**Temperature Coefficient:** The attenuation value of an attenuator will vary with temperature. The maximum change of attenuation or insertion loss per degree Centigrade over a specified temperature range is called the temperature coefficient.



**Spectrum Elektrotechnik GmbH offers custom compiled sets of attenuators, if needed optimized for specific frequency bands. Each attenuator within any set is 100% tested to ensure optimum performance over its full frequency range. To enable the user to maintain these quality attenuators in pristine condition, they are supplied in a nicely finished wooden case. For details please call your nearest Spectrum Representative.**

# Attenuators

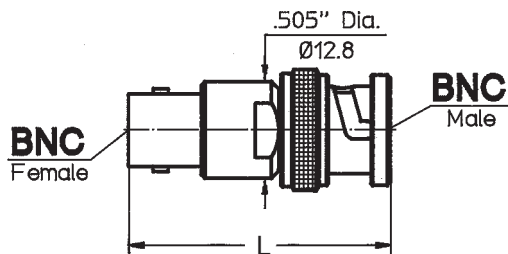
## 7mm to 7mm



### Attenuator 7mm to 7mm

<b>Part No.</b>	<b>DG-0018-XX90*</b>
Frequency Range	DC - 18.0 GHz
Attenuation Values	3, 6, 10 and 20 dB
Attenuation Accuracy	3 and 6 dB: ± 0.3 dB 10 and 20 dB: ± 0.5 dB
Max. VSWR	DC to 4.0 GHz: 1.12 4 to 8.0 GHz: 1.15 8 to 18.0 GHz: 1.20
Max. Input Power	2 Watts average at + 25°C 0.5 Watts average at +125°C
Operating Temp. Range	-54°C to + 125°C
* XX: Please specify the attenuation value (dB) required.	

## BNC Male to BNC Female

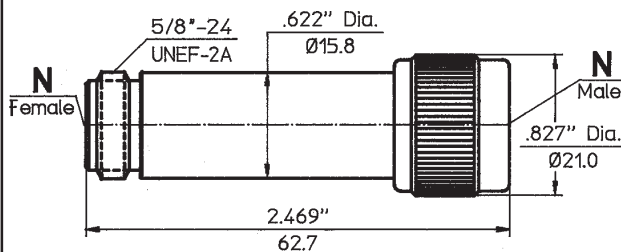


Length L:  
1 - 20 dB: 34.5mm  
21 - 60 dB: 41.9mm

### Attenuator BNC Male to BNC Female

<b>Part No.</b>	<b>DG-0004-XX71*</b>
Frequency Range	DC - 4.0 GHz
Attenuation Values	1 - 60 dB in 1 dB increments
Attenuation Accuracy	1 to 6 dB: ± 0.3 dB 7 to 10 dB: ± 0.5 dB 11 to 20 dB: ± 0.75 dB 21 to 40 dB: ± 1.0 dB 41 to 60 dB: ± 1.5 dB
Max. VSWR	1.25 : 1
Max. Input Power	2 Watts average at + 25°C 0.5 Watts average at +125°C
Operating Temp. Range	-54°C to + 125°C
* XX: Please specify the attenuation value (dB) required.	

## N Male to N Female



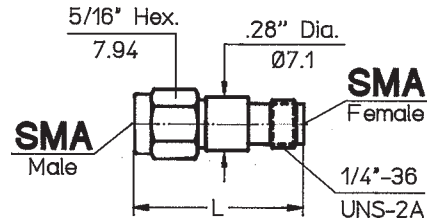
### Attenuator N Male to N Female

<b>Part No.</b>	<b>DG-0018-XX51*</b>
Frequency Range	DC - 18.0 GHz
Attenuation Values	3, 6, 10 and 20 dB
Attenuation Accuracy	3 and 6 dB: ± 0.3 dB 10 and 20 dB: ± 0.5 dB
Max. VSWR	DC to 4.0 GHz: 1.12 4 to 8.0 GHz: 1.15 8 to 18.0 GHz: 1.20
Max. Input Power	2 Watts average at + 25°C 0.5 Watts average at +125°C
Operating Temp. Range	-54°C to + 125°C
* XX: Please specify the attenuation value (dB) required.	

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## SMA Male to SMA Female

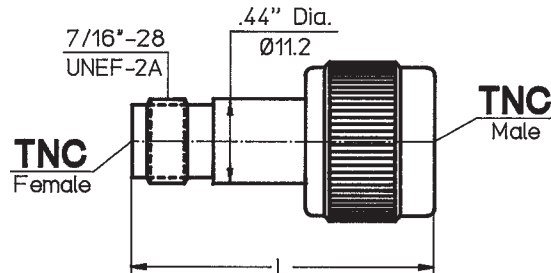
Attenuator SMA Male to SMA Female	
Part No.	DG-0018-XX11*
Frequency Range	DC - 18.0 GHz
Attenuation Values	1 - 30 dB in 1 dB increments
Attenuation Accuracy	1 to 6 dB: ± 0.3 dB 7 to 20 dB: ± 0.5 dB 21 to 30 dB: ± 1.0 dB
Max. VSWR	1.07 + 0.015 f(GHz)
Max. Input Power	2 Watts average at + 25°C 0.5 Watts average at +125°C
Operating Temp. Range	-54°C to + 125°C
* XX: Please specify the attenuation value (dB) required.	



Length L:  
 1 - 12 dB: 21.8mm  
 13 - 30 dB: 25.9mm

## TNC Male to TNC Female

Attenuator TNC Male to TNC Female	
Part No.	DG-0018-XX31*
Frequency Range	DC - 18.0 GHz
Attenuation Values	1 - 60 dB in 1 dB increments
Attenuation Accuracy	1 to 6 dB: ± 0.3 dB 7 to 20 dB: ± 0.5 dB 21 to 40 dB: ± 1.0 dB 41 to 60 dB: ± 1.5 dB
Max. VSWR	1.07 + 0.015 f(GHz)
Max. Input Power	2 Watts average at + 25°C 0.5 Watts average at +125°C
Operating Temp. Range	-54°C to + 125°C
* XX: Please specify the attenuation value (dB) required.	



Length L:  
 1 - 20 dB: 39.9mm  
 21 - 60 dB: 46.7mm

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".**

