Fixed Coaxial Attenuators

AEROFLEX
A passion for performance.

- dc to 50 GHz, up to 1,000 Watts
- Choice of frequency ranges, attenuation valure and power level.
- Consistent, repeatable performance
- High reliability
- Rugged injection molded connectors
- Low Intermodulation (LIM) versions available
- Custom connector options

General Information

In this section of the catalog, each Fixed Coaxial Attenuator is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the Fixed Coaxial Attenuator(s) that fits your needs. The page number for each Fixed CoaxialAttenuator data sheet is given in the quick reference guide.

From the company's very first DC - 1 GHz tee attenuator, came the technology that enabled the design of the first DC - 5 GHz, the first DC - 10 GHz, and the first DC - 18 GHz coaxial attenuators. These designs led to the development of the distributed resistor card attenuator element, which is the basis for most all attenuators manufactured today from DC - 60 GHz. Until the original patents expired a few years ago, most major attenuator manufacturers in the U.S. were licensed under one or more Weinschel Engineering, Co., patents.

Also MIL-DTL-3933 Qualified - Aeroflex / Weinschel is a QPL supplier of Fixed Attenuators. Most Aeroflex / Weinschel Fixed Coaxial Attenuators can be supplied according to customer specified testing, environmental or military or government specification requirements (page 26).

Attenuator Sets of Aeroflex / Weinschel Fixed Attenuators are also available...see page 62.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with our distributor for current products and stocking quantities.

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Revision Date: 1/28/09

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Fixed Coaxial Attenuators

Fixed Attenuators...dc-40 GHz, 1-10 Watts

Model Number	Frequency Range (GHz)	Average Power (Watts)	Peak Power (kW)	Nominal Attenuation Value (dB)	SWR	Connector Type	Page No	
☆ 1 ☆ 2	dc-12.4 dc-18.0	5	1	1-10, 20, 30, 40, 50, 60	1.15-1.25* 1.15-1.35*	N	32	
☆ 1W	dc-4.0	2	0.25	1-10, 20	1.25	N	30	
☆ 3T ☆ 4T	dc-12.4 dc-18.0	2	0.50	1-12, 20, 30, 40, 50, 60 1.15-1.35*	1.15-1.25*	SMA	22	
☆ 3M ☆ 4M	dc-12.4 dc-18.0	2	0.50	1-10, 20, 30, 40, 50, 60 1.15-1.35*	1.15-1.25*	SMA	21	
☆ 4H	dc-18.6	2	0.25	0-10, 12, 15, 20, 30	1.15-1.35*	SMA	20	
☆ 23 ☆ 37	dc-18.0 dc-8.5	10 10	1 1	3, 6, 10, 20, 30, 40, 50, 60 3, 6, 10, 20, 30	1.15-1.35* 1.15-1.25*	N N	38 37	
32	dc-18.0	2	0.50	0-20 in 0.5 dB Increments	1.15-1.35*	SMA	23	
32J 87	dc-32.0	2	0.50	0-30 in 0.5 dB Increments	1.25	2.92mm	24 25	
☆ 41	dc-18.0	10	1	1, 2, 3, 6, 10, 20, 30	1.20-1.35*	SMA	36	
☆ 44	dc-18.0	5	1	1-10, 20, 30, 40, 50, 60	1.15-1.25*	N	33	
☆ 54A	dc-40.0	2	0.5	3, 6, 10, 20, 30	1.25-1.40*	2.92mm	28	
☆ 55	dc-18.0	5	1	3, 6, 10, 20, 30	1.15-1.35*	TNC	30	
☆ 56	dc-26.5	2	0.5	0-10, 20, 30	1.10-1.25*	3.5mm	27	
☆ 69A	dc-18.0	5	0.5	1-10, 20, 30	1.15-1.35*	SMA	34	
75A	dc-40.0	5	0.2	3, 6, 10, 20, 30	1.20-1.35*	2.92mm	35	
☆ 84A	dc-40.0	2	0.5	3, 6, 10, 20, 30	1.35-150*	2.4mm	29	
☆ 3330A ☆ 3331A	dc-18.0	2	0.25	1-10, 20, 30	1.15-1.40*	SMA	19	

* VARIES WITH FREQUENCY.

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Note: Other models may also be available from Express delivery.

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Fixed Coaxial Attenuators

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Fixed Attenuators...dc-40 GHz, 20-100 Watts

Model Number	Frequency Range (GHz)	Average Power (Watts)	Peak Power (kW)	Nominal Attenuation Value (dB)	SWR	Connector Type	Page No	
✯ 24	dc-8.5	50	5	3, 6, 10, 20, 30	1.20-1.30*	2.92mm/N	45	
✯ 33 ✯ 34	dc-8.5 dc-4.0	25 25	5 5	3, 6, 10, 20, 30 3, 6, 10, 20, 30	1.20-1.30* 1.10-1.20*	2.92mm/N	41 40	
✯ 46	dc-18.0	25	1	3, 6, 10, 20, 30, 40	1.20-1.35*	3.5mm/N	42	
✯ 47	dc-18.0	50	1	3, 6, 10, 20, 30, 40	1.20-1.45*	3.5mm/N	47	
✯ 48	dc-18.0	100	1	6, 10, 20, 30, 40	1.25-1.55*	3.5mm/N	51	
✯ 59	dc-2.5	100	10	10, 20, 30, 40	1.15	N	49	
✯ 68	dc-4.0	100	10	1, 2, 3, 6, 10, 20, 30, 40	1.20	N	50	
✯ 72	dc-4.0	50	5	3, 6, 10, 20, 30, 40	1.20	N/2.92mm	44	
✯ 73	dc-8.5	100	5	3, 6, 10, 20, 30, 40	1.25-1.35*	N	52	
✯ 74	dc-26.5	25	0.5	3, 6, 10, 20, 30	1.30-1.35*	3.5mm	43	
86	dc-22.0	50	1	3, 6, 10, 20, 30	1.30	3.5mm	48	
89	dc-40.0	20	0.2	10, 20, 30	1,25-1.40*	2.92mm	39	
90	dc-18.0	50	1	3, 6, 10, 20, 30	1.15-1.30	N	46	

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Fixed Coaxial Attenuators

Fixed Attenuators...dc-18.0 GHz, 150-1000 Watts

Model Number	Frequency Range (GHz)	Average Power (Watts)	Peak Power (kW)	Nominal Attenuation Value (dB)	SWR	Connector Type	Page No.	
✯ 40 ✯ 57	dc-1.5 dc-5.0	150 150	10 10	3, 6, 10, 20, 30, 40 6, 10, 20, 30, 40	1.10 1.20	N N	53	
✯ 45 ✯ 58	dc-1.5 dc-5.0	250 250	10 10	3, 6, 10, 20, 30, 40 6, 10, 20, 30, 40	1.10 1.15-1.20*	N	57	
✯ 49	dc-8.5	150	5	3, 6, 10, 20, 30, 40	1.25-1.35*	N	55	
✯ 53	dc-2.5	500	10	3, 6, 10, 20, 30, 40	1.10	N	59	
65	dc-2.5	150	10	3, 6, 10, 20, 30	1.20	N	54	
66	dc-18.0	150	1	10, 20, 30, 40	1.90	N	56	
67	dc-12.7	350	5	10, 20, 30	1.30-1.60*	N	58	
81 *NEW*	dc-10.0	500	5	10, 20, 30, 40	1.65-1.90*	N	60	
✯ 82	dc-3.0	1,000	10	10, 20, 30, 40	1.15-1.25*	N	61	

* VARIES WITH FREQUENCY.

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Fixed Coaxial Attenuators

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Low IM Fixed Attenuators...dc-18.0 GHz, 25-500 Watts

Model Number	Frequency Range (GHz)	Average Power (Watts)	Peak Power (kW)	Nominal Attenuation Value (dB)	SWR	Connector Type	Page No.	
24-XX-XX-LIM	dc-8.5	50	5	10, 20, 30	1.20-1.30*	2.92mm/N	45	
33-XX-XX-LIM	dc-8.5	25	5	dc-8.510, 20, 30, 40	1.20-1.30*	2.92mm/N	41	
46-XX-XX-LIM	dc-18.0	25	1	10, 20, 30, 40	1.20-1.35*	3.5mm/N	42	
47-XX-XX-LIM	dc-18.0	50	1	10, 20, 30, 40	1.20-1.45*	3.5mm/N	47	
48-XX-XX-LIM	dc-18.0	100	1	10, 20, 30, 40	1.25-1.55*	3.5mm/N	51	
57-XX-XX-LIM	dc-5.0	150	10	10, 20, 30, 40	1.20	N	53	
58-XX-XX-LIM	dc-5.0	250	10	10, 20, 30, 40	1.15-1.20*	N	57	
49-XX-XX-LIM	dc-8.5	150	5	10, 20, 30, 40	1.25-1.35*	N	55	
53-XX-XX-LIM	dc-2.5	500	10	10, 20, 30, 40	1.10	N	59	

* VARIES WITH FREQUENCY.

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Frequently Asked Questions about Fixed Coaxial Attenuators....

What are the advantages of Weinschel's fixed attenuators?

Aeroflex / Weinschel low power fixed attenuators feature a combination of advantages over other designs:*

1. Most Aeroflex / Weinschel attenuators feature injection molded dielectric for better center pin captivation and alignment. Injection molded dielectric also eliminates the need for the epoxy hole "stake" as seen in other designs. This epoxy hole in other designs is subject to RF leakage and movement when exposed to environmental extremes and prolonged use.
2. Aeroflex / Weinschel fixed attenuators have a proprietary resistor element, fired at 950°C for superior long term stability over temperature, power and time. The attenuator element is trimmed for precise custom attenuation values.
3. Aeroflex / Weinschel fixed attenuators have no solder contacts. They feature spring loaded plunger contacts to the resistor cards that provide expansion tolerance over wide temperature and power ranges.
4. Aeroflex / Weinschel fixed attenuators are made with high quality materials and machined to very close tolerances. The result is a design that stands up to severe environmental and multiple matings.
5. High power designs feature special high temperature dielectric support beads.

Does Aeroflex / Weinschel offer high reliability fixed attenuators?

Yes. Aeroflex / Weinschel is a major QPL supplier of **MIL-DTL-3933, CLASS III/IV, N/S** Fixed Attenuators. Most Weinschel Fixed Coaxial Attenuators can be supplied according to customer specified testing, environmental or military or government specification requirements.

Hi-Rel units can be laser-marked and are manufactured from materials which have a TML of less than 1% and CVCM less than 0.1%. Refer to page 25 for more details.

What is a bidirectional and unidirectional attenuator?

All Aeroflex / Weinschel attenuators are bidirectional unless they are specified as unidirectional in the power rating specification. Bidirectional means the maximum specified power can be applied to either the input or output of the attenuator. Unidirectional means the maximum specified power can only be applied to the input port of the attenuator. Unidirectional designs allow for smaller overall package sizes and reduced costs. All our attenuators have maximum average and peak pulse input power limits. The average power limit decreases linearly as the ambient temperature increases. If these limits are exceeded, burnout of the attenuator element results or its calibration may be permanently changed. When used within its specifications, an attenuator is an indispensable component in measurement and system applications.

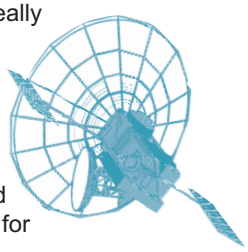
*Most designs, some features may not apply to certain low cost attenuator designs.

What dB values are available besides those in the catalog?

Most any dB value is available; however you should consult your local sales representative or the factory for design availability for a particular dB value for the selected model. There is generally an additional charge for non-catalog values.

Can Aeroflex / Weinschel provide attenuators for space applications?

Yes. Aeroflex / Weinschel fixed attenuators are being used on a wide variety of military and commercial communication satellites. "S" level fixed attenuators can be provided for any dB value up to 40 dB from dc to 40 GHz. Aeroflex / Weinschel has recently introduced Models 32 (page 24) and 32J (page 23) standard fixed attenuators that operates from dc to 18 or 32 GHz. These attenuators offer superior electrical and mechanical design that is ideally suited for space applications.



Aeroflex / Weinschel's use of precision connectors, injection molded captivation of connector contacts (no solder or contact fingers) and very precise and stable resistors result in a superior electrical and mechanical design that is ideally suited for space applications.

Aeroflex / Weinschel program experience includes:

Aussat (Optus)	SSTI	JCSAT
KOREASAT	GlobalStar	GEM
TDRSS	ICO	SMTS
TELSTAR	INTELSAT	AGILA
GOES	ACeS	MSAT
MILSTAR	EOS	TOMS

...and many others.

Aeroflex / Weinschel offers extensive testing programs for space qualified attenuators and other components that can include:

Random Vibration: Random and/or Sine Vibration up to 100 g rms.

Monitored Thermal Cycle: Units monitored for open condition over -55 to +85°C temperature range.

Thermal Shock: Performed per MIL-STD-202, Method 107.

Burn-In Testing: Performed at rated power and operating temperature from 96 to 360 hours typical.

Mechanical Shock: Performed per MIL-STD-202, Method 213 Test Condition F up to 1000 G peak.

Moisture Resistance Testing: Performed per MIL-STD-202, Method 106. (except sub-cycle 7b is not applicable) with connectors capped.

Salt Spray: Performed per MIL-STD-202, Method 101 with connectors capped.

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Fixed Coaxial Attenuators

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Can Weinschel provide special fixed attenuators?

Yes. Aeroflex / Weinschel has produced over 2000 custom fixed attenuator designs. Specials continue to be a significant part of Weinschel's product offering. Special features may include:

1. Custom Connector Configurations
2. Matched Pairs or Sets
3. Lower VSWR & Higher Accuracy
4. Special Mounting & Environmental Conditions
5. Unique Test Requirements & Data

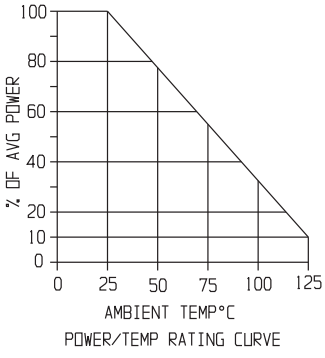
Does Weinschel offer any attenuators with IM3 specified?

Yes Aeroflex / Weinschel has recently introduced new as well as updated models specifically for applications requiring low intermodulation distortion. Models are available with the low IM options are...24, 33, 40, 45, 46, 47, 48, 48, 53, 57, & 58. Refer to the page 17 for a product line overview or the specific data sheet for IM3 details.

How is the temperature or power coefficient specification applied?

These specifications tell how much the attenuation will change when the ambient temperature or input power changes. First multiply the catalog temperature coefficient or power coefficient by the ambient temperature range or input power range to which the attenuator will be exposed. Then multiply that number by the dB value of the attenuator. The result is the maximum change in attenuation than can be expected over the ambient temperature range or power range that was specified.

How is the attenuator power rating calculated?



POWER/TEMP RATING CURVE

An attenuator will handle specified power at ambient temperatures as specified in the catalog. No special fan cooling is required. At higher temperatures the power rating is calculated by using catalog specifications and a straight line graph (Example shown above). For instance the power rating of the Model 48 attenuator is 100 watts to 25°C and 10 watts at 125°C. Using linear graph paper, plot a straight line between these two points. This plot shows that the power rating at 75°C is approximately 56 Watts.

Does Aeroflex / Weinschel offer attenuators sets or attenuation test kits?

Aeroflex / Weinschel offers a variety of attenuation standard sets consisting of precision designed fixed attenuators. These sets are ideally suited for standards and research laboratories as well as production, quality control, and inspection departments. Aeroflex / Weinschel attenuation sets are available in either 3, 6, 10, 20 dB or 1, 3, 6, 10, 20, 30 dB attenuation values. Each attenuator is tested in 1 GHz intervals to minimize interpolation error. The attenuator sets are available in stainless steel type N (Model 1 & 44), and 3.5mm (Model 56) connectors. Custom sets with other connector type and higher power sets are also available upon request. Refer to page 60 for more details.

What is Third-Order Intermodulation Distortion?

(IM3) Intermodulation distortion (IM) consists of the spurious signals which result from the mixing of nth order frequencies in the non-linear elements of a component. Third order intermodulation distortion is of particular interest because third order products typically represent the highest level distortion appearing close to the desired signal, and as such the highest level non-filterable distortion. Third order IM level (IM3) is tested by injecting two pure tones of equal magnitude (f1 and f2) into the component to be tested. The third order IM products will appear in the output spectrum at the frequencies 2f1-f2 and 2f2-f1. These products are characterized by defining their level (in dBc) relative to the fundamental output tones at either f1 or f2.

Applications....

Aeroflex / Weinschel Attenuators are used in a wide variety of applications in the electronic field for the control or measurement of radio frequency energy. Attenuators are used as accurate standards in the measurement of loss or gain by the RF substitution method. They are used as a means of extending the dynamic range of measuring equipment such as power meters, field intensity meters, spectrum analyzers, and amplifiers, or to prevent overloading of receivers and amplifiers. They also reduce, by masking, the effects of variable or mismatched impedances on such circuit elements as oscillator, T-junctions, mixers, etc.

Fixed Attenuators can satisfy almost any requirement involving a reduction in power. Attenuators designed and manufactured by Weinschel Corporation are very stable and remain precision calibrated over wide ranges of humidity, temperature, and other ambient conditions for long periods of time.

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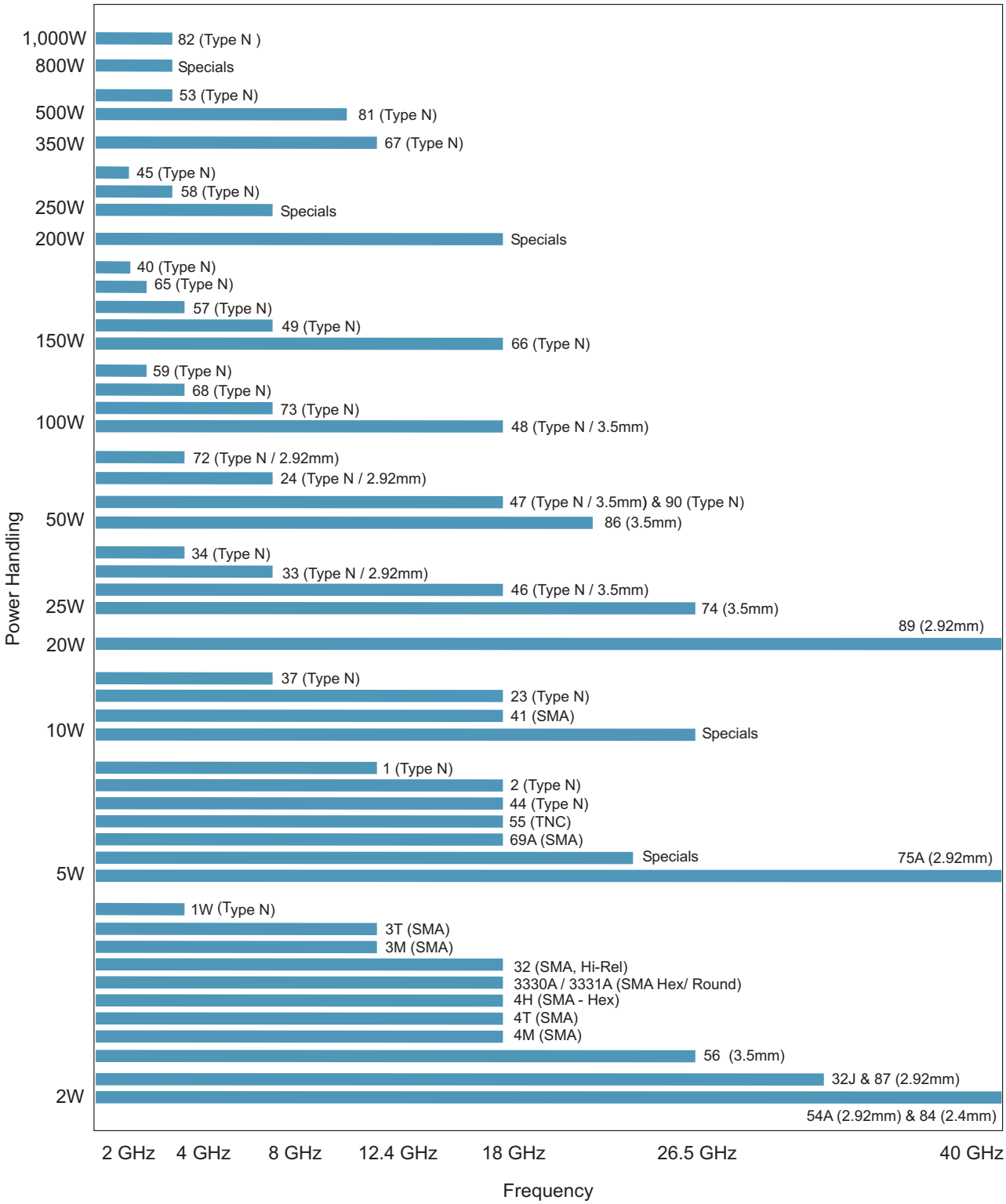
Fixed Attenuators....



Attenuation Selection Guide: *Power Handling / Frequency / Connector Type*

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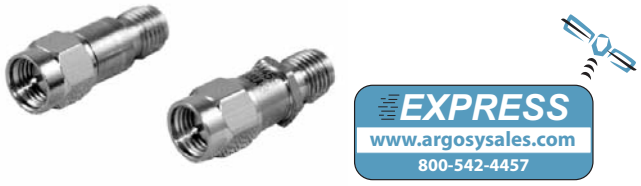
AEROFLEX WEINSCHEL

Models 3330A & 3331A
General Purpose Attenuators

dc to 18.0 GHz
2 Watts

Low Cost Subminiature

RoHS



Features

- **Low Cost** - These general purpose attenuators offer subminiature size, broadband frequency response, and attenuation values from 1 to 30 dB at low, competitive prices.
- **Two Configurations -** Round body Model 3330A and a hex body Model 3331A.
- **Ideal for Bulk Quantity Requirements.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
0-6	± 0.30
7-10, 20	± 0.50
30	± 0.75

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15
4 - 12.4	1.30
12.4 - 18.0	1.40

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts @ 125°C. 250 watts **peak** (5 µsec pulse width; 0.4% duty cy**cle).**

TEMPERATURE RANGE: -55°C to +125°C.

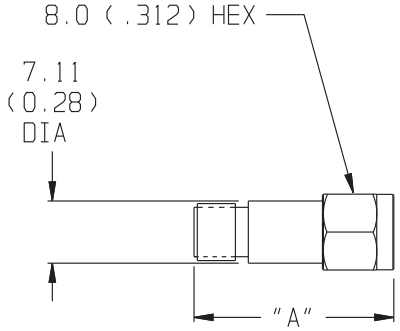
CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts.

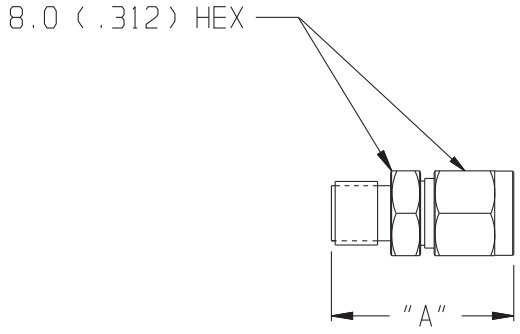
WEIGHT: 5.6 g (0.2 oz) maximum (Both Models)

PHYSICAL DIMENSIONS:

Model 3330A (Round):



Model 3331A (Hex):



dB VALUE	DIM A
1 - 10	21.72 ± 0.51 (0.855 ± 0.020)
20, 30	25.02 ± 0.51 (0.985 ± 0.020)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

3330A - XX

Basic Model Number

Attenuation Value (dB)

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Fixed Coaxial Attenuators

Model 4H
Hex Body Attenuator

dc to 18.6 GHz
2 Watts

Precision SMA Connectors

RoHS

Features

- **Subminiature** - These attenuators offer the smallest package size with broadband frequency response, and attenuation values from 0 to 10, 12, 15, 20 & 30 dB.
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Precision SMA Connectors.**
- **Usable to 23 GHz.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.6 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB)
0	± 0.40
1-10	± 0.30
12, 15, 20, 30	± 0.70

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 12.4	1.25
12.4 - 18.6	1.35

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts @ 125°C. 250 watts **peak** (5 µsec pulse width; 1% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

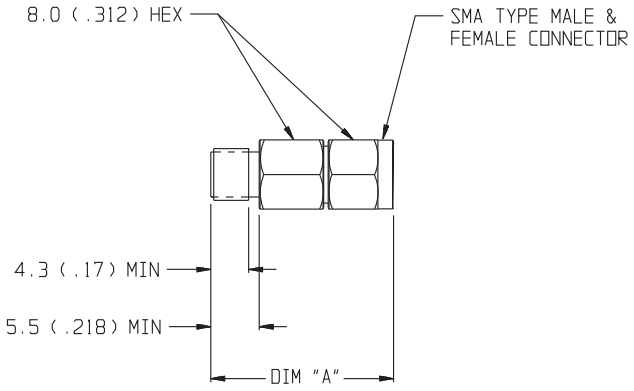
TEMPERATURE RANGE: -50°C to +125°C

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT: 5.0 g (0.18 oz) maximum

PHYSICAL DIMENSIONS:



dB VALUE	DIM A
0-10	19.0 (0.75)
12, 15, 20	21.6 (0.85)
30	24.0 (0.95)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

4H - XX

Basic Model Number

Attenuation Value (dB)

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Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 3M dc to 12.4 GHz
Model 4M dc to 18.0 GHz
Fixed Coaxial Attenuators 2 Watts

Ruggedized SMA Connectors

RoHS

Features

- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Usable to 22 GHz.**

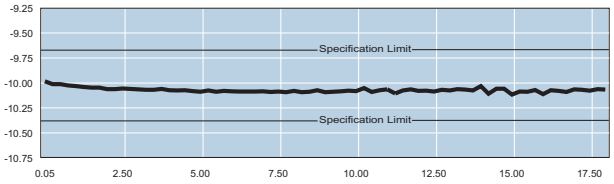
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 3M: dc to 12.4 GHz
Model 4M: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

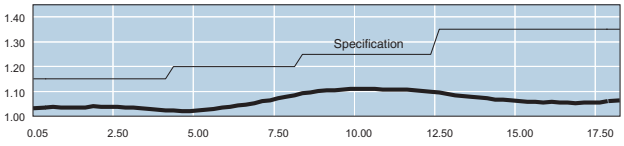
Nominal ATTN (dB)	3M	4M
1 - 2	± 0.30	± 0.50
3 - 6	± 0.30	± 0.30
7 - 10	± 0.30	± 0.50
20	± 0.50	± 0.70
30, 40	± 0.75	± 1.00
50, 60	± 1.00	± 2.00



Typical Attenuation Performance of 4M-10

MAXIMUM SWR:

Frequency (GHz)	3M	4M
dc - 4	1.15	1.15
4 - 8	1.20	1.20
8 - 12.4	1.25	1.25
12.4 - 18	- - -	1.35



Typical SWR of a Model 4M-10

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 125°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

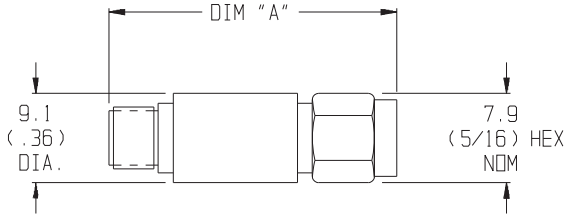
CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT (Both Models):

dB VALUE	WEIGHT (Net)
1 - 10, 20	10 g (0.35 oz)
30, 40, 50, 60	20 g (0.70 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A ± 0.5 (0.02)
1 -10, 20	30.5 (1.20)
30, 40, 50, 60	47.0 (1.85)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. 4M available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

***4M - XX**

Basic Model Number

Attenuation Value (dB)

*Add Prefix M for double male and F for double female connectors.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Model 3T
Model 4T
Fixed Coaxial Attenuators

dc to 12.4 GHz
dc to 18.0 GHz
2 Watts

RoHS

Ruggedized SMA Connectors

Features

- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Small Package Size**
- **Usable to 22 GHz.**

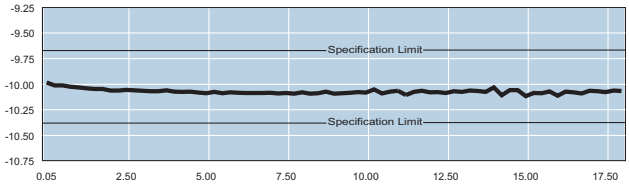
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 3T: dc to 12.4 GHz
Model 4T: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

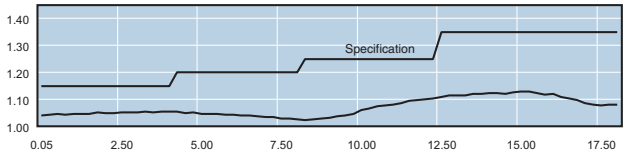
Nominal ATTN (dB)	3T	4T
1 - 6	± 0.30	± 0.30
7 - 12	± 0.30	± 0.50
20	± 0.50	± 0.70
30, 40	± 0.75	± 1.00
50, 60	± 1.00	± 1.50



Typical Attenuation Performance of 4T-10

MAXIMUM SWR:

Frequency (GHz)	3T	4T
dc - 4	1.15	1.15
4 - 8	1.20	1.20
8 - 12.4	1.25	1.25
12.4 - 18	- - -	1.35



Typical SWR of a Model 4T-10

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 125°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

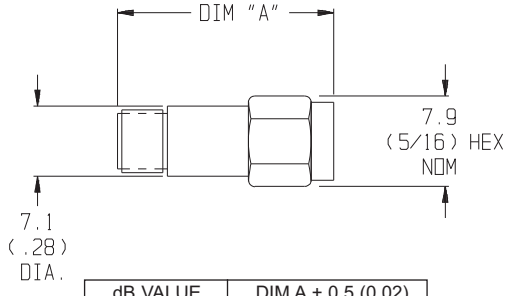
CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT (Both Models):

dB VALUE	WEIGHT (Net)
1 - 12	3.9 g (0.14 oz)
20	4.3 g (0.15 oz)
30	4.9 g (0.17 oz)
40, 50, 60	6.5 g (0.23 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A ± 0.5 (0.02)
1 -12	21.8 (0.86)
20	23.9 (0.94)
30	26.5 (1.04)
40, 50, 60	34.0 (1.85)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

4T - XX

Basic Model Number

Attenuation Value (dB)

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 32 dc to 18.0 GHz
High Reliability Fixed Coaxial Attenuator 2 Watts

Suitable for Space & Airborne Applications

RoHS

Features

- **Available in 0.5 dB increments from 0-20 dB.**
- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **100% Subjected to Thermal Shock & Peak Power Tests.**

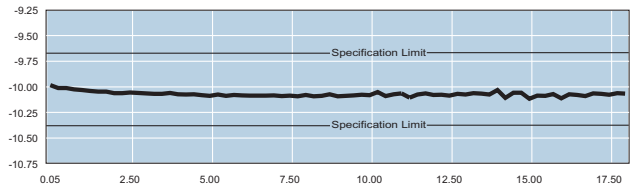
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

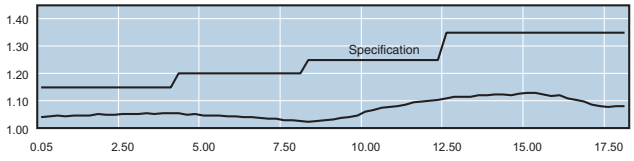
Nominal ATTN (dB)	Deviation (dB)
0	+ 0.30
0.5 - 6	± 0.30
6.5 - 12	± 0.50
12.5 - 20	± 0.70



Typical Attenuation Accuracy of 32-10

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.15
4 - 8	1.20
8 - 12.4	1.25
12.4 - 18	1.35



Typical SWR of a 32-10

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 125°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

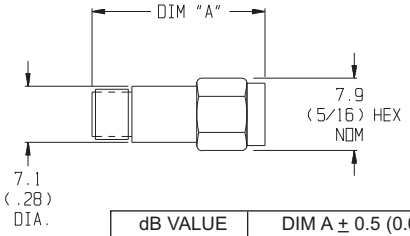
CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts. Each unit is sealed using low outgassing sealant.

WEIGHT:

dB VALUE	WEIGHT (Net)
0 - 12	3.9 g (0.14 oz)
12.5 - 20	4.3 g (0.15 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A ± 0.5 (0.02)
0-12	21.8 (0.86)
12.5-20	23.9 (0.94)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

Screening

Units are screened by lot as follows:

Thermal Shock: 10 cycles, -55 C to +125 °C, with a minimum of 1/2 hour dwell time at each temperature extreme. Attenuation is measured before and after thermal shock.

Peak Power: 500 Watts, 5 µsec pulse width; 0.05% duty cycle for 3 minutes at each end. DC Attenuation is measured before and after peak power.

Attenuation and SWR are tested as final electrical test. Test data is available at additional cost.

MODEL NUMBER DESCRIPTION:

Example:

32 - XX

Basic Model Number — Attenuation Value (dB)

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Revision Date: 2/10/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Models 32J dc to 32.0 GHz
High Reliability Fixed Coaxial Attenuator 2 Watts

Suitable for Space & Airborne Applications

RoHS

Features

- **Available in 0.5 dB increments from 0-30 dB.**
- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **100% Subjected to Thermal Shock & Peak Power Tests.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 32.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
0	+ 0.5 / -0.0
0.5 - 12	± 0.50
12.5 - 20	± 1.00
20.5 - 30	± 2.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 32	1.25

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 100°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

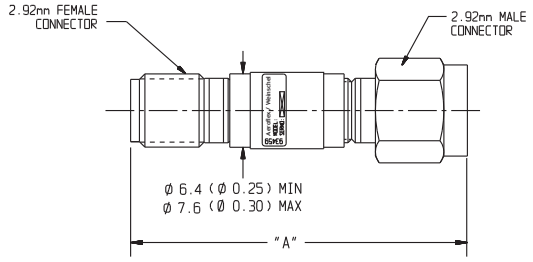
TEMPERATURE RANGE: -55°C to +100°C

CONNECTORS: 2.92mm connectors - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts. Each unit is sealed using low outgassing sealant.

WEIGHT: 13g (0.43 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A ± 0.5 (0.02)
0-12	28.6 (1.15)
12.5-20	31.2 (1.23)
20.5-30	33.8 (1.33)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

Screening

Units are screened by lot as follows:

Thermal Shock: 10 cycles, -55 C to +100 °C, with a minimum of 1/2 hour dwell time at each temperature extreme. Attenuation is measured before and after thermal shock.

Peak Power: 500 Watts, 5 µsec pulse width; 0.05% duty cycle for 3 minutes at each end. DC Attenuation is measured before and after peak power.

Attenuation and SWR are tested as final electrical test. Test data is available at additional cost.

MODEL NUMBER DESCRIPTION:

Example:

32J - XX

- 32J: Basic Model Number
- XX: Attenuation Value (dB)

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Revision Date: 11/13/09

AEROFLEX WEINSCHEL

Model 87
Fixed Coaxial Attenuator

dc to 32.0 GHz
2 Watts

Quality 2.92mm Connectors

Features

- **Available in 0.5 dB increments from 0-30 dB.**
- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **New Lower Cost Commerical Version.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 32.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB)
0	+ 0.5 / -0.0
0.5 - 12	± 0.50
12.5 - 20	± 1.00
20.5 - 30	± 2.00

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 32	1.25

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 100°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +100°C

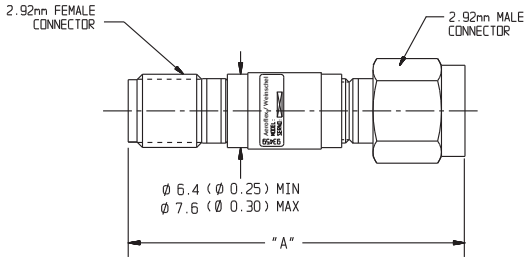
TESTING & CALIBRATION Attenuation and SWR are tested as final electrical test. Test data is available at additional cost.

CONNECTORS: 2.92mm connectors - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.

CONSTRUCTION: Passivated stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT: 8 g (0.28 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A ± 0.5 (0.02)
0-12	28.6 (1.15)
12.5-20	31.2 (1.23)
20.5-30	33.8 (1.33)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

87 - XX

Basic Model Number

Attenuation Value (dB)

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Revision Date: 1/28/09

Military-Qualified Attenuators

dc to 18.0 GHz 2 to 25 Watts

MIL-DTL-3933, CLASS III/IV, N/S

Features

- Screened and Non-screened models available.
- Choice of attenuation values from 0 to 40 dB.
- Frequency Ranges from dc to 18 GHz.
- Power capability from 2 to 25 watts.
- Test Data supplied per MIL-DTL-3933.
- Type N, SMA, & TNC Connectors.

MIL-DTL-3933 Basic Information...

Military Part Number	Description *	Outline Drawing/ Dimensions
M3933/10 (-2 through -21) Non-Screened (N), Screened (S)	dc to 18 GHz 25 Watts Average; 2 kW peak	Refer to Aeroflex / Weinschel Standard Model 46 (page 41)
M3933/14 (-01 through-14, -17 through -24) Non-Screened (N), Screened (S)	dc to 12.4 GHz 2 watts Average; 200 W peak	Refer to Aeroflex / Weinschel Standard Model 3M (page 21)
M3933/16 (-01 through -13, -16 through -51, -57, -58) Non-Screened (N), Screened (S)	dc to 18 GHz 2 watts Average; 500 W peak	Refer to Aeroflex / Weinschel Standard Model 4M (page 21).
M3933/17 (-01, -02) Non-Screened (N), Screened (S)	dc to 18 GHz 4 watts Average; 500 W peak	Refer to Aeroflex / Weinschel Standard Model 55 (page 30).
M3933/18 (-01 through -06, -09 through -18) Non-Screened (N), Screened (S)	dc to 12.4 GHz 5 watts Average; 1 kW peak	Refer to Aeroflex / Weinschel Standard Model 1 (page 31).
M3933/25 (-01 through -54, -58 through -92) Non-Screened (N), Screened (S)	dc to 18.0 GHz 2 watts Average; 500 W peak	Refer to Aeroflex / Weinschel Standard Model 3T/4T (page 22).

*For complete specifications and ordering information refer to Military Specification, MIL-DTL-3933.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 56
Fixed Coaxial Attenuator

dc to 26.5 GHz
2 Watts

3.5mm Connectors

RoHS

Features

- **Precision 3.5mm Connectors.**
- **Low SWR & Flat Response.**
- **Bulkhead ideal for instrument front panels.**

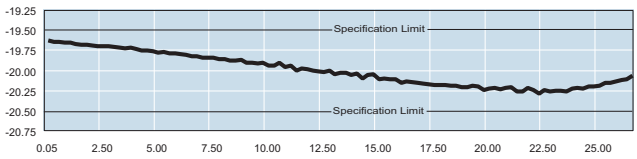
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

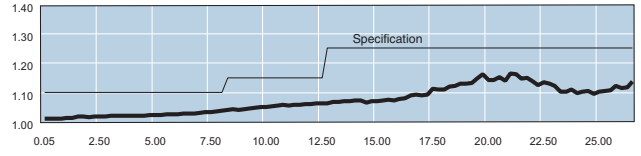
Nominal ATTN (dB)	DEVIATION (dB)
0	+ 0.50
3, 6, 10	± 0.60
20, 30	± 0.75



Typical Attenuation Accuracy of a 56-20

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8	1.10
8 - 12.4	1.15
12.4 - 26.5	1.25



Typical SWR of a 56-20

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts at 85°C. 500 watts **peak** (5 µsec pulse width; 0.2% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to +85 °C.

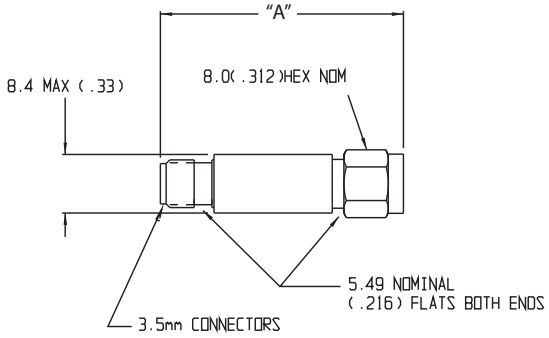
TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

CONNECTORS: 3.5mm connectors - contact pin recession (0 to -0.003 in).

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT: 10 g (0.28 oz) maximum

PHYSICAL DIMENSIONS:



Model	DIM A
56	32.5±0.5 (1.275±0.002)
F56	35.9±0.5 (1.415±0.002)
M56	29.0±0.5 (1.140±0.002)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

***56 - XX**

Basic Model Number — Attenuation Value (dB)

* Add Prefix M for double male and F for double female connectors.

ATTENUATOR SET (AS-20): Model 56 is also available in a Attenuator Set which includes five different attenuators (3, 6, 10, 20, 30 dB). Refer to Attenuator Sets data sheet for more information.

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Revision Date: 1/28/09

Model 54A
Fixed Coaxial Attenuator

dc to 40.0 GHz
2 Watts

Ruggedized 2.92mm Connectors

Features

- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Ruggedized 2.92mm Connectors.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) dc-26.5	26.5-40
3, 6	± 0.50	± 1.00
10, 20	± 1.00	± 1.00
30	± 2.00	± 2.00

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 26.5	1.25
26.5 - 40	1.45

POWER RATING: 2 watts **average** to 25 °C ambient temperature, derated linearly to 0.1 watt at 85 °C. 200 watts **peak** (5 µsec pulse width; 0.5 % duty cycle).

POWER COEFFICIENT: < 0.004 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to +100 °C

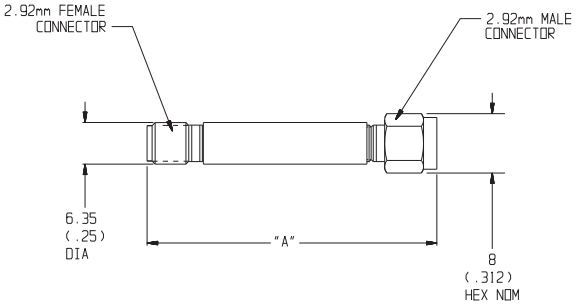
TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

CONNECTORS: 2.92mm connectors - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT: 13 g (0.46 oz.) maximum

PHYSICAL DIMENSIONS:



Model	DIM A
54A	39.9 (1.57)
F54A	37.9 (1.49)
M54A	42.0 (1.64)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

***54A - XX**

Basic Model Number

Attenuation Value (dB)

* Add Prefix M for double male and F for double female connectors.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 84A
Fixed Coaxial Attenuator

dc to 40.0 GHz
2 Watts

2.4mm Connectors

☑ RoHS

Features

- **Useable to 43 GHz.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Ruggedized 2.4mm Connectors.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) dc-18.0	18-26.5	26.5-40
3	± 0.60	± 0.70	± 1.10
6	± 0.60	± 0.70	± 1.00
10	± 0.60	± 0.80	± 1.00
20	± 0.70	± 1.00	± 1.00
30	± 1.00	± 1.40	± 1.40

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 26.5	1.35
26.5 - 40	1.50

POWER RATING: 2 watts **average** to 25 °C ambient temperature, derated linearly to 0.1 watt at 125 °C. 200 watts **peak** (5 µsec pulse width; 0.5 % duty cycle).

POWER COEFFICIENT: < 0.01 dB/dB/watts

TEMPERATURE COEFFICIENT: < 0.001 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

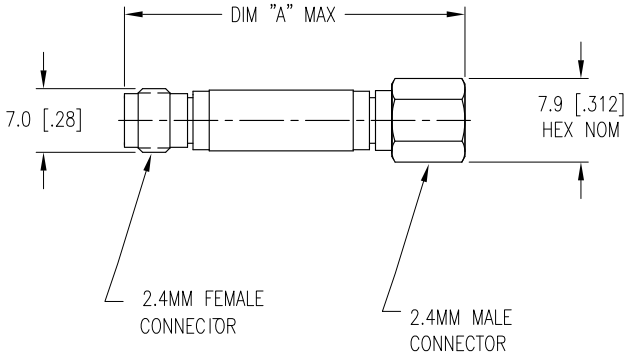
TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

CONNECTORS: 2.4mm connectors mate nondestructively with other 2.4mm connectors. Contact Pin Recession (0 to 0.003)

CONSTRUCTION: Stainless steel body; gold plated beryllium copper contacts and brass connectors.

WEIGHT: 13 g (0.46 oz.) maximum

PHYSICAL DIMENSIONS:



Model	DIM A
84A	38.10 (1.50)
F84A	34.00 (1.34)
M84A	42.20 (1.66)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

***84A - XX**

Basic Model Number

Attenuation Value (dB)

* Add Prefix M for double male and F for double female connectors.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 1W
General Purpose Attenuator

dc to 4.0 GHz
2 Watts

Low Cost, Type N

RoHS

Features

- **Attenuation Values from 1 to 10, 20 dB.**
- **Low Cost**
- **Wireless Applications -** Optimized for use in the wireless communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
1 -6	± 0.30
7 -10, 20	± 0.50

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 8.0	1.25

POWER RATING: 2 watts **average** to 25°C ambient temperature, derated linearly to 0.5 watts @ 105°C. 250 watts **peak** (5 µsec pulse width; 0.4% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

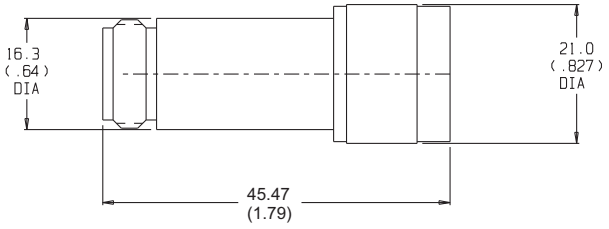
TEMPERATURE RANGE: -20°C to +105°C.

CONNECTORS: Type N (male/female) connectors - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Nickel-plated brass body and connectors, gold plated Beryllium contacts

WEIGHT: 65 g (2.5 oz) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1W - XX

Basic Model Number

Attenuation Value (dB)

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 55
Fixed Coaxial Attenuator

dc to 18.0 GHz
5 Watts

TNC Connectors

☑ RoHS

Features

- **Quality TNC Connectors** - This Attenuator incorporates an improved 18 GHz TNC connector design standardized through the IEC.
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB)
1 -6	± 0.40
7 -10, 20	± 0.50
30	± 0.90

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.15
4 - 8	1.20
8 - 12.4	1.25
12.4 - 18	1.35

POWER RATING: 5 watts **average** @ 25°C ambient temperature, derated linearly to 0.5 watt @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.0005% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/ °C

TEMPERATURE RANGE: -55°C to +125°C

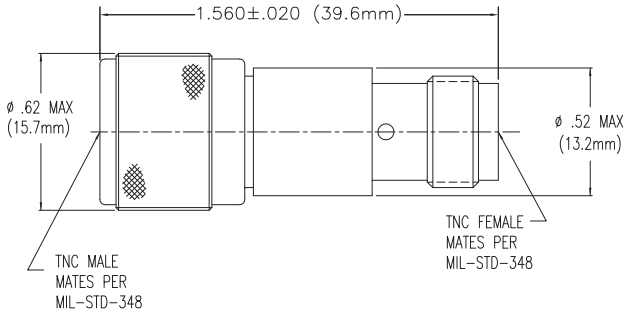
TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

CONNECTORS: TNC connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT: 28 g (1 oz) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

55 - XX

Basic Model Number

Attenuation Value (dB)

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Model 1
Model 2
Fixed Coaxial Attenuators

dc to 12.4 GHz
dc to 18.0 GHz
5 Watts

☑ RoHS

Type N Connectors

Features

- **Rugged injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

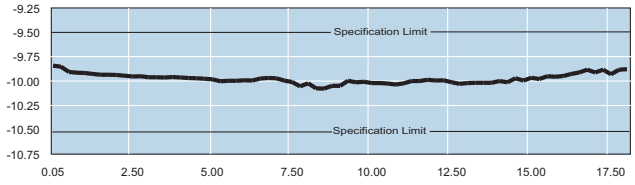
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 1: dc to 12.4 GHz
Model 2: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

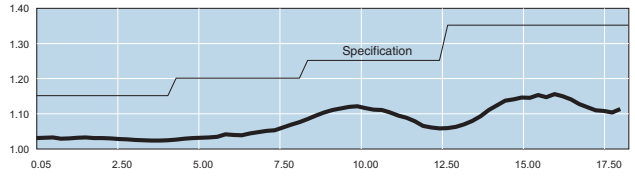
Nominal ATTN (dB)	1	2
1-9	± 0.30	± 0.30
10, 20	± 0.30	± 0.50
30, 40	± 0.75	± 1.00
50	± 0.75	± 1.25
60	± 1.00	± 1.50



Typical Attenuation Performance of Model 2-10

MAXIMUM SWR:

Frequency (GHz)	1	2
dc - 4	1.15	1.15
4 - 8	1.20	1.20
8 - 12.4	1.25	1.25
12.4 - 18	- - -	1.35



Typical SWR of Model 2-10

POWER RATING: 5 watts **average** to 25°C ambient temperature, derated linearly to 80% @ 45°C, 60% @ 65°C, 40% @ 85°C, 20% @ 105°C, 0 Watts @ 125°C. Note: dB values 1, 2 and 3 can handle 10 watts.1 kilowatt **peak** (5 µsec pulse width; 0.25% duty cycle).

POWER COEFFICIENT: <0.005 dB/dB/Watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

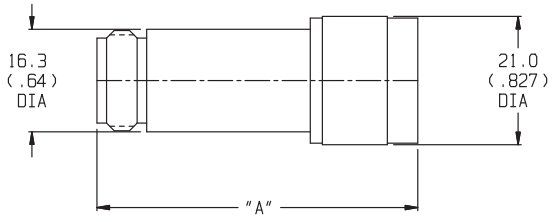
CONNECTORS: Precision Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts.

WEIGHT:

dB VALUE	WEIGHT (Net)
1 - 10, 20, 30	70 g (2.6 oz)
40, 50, 60	100 g (3.6 oz)

PHYSICAL DIMENSIONS:



dB VALUE	DIM A
1-10, 20, 30	57.9 (2.28)
40, 50, 60	68.1 (2.68)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

***1 - XX**

Basic Model Number — Attenuation Value (dB)

*Add Prefix M for double male or F for double female connectors.

ATTENUATOR SET (AS-6): Model 2 is also available in a Attenuator Set which includes four different attenuators (3, 6, 10, 20 dB). Refer to Attenuator Sets data sheet for more information.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 44 dc to 18.0 GHz
Lab Standard Fixed Coaxial Attenuator 5 Watts

Lab Standard N Connectors

Features

- **Precision Connectors**
- **Test data** - A certificate of test supplied with each attenuator.
- **Hex Nut Connector** - Allows for use of a torque wrench to improve connector repeatability.
- **Designed to meet environmental requirements of MIL-DTL-3933.**

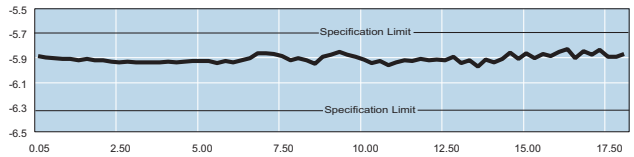
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

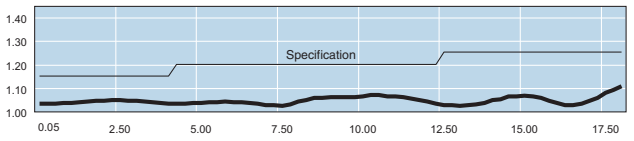
Nominal ATTN (dB)	Deviation (dB)
1 -9	± 0.30
10, 20	± 0.50
30, 40	± 1.00
50	± 1.25
60	± 1.50



Typical Attenuation Accuracy of a 44-6

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.15
4 - 12.4	1.20
12.4 - 18	1.25



Typical SWR of a 44-6

POWER RATING: 5 watts **average** to 25°C ambient temperature, derated linearly to 4 watts @ 45°C, 3 watts @ 65°C, and 2 watts @ 85 °C. 1 kilowatt **peak** (5 µsec pulse width; 0.25% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -50°C to +85°C

TEST DATA: Insertion loss and SWR data supplied at 0.05, 4, 8, 12 and 18 GHz. Other test data available at additional cost.

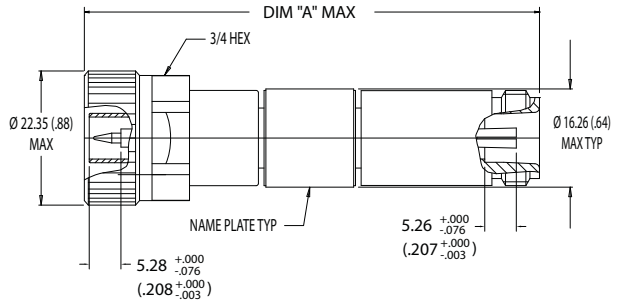
CONNECTORS: Precision Type N per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Coupling Torque: 14 ± 1 in/lbs.

CONSTRUCTION: Brass Body (plated) and Stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT:

dB VALUE	WEIGHT (Net)
1 - 10, 20, 30	100 g (3.5 oz)
40, 50, 60	140 g (4.5 oz)

PHYSICAL DIMENSIONS:



dB VALUE	Prefix M	DIM A STD	Prefix F
0-10, 20, 30	76.2 (3.0)	76.2 (3.0)	77.7 (3.06)
40, 50, 60	86.4 (3.4)	86.4 (3.4)	87.9 (3.46)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

***44 - XX**

Basic Model Number — Attenuation Value (dB)

*Add Prefix M for double male or F for double female connectors.

ATTENUATOR SET (AS-18): Model 44 is also available in a Attenuator Set which includes six different attenuators (1, 3, 6, 10, 20, 30 dB). Refer to Attenuator Sets data sheet for more information.

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Revision Date: 10/20/09

AEROFLEX WEINSCHEL

Model 69A
Medium Power Fixed Coaxial Attenuator

dc to 18.0 GHz
5 Watts

SMA Connectors, Bi-directional Design

RoHS

Features

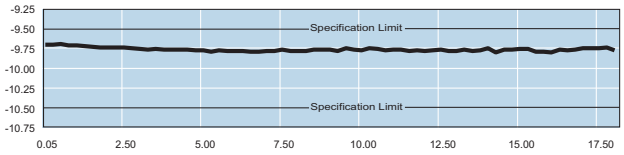
- **Compact Construction -** Lowest size/power ratio.
- **Precision Injection Molded Connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flat Response & Low SWR.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

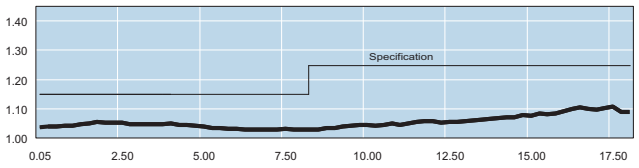
FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
1 - 6	± 0.30
7 -10, 20, 30	± 0.50



Typical Attenuation Accuracy of a 69A-10

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 8	1.15
8 - 18	1.25



Typical SWR of a 69A-10

POWER RATING (mounted horizontally): 5 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 0.5 Watt @ 125°C. 500 watts **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.003 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 100 °C

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

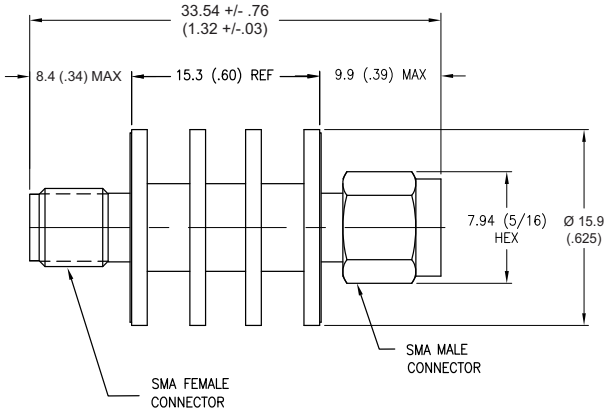
CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with SMK, 3.5mm, 2.92mm and SMA connectors per MIL-C-39012 .

Connector Options	Type/Description
1	SMA, Female
2	SMA, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: Net 10 g (0.35 oz) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

69A - XX - 12*

- 69A: Basic Model Number
- XX: Attenuation Value (dB)
- 12*: Connector Options
  - -11 Female/Female
  - -12 Male/Female
  - -22 Male/Male

*Unit is bi-directional and full power may be applied to either connector.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 75A dc to 40.0 GHz
Medium Power Fixed Coaxial Attenuator 5 Watts

Bi-directional Design

Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flat Response.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) dc-18 GHz	18-40 GHz
3	± 0.50	± 1.00
6, 10, 20, 30	± 0.80	± 1.50

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 18	1.25
18 - 40	1.45

POWER RATING (mounted horizontally): 5 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 0.5 Watt @ 125°C. 200 watts **peak** (5 µsec pulse width; 1.25% duty cycle).

POWER COEFFICIENT: <0.002 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA SUPPLIED: Sweep SWR/Attenuation data/ plots performed across 0.1-40 GHz frequency range.

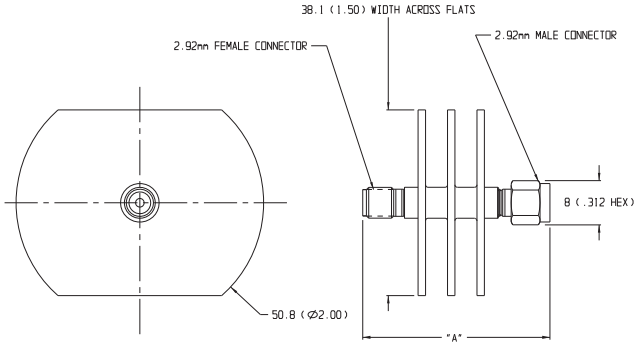
CONNECTORS: 2.92mm (Male/Female) connectors - mate nondestructively with SMA per MIL-C-39012, 3.5mm and other 2.92mm connectors.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 200 g (7.0 oz.) maximum

PHYSICAL DIMENSIONS:



Dash No.	Connector Type	DIM A
11	2.92mm Female/Female	39.9 (1.56)
12	2.92mm Male/Female	44.1 (1.74)
22	2.92mm Male/Male	48.8 (1.92)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

75A - XX - XX*

- 75A: Basic Model Number
- XX: Attenuation Value (dB)
- XX*: Connector Options
  - -11 Female/Female
  - -12 Female/Male
  - -22 Male\Male

*Unit is bi-directional and full power may be applied to either connector.

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Revision Date: 1/28/09

Model 41
Medium Power Fixed Coaxial Attenuator

dc to 18.0 GHz
10 Watts

Bi-directional Design

RoHS

Features

- **Compact Construction -** Lowest size/power ratio.
- **Quality Connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

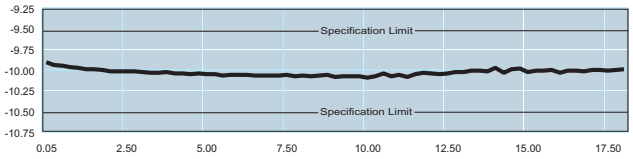
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

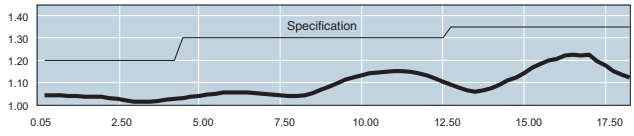
Nominal ATTN (dB)	Deviation (dB)
1, 2	± 0.50
3, 6	± 0.30
10	± 0.50
20	± 0.70
30	± 1.00



Typical Attenuation Accuracy

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8	1.20
8 - 12.4	1.30
12.4 - 18	1.35



Typical SWR of a 41-10

POWER RATING (mounted horizontally): 10 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 1 Watt @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.0015 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.0, and 18.0 GHz. Other test data can be provided at additional cost.

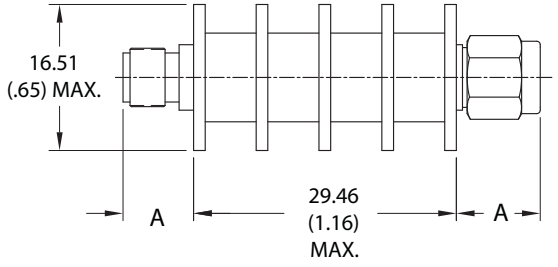
CONNECTORS: SMA (Male/Female) connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
1	SMA, Female
2	SMA, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 28 g (1 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
SMA Male	11.18 (0.44)
SMA Female	9.4 (0.37)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

41 - XX - XX*

- **41** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX*** — Connector Options
  - -11 Female/Female
  - -12 Female/Male
  - -22 Male\Male

* Unit is bi-directional and full power may be applied to either connector.

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Revision Date: 5/12/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 37 dc to 8.5 GHz
Medium Power Fixed Coaxial Attenuator 10 Watts

Bi-directional Design!

RoHS

Features

- **Optimized for Wireless OEM & Test Applications.**
- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:		
Nominal ATTN (dB)	Deviation (dB) dc-4 GHz	4 - 8.5 GHz
3, 6, 10, 20	± 0.30	± 0.50
30	± 0.50	± 0.80

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15
4 - 8.5	1.25

POWER RATING (mounted horizontally): 10 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 1 watts @ 125°C. Note: 3 dB model can handle 20 Watts **average (bi-directional)**. 1 kilowatt **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA: Insertion loss test data supplied at 0.05, 2.0, 4.0, 8.0 and 8.5 GHz. Other test data can be provided at additional cost.

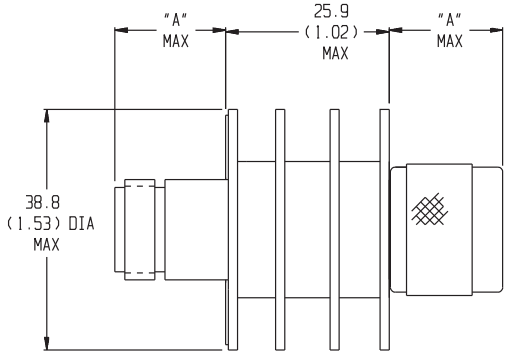
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 110 g (4 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	24.1 (0.95)
N Female	19.1 (0.75)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

37 - XX - XX*

- 37 — Basic Model Number
- XX — Attenuation Value (dB)
- XX* — Connector Options (1st digit is J1 side; 2nd digit is J2 side)

*Unit is bi-directional and full power may be applied to either J1 or J2.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 23
Medium Power Fixed Coaxial Attenuator

dc to 18.0 GHz
10 Watts

Bi-directional Design!

RoHS

Features

- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

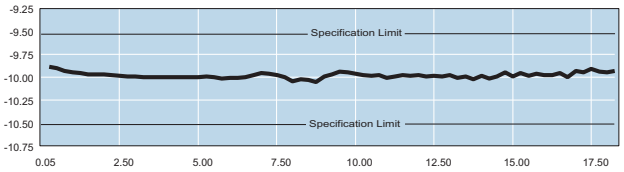
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

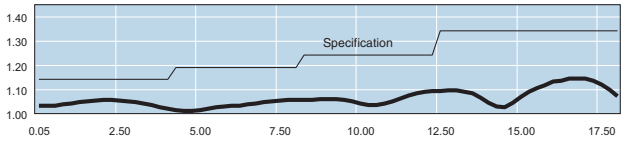
Nominal ATTN (dB)	Deviation (dB)
1, 2	± 0.50
3, 6	± 0.30
10, 20	± 0.50
30, 40	± 1.00
50	± 1.25
60	± 1.50



Typical Attenuation Accuracy of a 23-10-34

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.15
4 - 8	1.20
8 -12.4	1.25
12.4 - 18	1.35



Typical SWR of a 23-10-34

POWER RATING (mounted horizontally): 10 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 1 watts @ 125°C. Note: 1, 2, 3 dB models can handle 20 Watts **average (bi-directional)**. 1 kilowatt **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.0015 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.0, and 18.0 GHz. Other test data can be provided at additional cost.

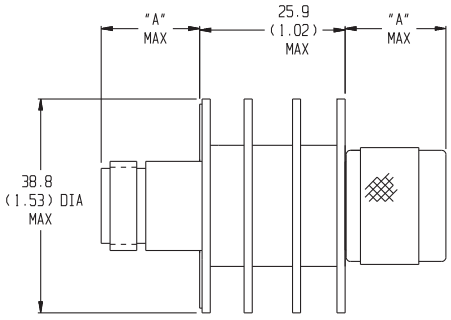
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 110 g (4 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	24.1 (0.95)
N Female	19.1 (0.75)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

23 - XX - 34*

- **23** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **34** — Connector Options -34 Male/Female only!

* Unit is bi-directional and full power may be applied to either J1 or J2.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 89 dc to 40.0 GHz
Medium Power Fixed Coaxial Attenuator 20 Watts

Higher Power Vs Frequency Design

Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flat Response.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) dc-18 GHz	18-40 GHz
10, 20, 30	± 1.5	+3.0/-0.0

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 18	1.25
18 - 40	1.40

POWER RATING (mounted horizontally): 20 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 2 Watts @ 125°C. 200 watts **peak** (5 µsec pulse width; 1.25% duty cycle). Maximun in power into output port is 5 Watts.

POWER COEFFICIENT: <0.002 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA SUPPLIED: Sweep SWR/Attenuation data/ plots performed across 0.1-40 GHz frequency range.

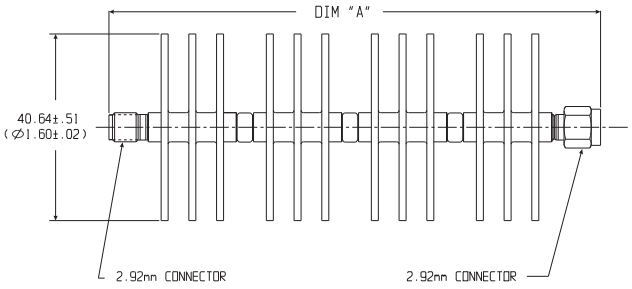
CONNECTORS: 2.92mm (Male/Female) connectors - mate nondestructively with SMA per MIL-C-39012, 3.5mm and other 2.92mm connectors.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 200 g (8.0 oz.) maximum

PHYSICAL DIMENSIONS:



Dash No.	Connector Type	DIM A
11	2.92mm Female/Female	106.2 (4.18)
12	2.92mm Female/Male	109.2 (4.30)
21	2.92mm Male/Female	109.2 (4.30)
22	2.92mm Male/Male	112.0 (4.40)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

89 - XX - XX

- 89 — Basic Model Number
- XX — Attenuation Value (dB)
- XX — Connector Options
  - -11 Female/Female
  - -12 Female/Male
  - -21 Male/Female
  - -22 Male/Male

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 34
Medium Power Fixed Coaxial Attenuator

dc to 4.0 GHz
25 Watts

Bi-directional Design

RoHS

Features

- **Optimized for Wireless OEM & Test Applications.**
- **Precision Connectors with high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:		
Nominal ATTN (dB)	Deviation (dB) dc-2 GHz	2 - 4 GHz
3, 6, 10, 20, 30	± 0.60	± 1.00

MAXIMUM SWR*:	
Frequency (GHz)	SWR
dc - 2	1.10
2 - 4	1.20

POWER RATING (mounted horizontally): 25 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. Note: 3 dB model can handle 50 Watts **average (bi-directional)**. 5 kilowatt **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.0006 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA: Insertion loss test data supplied at 0.05, and 4.0 GHz. Other test data can be provided at additional cost.

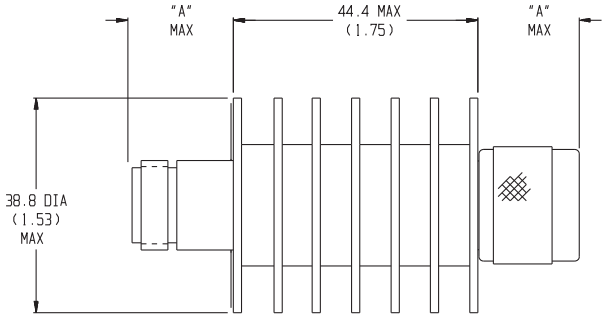
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 170 g (6 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

34 - XX - XX*

- **34** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX*** — Connector Options
  - 1st digit is J1 side
  - 2nd digit is J2 side

*Unit is bi-directional and full power may be applied to either J1 or J2.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 33 — dc to 8.5 GHz
Medium Power Fixed Coaxial Attenuator — 25 Watts

Bi-directional Design!

RoHS

Features

- **Quality Connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Low Intermodulation option available.**
- **Mode free operation to 10 GHz.**

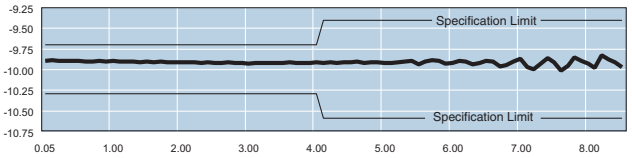
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

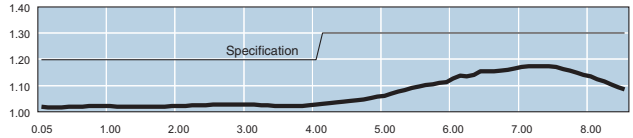
Nominal ATTN (dB)	dc-4 GHz 33	dc-4 GHz 33-LIM	4 - 8.5 GHz 33	4 - 8.5 GHz 33-LIM
3, 6	± 0.30	- - -	± 0.60	- - -
10, 20	± 0.30	± 0.40	± 0.60	± 0.70
30	± 0.60	± 0.70	± 1.00	± 1.20



Typical Attenuation Accuracy of a 33-10-34

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.20
4 - 8.5	1.30



Typical SWR of a 33-10-34

3rd ORDER INTERMODULATION (33-XX-XX-LIM Only): Reflected Levels (IM3), -100 dBc and Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +41 dBm each. IM specification at J2 limited to 10 Watts of input power.

POWER RATING (mounted horizontally): 25 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. Note: 3 dB model can handle 50 Watts **average (bi-directional)**. 5 kilowatt **peak** (5 µsec pulse width; 0.25% duty cycle).

POWER COEFFICIENT: <0.0006 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, and 8.5 GHz. Other test data can be provided at additional cost.

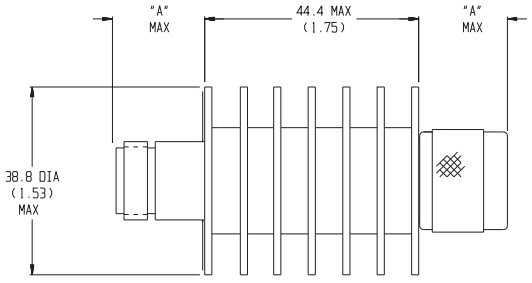
CONNECTORS: Type N & 2.92mm connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Options	Description	Options	Description
1	2.92mm Female	3	Type N, Female
2	2.92mm Male	4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 170 g (6 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A	Connector	DIM A
N Male	22.9 (0.90)	2.92mm Female	
N Female	15.0 (0.59)	2.92mm Male	14.0 (0.55)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

33 - XX - XX* - LIM (IM Option**)

- 33 — Basic Model Number
- XX — Attenuation Value (dB)
- XX* — Connector Options: 1st digit is J1 side; 2nd digit is J2 side
- LIM — IM Option**

*Unit is bi-directional & full power may be applied to either J1 or J2.
**Add -LIM to entire model number for Low Intermodulation option. Available in only 10, 20, 30 dB and is not available through Express.

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Revision Date: 1/28/09

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AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Model 46
Medium Power Fixed Coaxial Attenuator

dc to 18.0 GHz
25 Watts

Bi-directional Design!

RoHS

Features

- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Rugged injection molded connector dielectric.**
- **Low Intermodulation option available.**

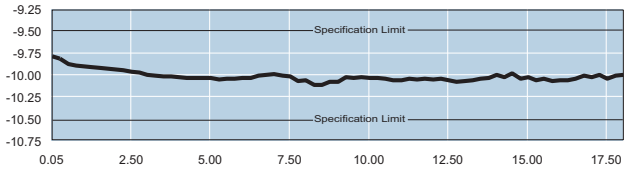
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

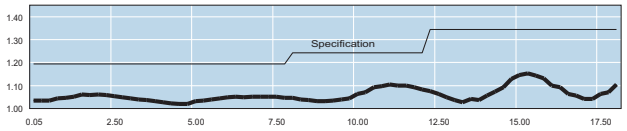
Nominal ATTN (dB)	46	46 LIM dc - 8 GHz	46 LIM 8- 18 GHz
3, 6	± 0.50	- - -	- - -
10	± 0.50	± 1.00	+2.0/-1.0
20	± 0.75	± 1.00	+2.0/-1.0
30, 40	± 1.00	± 1.00	+2.0/-1.0



Typical Attenuation Accuracy of a 46-10-34

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8	1.20
8 -12.4	1.25
12.4 - 18	1.35



Typical SWR of a 46-10-34

3rd ORDER INTERMODULATION (46-XX-XX-LIM ONLY): Reflected Levels (IM3), -90 dBc and Through Levels (IM3), -100 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +41 dBm each. Option only available 10, 20, 30, 40 dB.

POWER RATING (mounted horizontally): 25 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. Note: 3 dB model can handle 50 Watts **average (bi-directional)**. 1 kilowatt **peak** (5 µsec pulse width; 1.25% duty cycle).

POWER COEFFICIENT: <0.0006 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.0, and 18.0 GHz. Other test data can be provided at additional cost.

CONNECTORS: CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

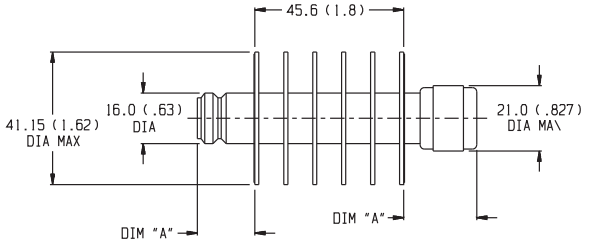
3.5mm Connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connectors.

Options	Description	Options	Description
1	3.5mm Female	3	Type N Female
2	3.5mm Male	4	Type N Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connectors with gold plated beryllium copper contacts.

WEIGHT: 110 g (4 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A	Connector	DIM A
N Male	24.1 (0.95)	3.5mm Female	14.0 (0.55)
N Female	19.0 (0.75)	3.5mm Male	13.2 (0.52)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

46 - XX - XX* - LIM

- 46: Basic Model Number
- XX: Attenuation Value (dB)
- XX*: Connector Options (1st digit is J1 side; 2nd digit is J2 side)
- LIM: IM Option**

* Unit is bi-directional & full power may be applied to either J1 or J2.

** Add -LIM for Low Intermodulation option. Option only available in 10, 20, 30 and 40 dB and is not available through Express.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 74 dc to 26.5 GHz
Medium Power Fixed Coaxial Attenuator 25 Watts

3.5mm Connectors

Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Low SWR Design.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
3	± 0.70
6, 10	± 1.00
20, 30	± 1.50

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 18	1.30
18 - 26.5	1.35

POWER RATING: 25 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 2.5 Watt @ 125°C. 500 watts **peak** (5 µsec pulse width; 2.5% duty cycle). Maximum power rating into output is 10% of the average power rating.

POWER COEFFICIENT: <0.0015 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA SUPPLIED: Sweep SWR/Attenuation data/ plots performed across 0.1-26.5 GHz frequency range.

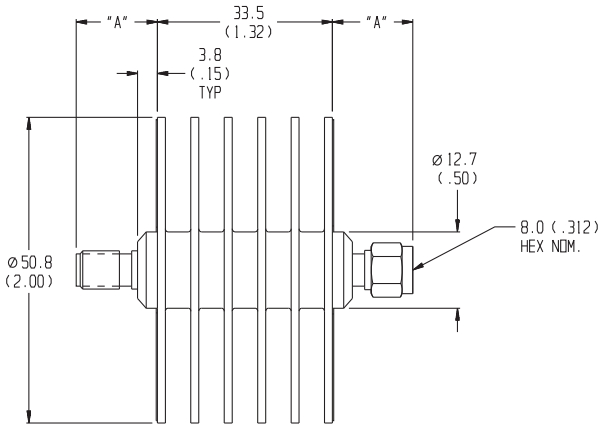
CONNECTORS: 3.5mm (Male/Female) connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connectors.

Connector Options	Type/Description
1	3.5mm, Female
2	3.5mm, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 100 g (3.5 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
3.5mm Male	16.0 (0.63)
3.5mm Female	15.0 (0.59)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

74 - XX - XX

- **74** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options
  1st digit is input side
  2nd digit is output side

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Model 72
Medium Power Fixed Coaxial Attenuator

dc to 4.0 GHz
50 Watts

RoHS

Conduction Cooled

Features

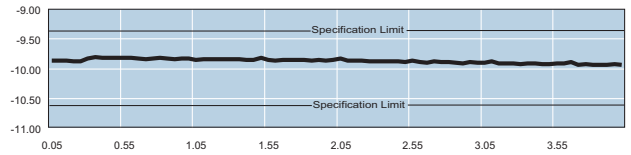
- **Compact Construction -** Lowest size/power ratio.
- **Precision Connectors with high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Wireless Applications** - Optimized for use in the communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

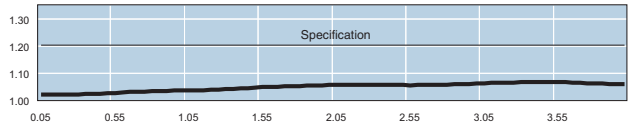
FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
3, 6, 10, 20, 30, 40	± 0.70



Typical Attenuation Accuracy of a 72-10-34

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.20



Typical SWR of a 72-10-34

POWER RATING 50 watts **average (unidirectional)**, 5 kilowatts **peak** (5 µsec pulse width; 0.5 % duty cycle) with case temperature held within **100°C maximum** with appropriate conductive heat sink. Maximum power rating into output port is 10% of the average power rating.

POWER COEFFICIENT: <0.0005 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C (case)

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

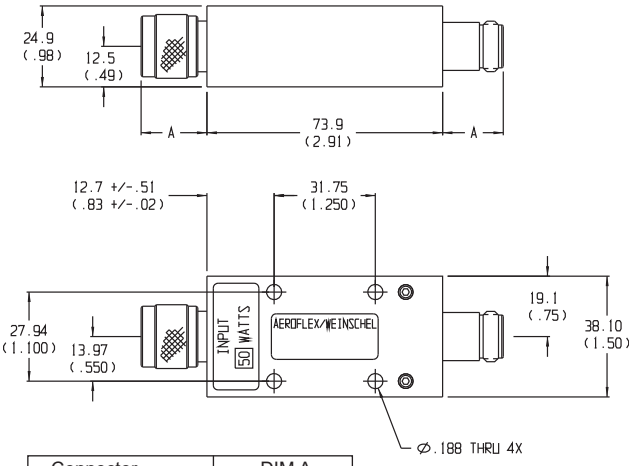
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. 2.92mm connectors mate with SMA, 3.5mm, Type K and other 2.92mm connectors.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 170 g (6 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)
2.92mm, Male	14.0 (0.55)
2.92mm, Female	12.7 (0.50)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

72 - XX - XX

- 72 — Basic Model Number
- XX — Attenuation Value (dB)
- XX — Connector Options: 1st digit is input side; 2nd digit is output side

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 24 dc to 8.5 GHz
Medium Power Fixed Coaxial Attenuator 50 Watts

RoHS

Bi-Directional Design!

Features

- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Low Intermodulation option available.**
- **Mode free operation to 10 GHz.**

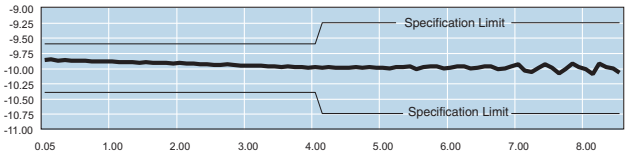
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

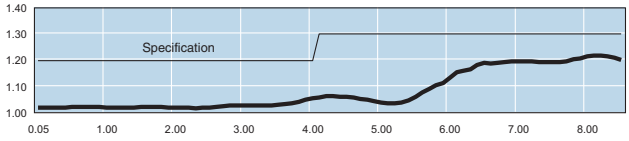
Nominal ATTN (dB)	dc-4 GHz 24	dc-4 GHz 24-LIM	4 - 8.5 GHz 24	4 - 8.5 GHz 24-LIM
3, 6	± 0.40	- - -	± 0.75	- - -
10, 20	± 0.40	± 0.50	± 0.75	± 1.00
30, 40	± 0.60	± 0.70	± 1.00	± 1.25



Typical Attenuation Accuracy of a 24-10-34

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.20
4 - 8.5	1.30



Typical SWR of a 24-10-34

3rd ORDER INTERMODULATION (24-XX-XX-LIM only!): Reflected Levels (IM3), -100 & Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each. Option only available 10, 20, 30, 40 dB. IM specification at J2 limited to 20 Watts of input power.

POWER RATING (mounted horizontally): 50 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. Note: 3 dB model can handle 100 Watts **average (bi-directional)**. 5 kilowatt **peak** (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: <0.0003 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, and 8.5 GHz. Other test data can be provided at additional cost.

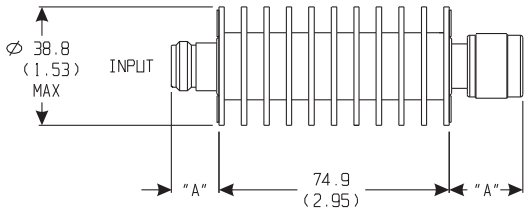
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. 2.92mm connectors - mate nondestructively with SMA per MIL-C-39012, 3.5mm, SMK, and other 2.92mm. Female 2.92mm connector NOT RoHS compliant.

Options	Description	Options	Description
1	2.92mm, Female	3	Type N, Female
2	2.92mm, Male	4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 280 g (10 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A	Connector	DIM A
N Male	22.9 (0.90)	2.92mm Male	14.0 (0.55)
N Female	15.0 (0.59)	2.92mm Female	12.7 (0.50)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

24 - XX - XX* - LIM

- 24: Basic Model Number
- XX: Attenuation Value (dB)
- XX*: Connector Options (1st digit is J1 side; 2nd digit is J2 side)
- LIM: IM Option**

*Unit is bi-directional & full power may be applied to either J1 or J2.
**Add -LIM to entire model number for Low Intermodulation option. Option only available in 10, 20, 30, 40 dB and is not available through Express.

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Revision Date: 1/28/09

Model 90
Medium Power Fixed Coaxial Attenuator

dc to 18.0 GHz
50 Watts

Bi-directional Design!

RoHS

Features

- **Precision injection molded connector dielectric.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flat Response.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
3, 6	± 0.50
10, 20	± 0.75
30	± 1.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 8	1.15
8 - 12.4	1.20
12.4 - 18	1.30

POWER RATING (mounted horizontally): 50 watts **average (bi-directional)** to 25°C ambient temperature, derated linearly to 10 Watts @ 125°C. 1 kW **peak** (5 µsec pulse width; 2.5% duty cycle).

POWER COEFFICIENT: <0.0006 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55 °C to 125 °C

TEST DATA SUPPLIED: Sweep SWR/Attenuation data/ plots performed across 50 MHz to 18 GHz frequency range. Frequency Markers 0.05, 2.0, 4.0 8.0, 12.4, 18 GHz.

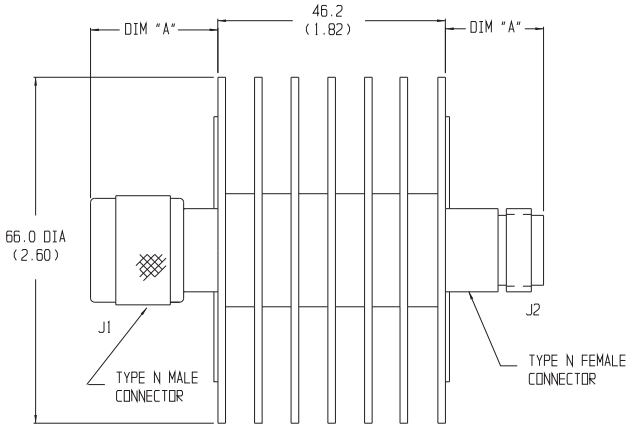
CONNECTORS: Type N (Male/Female) connectors - mate nondestructively with other N connectors per MIL-C-39012.

Connector Options	Type/Description
3	N, Female
4	N, Male

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 120 g (4.2 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	24.1 (0.95)
N Female	19.0 (0.75)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

90 - XX - XX

- 90 — Basic Model Number
- XX — Attenuation Value (dB)
- XX — Connector Options
  - -33 Female/Female
  - -34 Female/Male
  - -44 Male/Male

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 47 — dc to 18.0 GHz
Medium Power Fixed Coaxial Attenuator — 50 Watts

Type N Connectors

RoHS

Features

- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Low Intermodulation option available.**
- **Rugged injection molded connector dielectric.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	47	47 LIM dc-8 GHz	47 LIM 8-18 GHz
3, 6	± 0.75	- - -	- - -
10, 20	± 0.75	± 0.75	+2.0/-0.5
30, 40	± 1.00	± 0.75	+2.0/-0.5

MAXIMUM SWR:

Frequency (GHz)	3, 6 dB	10, 20, 30, 40 dB
dc - 8	1.25	1.20
8 -12.4	1.35	1.25
12.4 - 18	1.45	1.35

3rd ORDER INTERMODULATION (47-XX-XX-LIM ONLY: Reflected Levels (IM3), -90 & Through Levels (IM3), -100 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each. Option only available 10, 20, 30, 40 dB.

POWER RATING (mounted horizontally): 50 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 5 watts @ 125°C. Note: 3 dB model can handle 100 Watts **average (unidirectional)**. 1 kilowatt **peak** (5 µsec pulse width; 2.5% duty cycle). Maximum power rating into output port is 10 Watts average.

POWER COEFFICIENT: <0.0003 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.0, and 18.0 GHz. Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

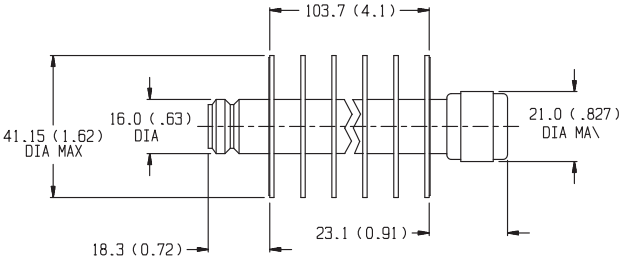
3.5mm Connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connectors.

Options	Description	Options	Description
1	3.5mm Female	3	Type N Female
2	3.5mm Male	4	Type N Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connectors with gold plated beryllium copper contacts.

WEIGHT: 175 g (6 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A	Connector	DIM A
N Male	24.1 (0.95)	3.5mm Female	14.0 (0.55)
N Female	19.0 (0.75)	3.5mm Male	13.2 (0.52)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

47 - XX - XX - LIM

- 47: Basic Model Number
- XX: Attenuation Value (dB)
- XX: Connector Options (1st digit is input side; 2nd digit is output side)
- LIM: IM Option*

* Add -LIM for Low Intermodulation option. Option only available in 10, 20, 30 and 40 dB and is not available through Express.

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Revision Date: 1/28/09

Model 86
Medium Power Fixed Coaxial Attenuator

dc to 22.0 GHz
50 Watts

Conduction Cooled, 3.5mm Connectors

RoHS

Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision Connectors with high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Ideal for Airborne or Space Applications.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 22.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
3, 6, 10, 20, 30	± 0.80

MAXIMUM SWR: 1.30

POWER RATING 50 watts **average (bi-directional)**, 1 kilowatts **peak** (5 µsec pulse width; 0.5 % duty cycle) with case temperature held within **90°C maximum** with appropriate conductive heat sink.

POWER COEFFICIENT: <0.0006 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 90°C (case)

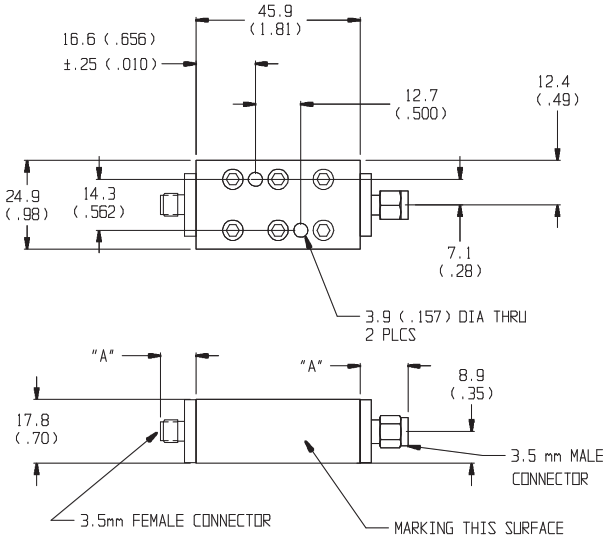
CONNECTORS: 3.5mm connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connectors.

Options	Description
1	3.5mm Female
2	3.5mm Male

CONSTRUCTION: Aluminum body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 60 g (2.1 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
3.5mm Male	13.4±0.5 (0.53±0.02)
3.5mm Female	9.9±0.5 (0.32±0.02)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

86 - XX - XX

- **86** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options
  1st digit is input side
  2nd digit is output side

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 59
High Power Fixed Coaxial Attenuator

dc to 2.5 GHz
100 Watts

Conduction Cooled

RoHS

Features

- **Precision Connectors with high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **10 Kilowatts peak, Conductive Cooled**
- **Wireless Applications** - Optimized for use in the communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 2.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:		
Nominal ATTN (dB)	Deviation (dB) dc-1 GHz	1-2.5 GHz
3, 6, 10, 20, 30, 40	± 0.70	± 1.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 2.5	1.15

POWER RATING 100 watts **average (unidirectional)**, 10 kilowatts **peak** (5 µsec pulse width; 0.4 % duty cycle) with case temperature held within **100 °C maximum** with appropriate conductive heat sink. Note: 3 dB model can handle 200 Watts **average (unidirectional)**. Maximum power rating into output port is 10 % of the average power rating.

POWER COEFFICIENT: <0.0004 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0003 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C (case temp)

TEST DATA: Insertion loss test data supplied at 0.05, 0.5, 1.0, 1.5, 2.0 and 2.5 GHz. Other test data can be provided at additional cost.

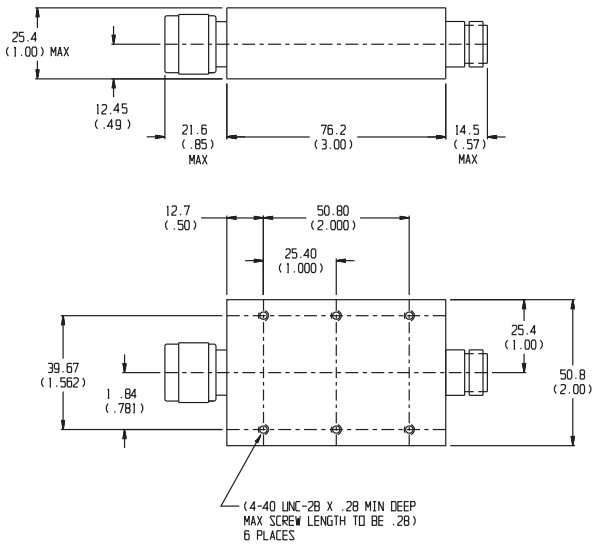
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 150 g (5.2 oz.) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and tolerances are .X±0.5 (0.02) & .XX+0.25 (0.01), unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering

MODEL NUMBER DESCRIPTION:

Example:

59 - XX - XX

- **59** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options: 1st digit is input side; 2nd digit is output side

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 68
High Power Fixed Coaxial Attenuator

dc to 4.0 GHz
100 Watts

Convection Cooled

RoHS

Features

- **Precision Connectors with high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **10 Kilowatts peak, Convection Cooled**
- **Wireless Applications** - Optimized for use in the communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
1, 2	± 1.20
3, 6, 10, 20, 30	± 1.25
40	± 2.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.20

POWER RATING (mounted horizontally): 100 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 10 watts @ 125°C. Note: 3 dB model can handle 200 Watts **average (unidirectional)**. 10 kilowatts **peak** (5 µsec pulse width; 0.5% duty cycle). Maximum power rating into output port is 10% of the average power rating.

POWER COEFFICIENT: <0.00025 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C

TEST DATA: Insertion Loss and SWR Testing performed across frequency range. Test data available at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 500 g (18 oz.) maximum

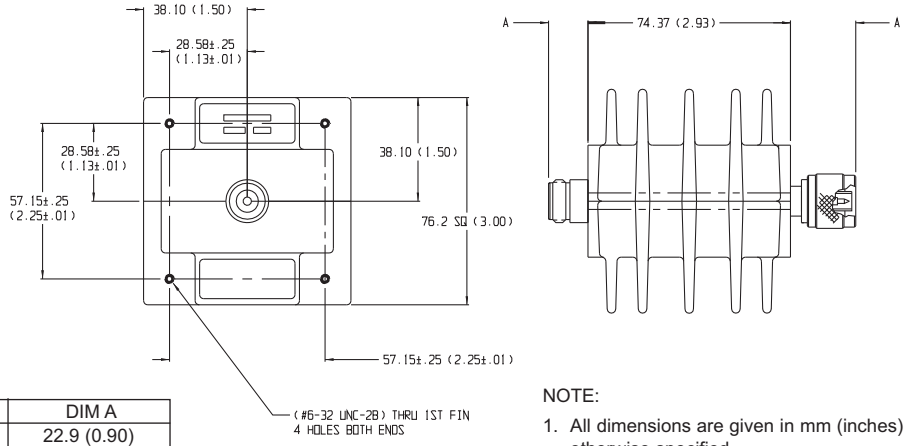
MODEL NUMBER DESCRIPTION:

Example:

68 - XX - XX

- **68** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options (1st digit is input side, 2nd digit is output side)

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 10/20/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 48
High Power Fixed Coaxial Attenuator

dc to 18.0 GHz
100 Watts

RoHS

Type N or 3.5mm Connectors

Features

- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Low Intermodulation option available.**
- **Rugged injection molded connectors.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

Nominal ATTN (dB)	48	48 LIM	
		dc-8 GHz	8-18 GHz
6	± 2.00	- - -	- - -
10	± 1.25	± 1.00	+3.0/-0.0
20	± 0.75	± 1.00	+3.0/-0.0
30, 40	± 1.00	± 1.00	+3.0/-0.0

MAXIMUM SWR:

Frequency (GHz)	48			48 LIM
	6 dB	10 dB	20, 30, 40 dB	
dc - 8	1.30	1.40	1.25	1.40
8 -12.4	1:45	1.40	1.35	1.45
12.4 - 18	1.60	1.55	1.45	1.45

POWER RATING (mounted horizontally): 100 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 10 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 5% duty cycle). Maximum power rating into output port is 10 Watts average.

3rd ORDER INTERMODULATION (48-XX-XX-LIM only): Reflected Levels (IM3), -90 dBc & Through Levels (IM3), -100 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each.

POWER COEFFICIENT: <0.00015 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.4, and 18.0 GHz. Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

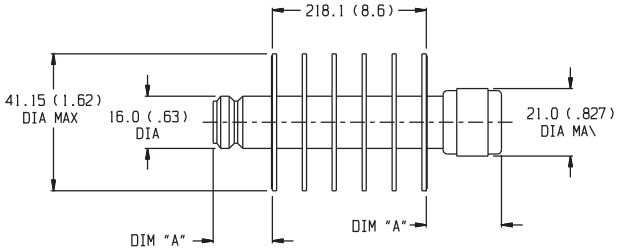
3.5mm (Male/Female) connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connectors.

Connector Options	Type/Description
1	3.5mm, Female
2	3.5mm, Male
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connectors, gold plated beryllium copper contacts.

WEIGHT: 320 g (11 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
3.5mm Female	13.2 (0.52)
3.5mm Male	14.0 (0.55)
N Male	24.1 (0.95)
N Female	19.0 (0.75)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

48 - XX - XX - LIM

- 48: Basic Model Number
- XX: Attenuation Value (dB)
- XX: Connector Options (1st digit is input side; 2nd digit is output side)
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option. Option is not available through Express.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 73
High Power Fixed Coaxial Attenuator

dc to 8.5 GHz
100 Watts

☑ RoHS

Type N Connectors

Features

- **Compact Construction** - Lowest size/power ratio.
- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) dc-4 GHz	4 - 8.5 GHz
3, 6, 10, 20, 30	± 0.75	± 0.75
40	± 0.50	± 1.00

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.25
4 - 8.5	1.35

POWER RATING (mounted horizontally with fins vertical): 100 watts **average (unidirectional)** to 35°C ambient temperature, derated linearly to 10 watts @ 125°C. Note: 3 dB model can handle 200 Watts **average (unidirectional)**. 5 kilowatt **peak** (5 µsec pulse width; 1.0% duty cycle). Maximum power rating into output port is 20 watts average.

POWER COEFFICIENT: <0.0003 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, and 8.5 GHz. Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 1130 g (2 lbs, 8 oz.) maximum

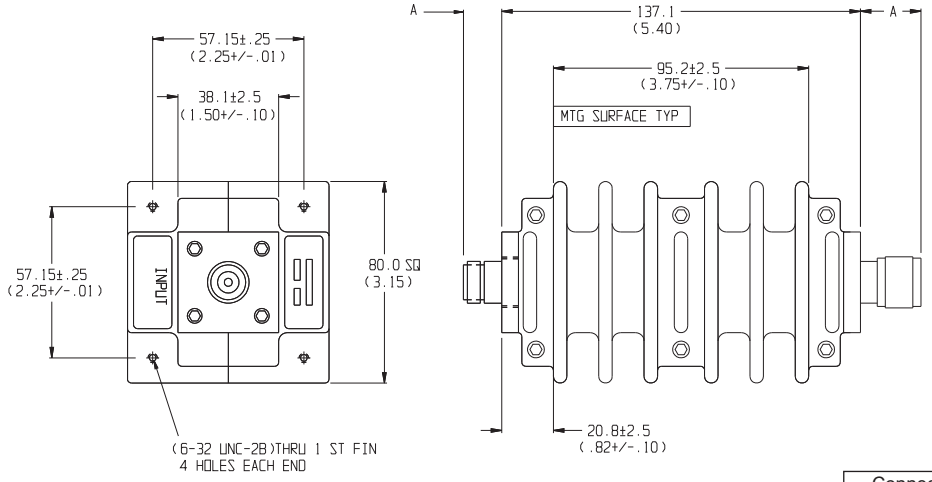
MODEL NUMBER DESCRIPTION:

Example:

73 - XX - XX

- 73 - Basic Model Number
- XX - Attenuation Value (dB)
- XX - Connector Options (1st digit is input side, 2nd digit is output side)

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 40 dc to 1.5 GHz
Model 57 dc to 5.0 GHz
High Power Fixed Coaxial Attenuator 150 Watts

Type N Connectors

RoHS

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 40: dc to 1.5 GHz
Model 57: dc to 5.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) 40	57	57-LIM
3*	± 0.50	± 1.25	- - -
6, 10	± 0.50	± 1.25	± 1.75
20, 30	± 0.50	± 1.50	± 2.00
40	± 0.50	± 2.00	± 2.00

MAXIMUM SWR:

Frequency (GHz)	Input	Output
dc - 2 (1.5*)	1.10	1.20 (1.10*)
2 - 5	1.15	1.20

* Model 40 only!

3rd ORDER INTERMODULATION (57-XX-XX-LIM ONLY): Reflected Levels (IM3), -100 & Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each. Option only available 6, 10, 20, 30, 40 dB.

POWER RATING (mounted horizontally with fins vertical): 150 watts **average (unidirectional)** to 55°C ambient temperature, derated linearly to 10% @ 125°C. Note: 3 dB model can handle 300 Watts **average (unidirectional)**. 10 kilowatt **peak** (5 µsec pulse width; 0.75% duty cycle). Maximum power rating into output port is 20 watts average.

POWER COEFFICIENT: <0.0001 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 1, 2, 3, 4, and 5 GHz (Model 40 at 0.05 and 1.5 GHz). Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium female copper contacts and stainless steel male contacts.

WEIGHT: 1,130 g (2 lbs, 8 oz.) maximum

MODEL NUMBER DESCRIPTION:

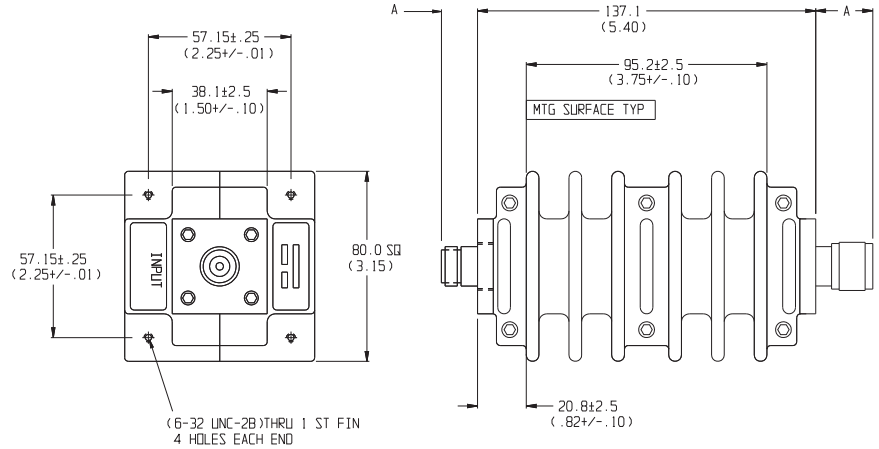
Example:

57 - XX - XX - LIM

- 57: Basic Model Number
- XX: Attenuation Value (dB)
- XX: Connector Options (1st digit is input side; 2nd digit is output side)
- LIM: IM Option*

* Add -LIM for Low Intermodulation option. Option only available with Model 57 in 6, 10, 20, 30, 40 dB and is not available through Express.

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Model 65
High Power Fixed Coaxial Attenuator

dc to 2.5 GHz
150 Watts

Conduction/Convection Cooled

Features

- **Compact Construction -** Lowest size/power ratio.
- **Flexible Mounting Position -** The units may be mounted in horizontal (fins up) or vertical position.
- **Rugged Construction -** Quality connectors with special high temperature support beads.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 2.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
3, 6, 10, 20, 30	± 1.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 2.5	1.20

POWER RATING 150 watts **average (unidirectional)**, 10 kilowatts **peak** (5 µsec pulse width; 0.5 % duty cycle) with case temperature held within **100 °C maximum** with appropriate convection cooling and/or conductive heat sink. Maximum power rating into output port is 20 watts average.

POWER COEFFICIENT: <0.0003 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C (case temp.)

TEST DATA: Insertion loss test data supplied at 0.05, 0.5, 1.0, 1.5, 2.0 and 2.5 GHz.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 850 g (1 lbs., 14 oz.) maximum

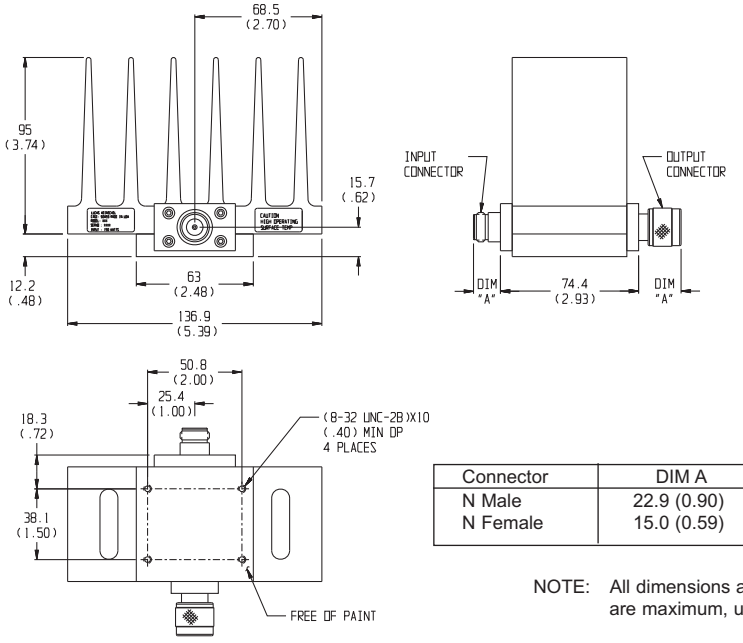
MODEL NUMBER DESCRIPTION:

Example:

65 - XX - XX

- **65** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options (1st digit is input side, 2nd digit is output side)

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 49
High Power Fixed Coaxial Attenuator

dc to 8.5 GHz
150 Watts

☑ RoHS

Conduction/Convection Cooled

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flexible Mounting Position -** The units may be mounted in horizontal (fins up) or vertical position.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

Nominal ATTN (dB)	dc-4 GHz 49	dc-4 GHz 49-LIM	4 - 8.5 GHz 49	4 - 8.5 GHz 49-LIM
3, 6	± 0.40	- - -	± 0.75	- - -
10, 20	± 0.40	± 0.70	± 0.75	± 1.25
30	± 0.40	± 0.70	± 0.75	± 1.75
40	± 0.50	± 0.70	± 1.00	± 1.75

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.25
4 - 8.5	1.35

3rd ORDER INTERMODULATION (49-XX-XX-LIM ONLY): Reflected Levels (IM3), -95 & Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each.

POWER RATING (mounted horizontally or vertically): 150 watts **average (unidirectional)** to 35°C ambient temperature, derated linearly to 15 watts @ 125°C. 5 kilowatt **peak** (5 µsec pulse width; 1.5% duty cycle). Maximum power rating into output port is 25 watts average.

POWER COEFFICIENT: <0.0001 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, and 8.5 GHz. Other test data can be provided at additional cost.

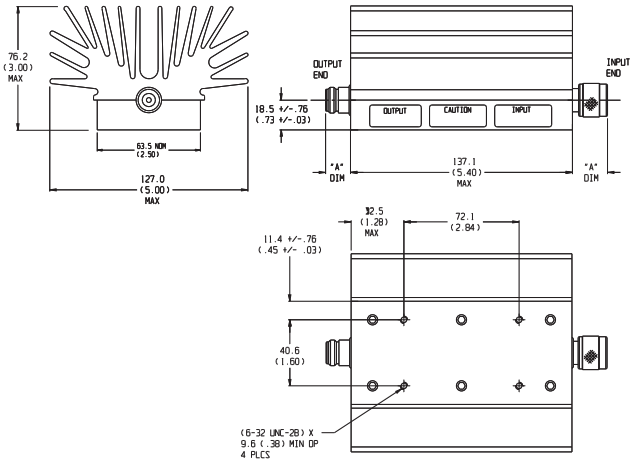
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper female contacts or stainless steel male contacts. (-LIM option uses different connector and contact materials)

WEIGHT: 1,450 g (3 lbs, 3 oz.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

49 - XX - XX - LIM

IM Option*

- 49: Basic Model Number
- XX: Attenuation Value (dB)
- XX: Connector Options (1st digit is input side; 2nd digit is output side)

*Add -LIM for Low Intermodulation option. Option only available in 10, 20, 30, and 40 dB and is not available through Express.

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Revision Date: 1/28/09

Model 66
High Power Fixed Coaxial Attenuator

dc to 18.0 GHz
150 Watts

Convection Cooled

RoHS

Features

- **Quality injection molded connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Broadband performance, ideal for test applications.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:	
Nominal ATTN (dB)	Deviation (dB)
10	± 2.00
20, 30, 40	± 1.50

MAXIMUM SWR:		
Frequency (GHz)	10	20, 30, 40 dB
dc - 18	1.90	1.60

POWER RATING (mounted horizontally): 150 watts **average (unidirectional)** @ case temperature of -55°C to **+100 °C maximum.** 1 kilowatt **peak** (5 µsec pulse width; 7.5% duty cycle). Maximum power rating into output port is 10 watts average.

POWER COEFFICIENT: <0.0002 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C (case temp.)

TEST DATA: Insertion loss test data supplied at 0.05, 4.0, 8.0, 12.4 and 18.0 GHz.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 480 g (17 oz.) maximum

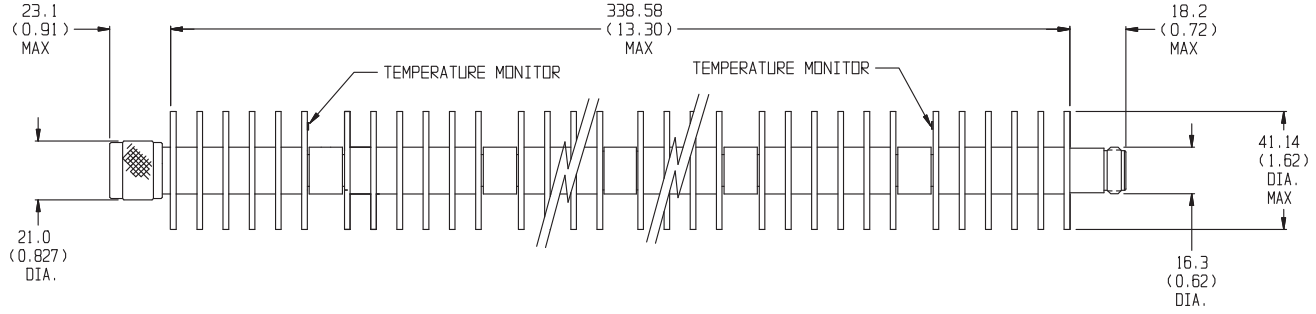
MODEL NUMBER DESCRIPTION:

Example:

66 - XX - XX

- **66** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options
  1st digit is input side
  2nd digit is output side

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 45 dc to 1.5 GHz
Model 58 dc to 5.0 GHz
High Power Fixed Coaxial Attenuator 250 Watts

Convection Cooled

☑ **RoHS**

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 45: dc to 1.5 GHz
Model 58: dc to 5.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB) 45	58	58 LIM
3*, 6	± 0.50	± 1.50	- - -
10, 20	± 0.50	± 1.50	± 2.00
30, 40	± 0.50	± 1.75	± 3.00

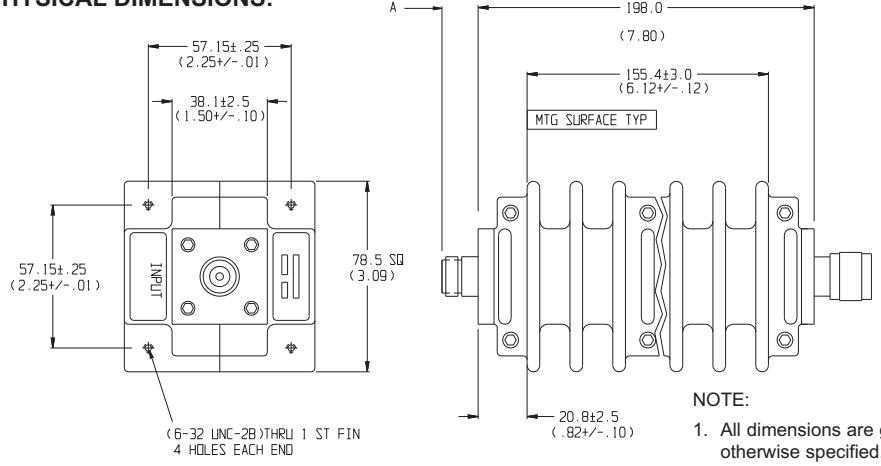
MAXIMUM SWR:

Frequency (GHz)	Input	Output
dc - 2 (1.5*)	1.10	1.20 (1.10*)
2 - 5	1.15	1.25

* Model 45 only!

3rd ORDER INTERMODULATION (58-XX-XX-LIM ONLY): Reflected Levels (IM3), -100 & Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each.

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE:
1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

POWER RATING (mounted horizontally with fins vertical): 250 watts **average (unidirectional)** to 55°C ambient temperature, derated linearly to 10% @ 125°C. 10 kilowatt **peak** (5 µsec pulse width; 1.25% duty cycle). Maximum power rating into output port is 50 watts average. Note: Model 45-3-XX is rated for 500 Watts **average (unidirectional)** into the input and 250 Watts average **(maximum)** into the output port.

POWER COEFFICIENT: <0.0001 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 1, 2, 3, 4 and 5 GHz (Model 45 at 0.05 and 1.5 GHz). Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 1,530 g (6 lbs, 3 oz.) maximum

MODEL NUMBER DESCRIPTION:

Example:

58 - XX - XX - LIM

IM Option*

- **58** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options: 1st digit is input side; 2nd digit is output side
- **LIM** — IM Option*

*Add -LIM for Low Intermodulation option. Option only available with Model 58 in 10, 20, 30, 40 dB and is not available through Express.

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Revision Date: 1/28/09

Model 67
High Power Fixed Coaxial Attenuator

dc to 12.7 GHz
350 Watts

Forced Cooled

RoHS

Features

- **Precision Injection Molded Connectors.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Broadband performance, ideal for test applications.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 12.7 GHz

MAXIMUM DEVIATION OVER FREQUENCY:		
Nominal ATTN (dB)	Deviation (dB) dc-8 GHz	8 -12.7 GHz
10	± 2.00	+6.00/-0.00
20, 30	± 2.50	+6.00/-0.00

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 8	1.30
8 - 12.7	1.60

POWER RATING (mounted horizontally): 350 watts **average (unidirectional)** @ 25°C ambient temperature. Case temperature must be held to **100°C maximum**. 5 kilowatt **peak** (5 µsec pulse width; 3.5% duty cycle). Maximum power rating into output port is 10 watts average.

POWER COEFFICIENT: <0.0001 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 100°C (case temp.)

TEST DATA: Insertion loss test data supplied at 0.05, 0.5, 4.0, 8.0 & 12.0 GHz.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 1200 g (43 oz.) maximum

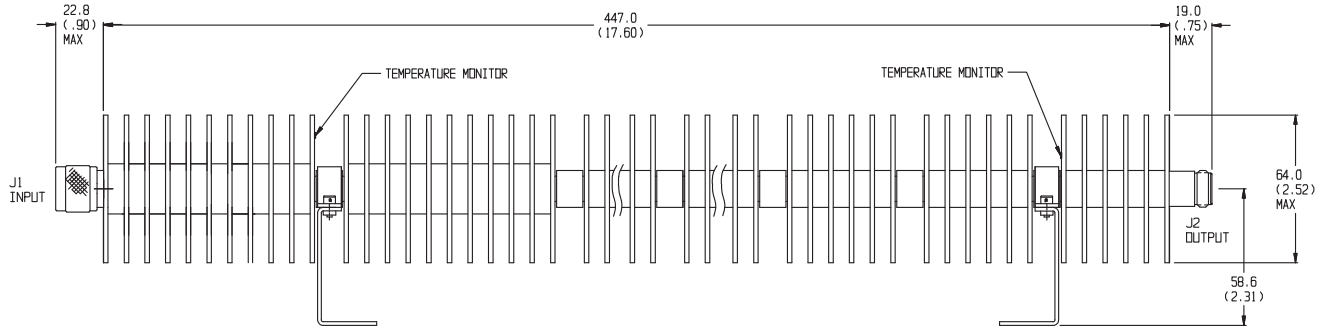
MODEL NUMBER DESCRIPTION:

Example:

67 - XX - XX

- **67** — Basic Model Number
- **XX** — Attenuation Value (dB)
- **XX** — Connector Options (1st digit is input side, 2nd digit is output side)

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 53 dc to 2.5 GHz
High Power Fixed Coaxial Attenuator 500 Watts

Conduction/Convection Cooled

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**
- **Flexible Mounting Position -** The units may be mounted in horizontal (fins up) or vertical position.
- **Low Intermodulation Distortion Option.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 2.5 GHz

MAXIMUM DEVIATION OVER FREQUENCY:

Nominal ATTN (dB)	Deviation (dB)	
	53	53 LIM
3, 6	± 1.00	- - -
10, 20, 30, 40	± 1.00	± 1.20

MAXIMUM SWR:

Frequency (GHz)	53	53 LIM
dc - 2.5	1.10	1.15

3rd ORDER INTERMODULATION (53-XX-XX-LIM ONLY): Reflected Levels (IM3), -100 & Through Levels (IM3), -110 dBc with two input signals @ 869 MHz and 891 MHz with average carrier power levels of +43 dBm each.

POWER RATING (mounted horizontally with fins vertical): 500 watts **average (unidirectional)** to 35°C ambient temperature, derated linearly to 50 watts @ 125°C. 10 kilowatt **peak** (5 µsec pulse width; 2.5% duty cycle). Maximum power rating into output port is 45 watts average. Note: 3 dB units are rated for 750 Watts **average (unidirectional)** into the input and 250 Watts **average (maximum)** into the output port.

POWER COEFFICIENT: <0.0001 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to 125°C

TEST DATA: Insertion loss test data supplied at 0.05, 2.5 GHz. Other test data can be provided at additional cost.

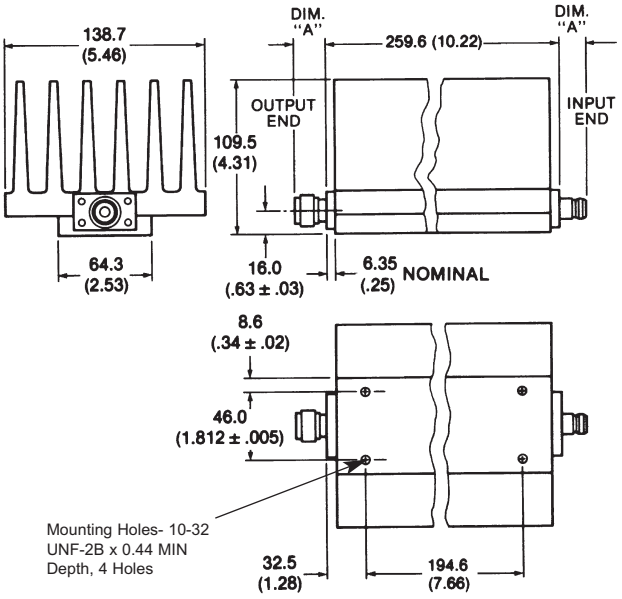
CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Aluminum alloy body, gold plated beryllium copper contacts.

WEIGHT: 3,640 g (8 lbs.) maximum

PHYSICAL DIMENSIONS:



Connector	DIM A
N Male	22.9 (0.90)
N Female	15.0 (0.59)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

53 - XX - XX - LIM

- 53: Basic Model Number
- XX: Attenuation Value (dB)
- XX: Connector Options (1st digit is input side; 2nd digit is output side)
- LIM: IM Option*

*Add -LIM for Low Intermodulation option. Option only available in 10, 20, 30 and 40 dB and is not available through Express.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Model 81
High Power Fixed Coaxial Attenuator

dc to 10.0 GHz
500 Watts

NEW

Conduction/Convection Cooled

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 10.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

NOM ATTN (dB)	Deviation dc - 7.0 GHz	Deviation 7.0 - 10.0 GHz
10, 20, 30, 40	±3.0	+5 / -0 dB

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8.0	1.65
8.0 - 10.0	1.95

POWER RATING (assuming unobstructed air flow and natural convection around unit): 500 watts **average (unidirectional)** to 35°C ambient temperature, derated linearly to 50 watts @ 125°C. 5 kilowatt **peak** (5 µsec pulse width; 1.5% duty cycle). Maximum power into output is 20 Watts **average**.

POWER COEFFICIENT: <0.0001 dB/dB/Watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: Insertion Loss and SWR Test data supplied at 0.05, 2.0, 4.0, 6.0, 8.0 and 10 GHz. Other test data can be provided at additional cost.

CONNECTOR: Type N connectors - mate nondestructively with MIL-C-39012 connectors .

Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel or silver plated brass connectors with gold plated beryllium copper or stainless steel N male contacts.

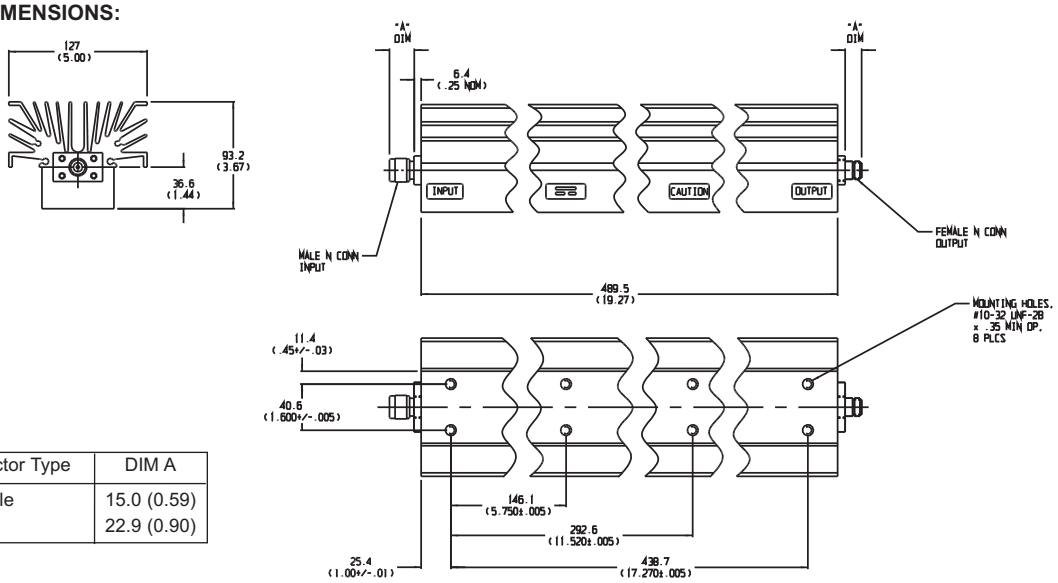
WEIGHT: Net 1.45 kg (3 lbs, 4 oz) maximum

MODEL NUMBER DESCRIPTION:

81 - XX - XX

- 81: Basic Model Number
- XX: Attenuation Value
- XX: Connector Options
  - 1st Digit is input side
  - 2nd digit is output side.

PHYSICAL DIMENSIONS:



Connector Type	DIM A
N female	15.0 (0.59)
N male	22.9 (0.90)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 1/28/09

Fixed Coaxial Attenuators

AEROFLEX WEINSCHEL

Model 82
High Power Coaxial Attenuator

dc to 3.0 GHz
1,000 Watts

Type N Connectors

RoHS

Features

- **Quality connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-DTL-3933.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 3.0 GHz

MAXIMUM DEVIATION OVER FREQUENCY (dB):

NOM ATTN (dB)	Deviation	
	dc - 1.5 GHz	1.5 - 3.0 GHz
10, 20, 30, 40	±0.75	+1.5, -0.5 dB

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 1.5	1.15
1.5 - 3.0	1.25

POWER RATING (assuming unobstructed air flow and natural convection around unit): 1,000 watts **average (unidirectional)** to 25°C ambient temperature, derated linearly to 100 watts @ 125°C. 10 kilowatt **peak** (5 µsec pulse width; 5% duty cycle). Maximum power into output is 75 Watts **average**.

POWER COEFFICIENT: <0.0001 dB/dB/Watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C with power derating applied.

TEST DATA: Insertion Loss and SWR measurements performed across frequency range. Test data supplied at additional cost.

CONNECTOR: Type N connectors - mate nondestructively with MIL-C-39012 connectors .

Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel or silver plated brass connectors with gold plated beryllium copper or stainless steel N male contacts.

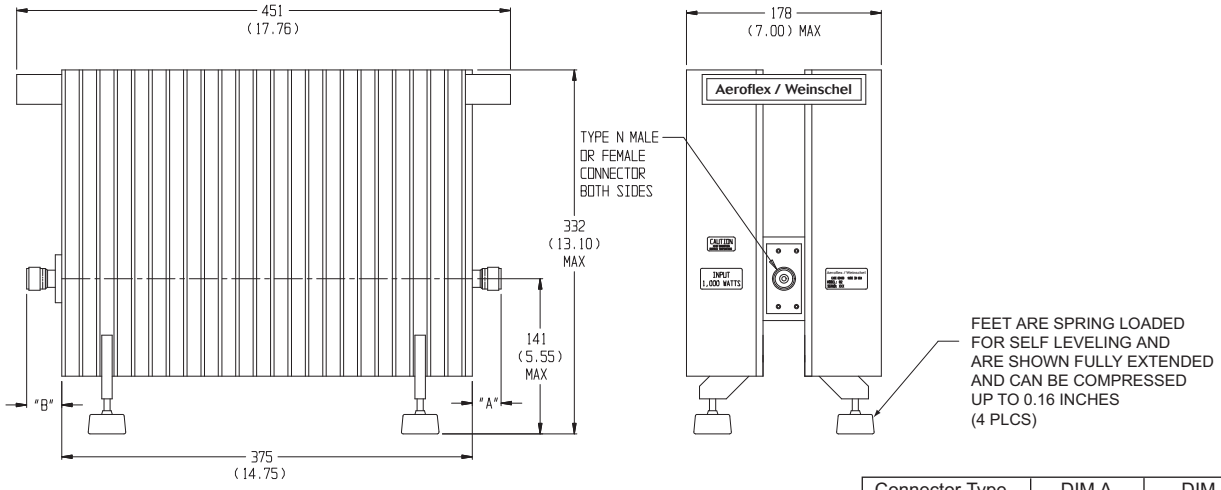
WEIGHT: Net 12.10 kg (34 lbs) maximum

MODEL NUMBER DESCRIPTION:

82 - XX - XX

- 82: Basic Model Number
- XX: Attenuation Value
- XX: Connector Options
  - 1st Digit is input side
  - 2nd digit is output side.

PHYSICAL DIMENSIONS:



Connector Type	DIM A	DIM B
N female	15.0 (0.59)	21.4 (0.84)
N male	22.9 (0.90)	29.3 (1.15)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 1/28/09

AEROFLEX WEINSCHEL

Fixed Coaxial Attenuators

Attenuator Sets dc to 18.0/26.5 GHz

Model AS-6
(Type N)

Model AS-18
(Precision Type N)

Model AS-20
(3.5mm)

Features

- **Test Data:** Test Data for each attenuator is provided.
- **Data furnished:** AS-6 and AS-18, Insertion loss & SWR ports 1 and 2 test data supplied at 0.05, 4.0, 8.0, 12.4 and 18.0 GHz and AS-20, Insertion loss & SWR ports 1 and 2 test data supplied at 0.05, 4.0, 8.0, 12.4, 18.0 and 26.5 GHz.
- **Wide Temperature Range:** -55 °C to 125 °C. Full rated power to 25 °C. Derated Linearity to 0.5 watts @ 125 °C.
- **Uniform Phase Characteristics:** Excellent unit-to-unit tracking and phase linearly with frequency.
- **Rugged Construction:** Designed to meet all environmental requirements of MIL-DTL-3933.
- **High Repeatability Connectors:**
  - AS-6: Type N per MIL-STD-348
  - AS-18: Precision N per MIL-STD-348
  - AS-20: Precision 3.5mm
- **Durable Storage Case**.

Specifications

Set Model Number	Standard Model Number	Nominal Values (dB)	Frequency Range (GHz)	Average Power (W)	Connector Type	Maximum* SWR	Page No.**
AS-6	2	3, 6, 10, 20	dc-18 GHz	5	N	1.15 - 1.35	32
AS-18	44	1, 3, 6, 10, 20, 30	dc-18 GHz	5	N	1.15 - 1.25	33
AS-20	56	3, 6, 10, 20, 30	dc-26.5 GHz	2	3.5mm	1.10 - 1.25	27

*Varies with frequency.
**Refer to indicated page for more detailed attenuator specifications.

STORAGE CASE DIMENSIONS:

Model AS-6: 136.5mm (5-3/8 in) long x 125.4mm (4-15/16 in) wide x 35.6mm (2-3/16 in) high
Model AS-18: 215.9mm (8.5 in) long x 273mm (10-3/4 in) wide x 63.5mm (2-1/2 in) high
Model AS-20: 139.7mm (5-1/2 in) long x 123.8mm (4-7/8 in) wide x 60.3mm (2-3/8 in) high

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Variable Attenuators (Step & Continuously)

AEROFLEX
A passion for performance.

- Wide Choice of Attenuation & Frequency Ranges.
- High Reliability & Long Life
- Rugged Construction & Connectors
- Rotational Stops Included on most models
- Low Cost Designs - Model 3033
- Custom Designs Available

General Information

In this section of the catalog, each Manual Step and Variable Attenuator is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the Manual Step and Variable(s) that fits your needs. The page number for each Step Attenuator data sheet is given in the quick reference guide.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current products and stocking quantities.

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Variable Attenuators

Continuously Variable Attenuators...dc-4.2 GHz

Model Number	Frequency Range (GHz)	Average Power (Watts)	Peak Power (Watts)	Residual Insertion Loss (dB)	Maximum Attenuation Range (dB)	Maximum SWR	Connector Type	Page No.	
☆ 940-60	dc-4.0	5	500	6	60	1.80	SMA/N	66	
940-114	dc-2.0				114	1.60	SMA/N		

Manual Step Attenuators...dc-2/4/12.4/18/26.5 GHz

Model Number	Frequency Range (GHz)	Incremental Attenuation Range (dB)	Insertion Loss (dB)	Average Power (Watts)	Peak Power (Watts)	Maximum SWR	Connector Type	Page No.	
☆ 3003	dc-2.50	0-70/10	0.3	1	100	1.20	SMA	69	
3006	dc-1.25	0-100/10	0.2			1.20			
3007	dc-2.5	0-10/1	0.3			1.30			
☆ 3010	dc-2.5	0-70/1	0.7			1.35			
3014	dc-1.25	0-110/1	0.5			1.30			
☆ 3053	dc-6.0	0-10/1	0.3-0.7*			1.3-1.4*			
☆ 3054	dc-6.0	0-70/1	0.8-1.3*			1.3-1.55*			
AC9009	dc-4.0	0-9/1	0.3	2	200	1.25	SMA	71	
☆ AC9003		0-69/1	0.6			1.35			
AC9004		0-99/1	0.6			1.35			
AC9010		0-6010	0.4			1.35			
AC9011		0-90/10	0.5			1.35			
☆ AF9009	dc-18.0	0-9/1	0.3-1.0*	2	200	1.60	SMA		
☆ AF9003		0-69/1	0.6-1.5*			1.75			
AF9004		0-99/1	0.6-1.5*			1.75			
AF9010		0-6010	0.4-1.0*			1.60			
AF9011		0-90/10	0.5-1.0*			1.60			
9012-9	dc-26.5	0-9/1	1.0-1.5*	2	200	1.45-1.50*	2.92mm	77	
9012-70		0-70/10	1.0 or 2%						
AC115A	dc-4.0	0-9/1	0.3	2	200	1.25-1.30*	SMA/N	74	
AC116A		0-60/10	0.3-0.4**			1.25-1.30*			
AC117A		0-69/1	0.5-0.6**			1.50			
AC118A		0-90/10	0.4-0.5**			1.25-1.30*			
AC119A		0-99/1	0.5-0.6**			1.35-1.70*			
AF115A	dc-18.0	0-9/1	0.7-1.0**	2	200	1.60	SMA/N		
AF116A		0-60/10	0.7-1.0**			1.60			
AF117A		0-69/1	1.2-1.5**			1.70			
AF118A		0-90/10	0.8-1.02**			1.60			
AF119A		0-99/1	1.2-15**			1.70			

* VARIES WITH FREQUENCY.

☆ *EXPRESS* Shipment available via **www.argosysales.com** or 800-542-4457.
Note: Other models may also be available from Express delivery.

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Frequently Asked Questions about Variable & Manual Step Attenuators....

What are the applications for Weinschel's variable/ manual step attenuators?

Continuously Variable Attenuators are used in applications where the need exists for controlling signal levels continuously without interrupting the circuit. Most Weinschel models are in linear scales, and have low frequency sensitivity with broad frequency coverage, resulting from the use of proven Aeroflex / Weinschel resistive films. The resistive elements located in these Variable Attenuators provide long-term stability over temperature and humidity.

Manual Step Attenuators are primarily used in areas demanding broadband accuracy with low SWR and accurate repeatability over large attenuation ranges. The Weinschel Step Attenuators utilize the excellent performance characteristics of the Weinschel fixed coaxial attenuators. The Weinschel step attenuators are widely used in many types of ATE and OEM systems operating throughout the world.

Aeroflex / Weinschel offers a selection of different attenuation ranges and frequency ranges to to select from. These range from 0 to 10 dB in 1 dB steps up to 0 to 100 dB in 10 dB steps and frequency ranges from dc to 40 GHz. High volume fabrication techniques, including injection molding, stamping, broaching and thick film printing ensure a cost effective and uniform product.

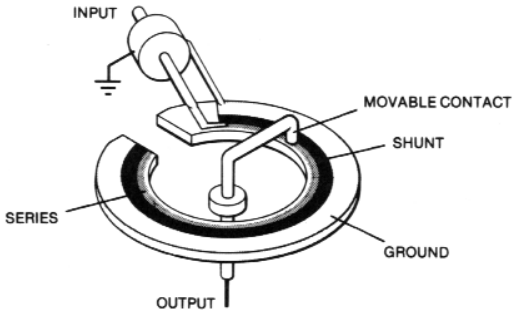
What is the difference between insertion loss and incremental attenuation?

Step and variable attenuators have insertion loss and also incremental attenuation. Insertion loss is the loss through the attenuator when all cells are switched to zero dB. It is the residual loss of the device itself. Insertion loss usually increases with frequency reaching several dB at the higher frequencies and generally has very flat frequency response. Incremental attenuation is the attenuation values of the attenuators cells relative to the insertion loss. Since insertion loss is always present, the performance of a step or variable attenuator is always given as incremental attenuation relative to insertion loss. Insertion loss is considered part of the fixed performance of the system path in which the step or variable attenuator is located.

What types of variable attenuators does Weinschel offer?

There are several designs of continuously variable attenuator available in the marketplace: Piston, card, tee, and resistive center conductor. Weinschel offers only the Variable Card Attenuator Design.

Weinschel's 940 series uses a card resistor on a disk with a movable coaxial contact (shown below) similar in nature to a potentiometer and provides an incremental range of 114 dB incremental range at 2 GHz and 60 dB at 4 GHz. Because the shunt film is connected to ground permanently, in order to achieve the extended attenuation range, the minimum loss of this type attenuator is higher (4 to 6 dB).



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AEROFLEX WEINSCHEL

Variable Attenuators

Model 940-60 dc to 4.0 GHz
Model 940-114 dc to 2.0 GHz
Precision Continuously Variable Attenuators 5 Watts

Choice of SMA or Type N Connectors

☑ RoHS

Features

- **Wide Variable Attenuation Range** - Variable attenuation range of 60 dB for Model 940-60 and 114 dB for Model 940-114, with minimum insertion loss at 6 dB.
- **Approximately Linear Calibrated Dial -** Direct reading dial individually calibrated in approximately linear 1 dB increments from 6 dB to full scale.
- **Rugged** - Designed to meet the environmental requirements of MIL-A-24215.
- **Long Life** - These variable attenuators offer a cycle life of up to 10,000 cycles. Optional models are also available to extend the life to 50,000 cycles.
- **Available *Express* Models:** 940-60-11, 940-60-33, 940-60-33-1

Other models may be available for Express delivery.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 940-60: dc to 4.0 GHz; Model 940-114: dc to 2.0 GHz

INCREMENTAL ATTENUATION RANGE:

Model 940-60: 60 dB
Model 940-114: 114 dB

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 1	1.50
1 - 2	1.60
2 - 3	1.70
3 - 4	1.80

DIRECT READING DIAL ACCURACY:

Model	ACCURACY*
940-60-XX 940-114-XX	± 0.25 dB or 0.4% @ 2 GHz ± 0.25 dB or 0.4% @ 1 GHz
940-60-XX-1 940-114-XX-1	± 0.5 dB or 1% @ 2 GHz ± 0.5 dB or 1% @ 1 GHz

*Whichever is greater.

CHARACTERISTIC INSERTION LOSS, RESIDUAL:
6 dB nominal

DIAL CALIBRATION (in 1 dB increments):
Model 940-60: 6 to 66 dB
Model 940-114: 6 to 120 dB

DIAL INCREMENTS: 1 dB

RESOLUTION OF SCALE:
Model 940-60: ~ 115°
Model 940-114: ~ 270°

CYCLE LIFE: A cycle consists of a rotation from minimum to maximum and back to minimum
Model 940-XX-XX : 10,000
Model 940-XX-XX-1: 50,000

PHASE SHIFT WITH CHANGE IN ATTENUATION:
1° per dB x f(GHz) maximum

POWER RATING: 5 watts average to 40°C ambient temperature, derated linearly to 0 watts @ 85°C. 500 watts peak (5 µsec pulse width; 0.5% duty cycle).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.001 dB/dB/°C

TEMPERATURE RANGE:
Operating: 0°C to +85°C
Nonoperating: -55°C to +125°C.

FREQUENCY SENSITIVITY:
Model 940-60: 0.05 x A x (F - Fd) dB
Model 940-114: 0.1 x A x (F - Fd) dB

A = Attenuation setting in dB, Fd = Dial cut frequency in GHz, F= Operation frequency in GHz

TEST DATA: Test frequency for Model 940-60 is 2 GHz and 1 GHz for 940-114. Test data is available at additional cost.

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Variable Attenuators

AEROFLEX WEINSCHEL

Specifications-Con't

CONNECTOR: SMA or Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

Connector Options	INPUT (J1)	OUTPUT (J2)
11	SMA, Female	SMA, Female
12	SMA, Female	SMA, Male
22	SMA, Male	SMA, Male
33	N, Female	N, Female
34	N, Female	N, Male
44	N, Male	N, Male

CONSTRUCTION: Aluminum body and stainless steel connector; gold plated beryllium copper contacts. Knob is included with each unit.

WEIGHT: Net 1,570 g (3 lbs, 8 oz)

MODEL NUMBER DESCRIPTION:

Example:

940 - XX - XX - *

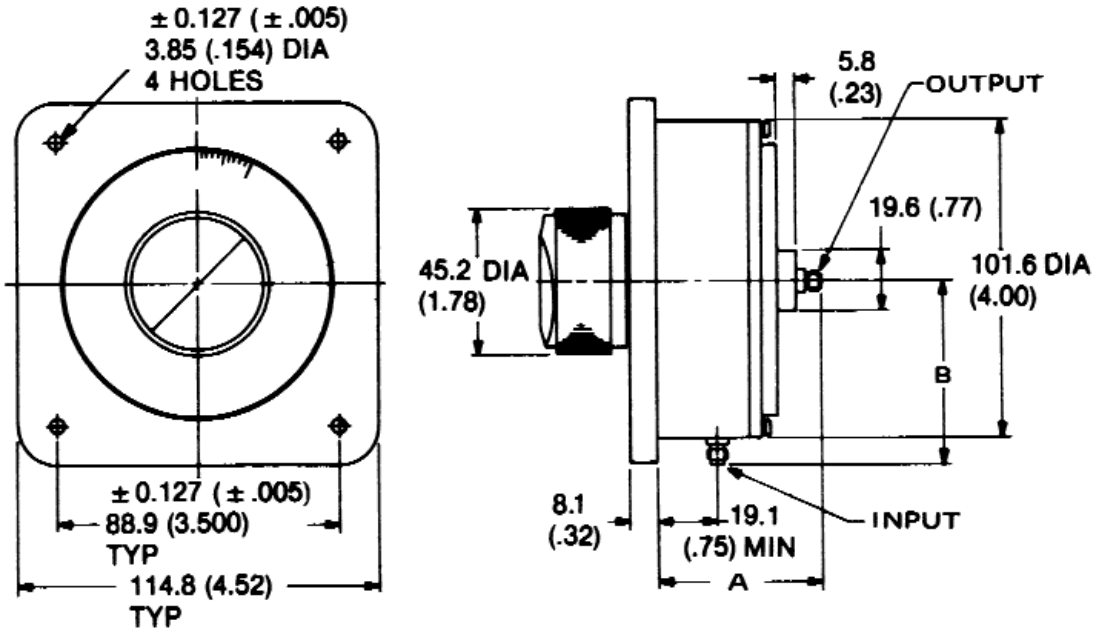
Basic Model Number — Attenuation Value (dB) — Connector Options

* Add -1 for long life version.

ACCESSORIES

ATTENUATOR STAND, MODEL 940 Z: This stand allows a user to easily mount any Model 940 for those bench applications.

PHYSICAL DIMENSIONS:



Model No.	DIM A	DIM B
940-XX-11	52.3 (2.06)	58.2 (2.29)
940-XX-12	55.6 (2.19)	58.2 (2.29)
940-XX-22	55.6 (2.19)	61.5 (2.42)
940-XX-33	61.0 (2.40)	68.1 (2.68)
940-XX-34	66.0 (2.60)	68.1 (2.68)
940-XX-44	66.0 (2.60)	71.9 (2.83)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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AEROFLEX WEINSCHEL

Models 3003, 3006, 3007, 3010, & 3014 dc to 2.5 GHz
Models 3053 & 3054 dc to 6.0 GHz
Manual Step Attenuators 1 Watt

Rugged SMA Connector

Features

- **New Models -** Models 3053 & 3054 offer an extended frequency range to 6 GHz.
- **Available *Express* Models:** 3003-100, 3010-100, 3053-100, 3054-100

  Other models may be available for Express delivery.
- **High Reliability -** Repeatability better than 0.1 dB over frequency range and life. Weinschel patented detent mechanism, tested to 1,000,000 operations at +75°C, operates dependably even down to -40°C.
- **Product Uniformity -** High volume fabrication techniques, including injection molding, stamping, broaching and thick film printing ensure a cost effective and uniform product.
- **Low Frequency Sensitivity -** Typically 0.1 to 0.2 dB up to 2.5 GHz.
- **Shock Resistant -** 100% spring contact system withstands mechanical and thermal shock and eliminates the need for epoxy or solder.
- **Wide Selection -** Wide choice of attenuation ranges and increments in standard stock models. Single and dual drum configurations available.
- **Knob Included -** Knobs for both single and dual drum models are included with every attenuator. Characters are screened on the face of the knob insert which is coated with a clear layer of epoxy for protection.

Special Configurations

Some modifications to the basic configuration of the 3000 Series can be made during manufacturing. Examples of these special configurations are shafts having special lengths and ends; clockwise shaft rotation; modified mounting arrangements; and provisions for add-on items such as concentric potentiometer and ganged switches.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: FREQUENCY RANGE:

Models 3006, 3014:	dc to 1.25 GHz
Models 3003, 3007, 3010:	dc to 2.5 GHz
Models 3053, 3054:	dc to 6.0 GHz

INCREMENTAL ATTENUATION RANGE/STEPS:

Model 3003:	0-70 dB in 10 dB steps
Model 3006:	0-100 dB in 10 dB steps
Model 3007:	0-10 dB in 1 dB steps
Model 3010:	0-70 dB in 1 dB steps
Model 3014:	0-110 dB in 1 dB steps
Model 3053:	0-10 dB in 1 dB steps
Model 3054:	0-70 dB in 1 dB steps

POWER COEFFICIENT: < 0.006 dB/dB/watt

TEMPERATURE COEFFICIENT: 0.0004 dB/dB/ °C

TEMPERATURE RANGE:

Operating:	-40°C to +65°C
Non-Operating:	-54°C to +85°C

POWER RATING: 1 watts **average** @ 25°C ambient temperature, derated linearly to 0 watts @ 65°C. 100 watts **peak** (5 µsec pulse width; 0.5 % duty cycle).

ATTENUATION ACCURACY:

Model	Accuracy
3003	± 0.3 dB or 1% up to 60 dB ± 2% to 70 dB
3006	± 0.3 dB or 1% up to 60 dB ± 2% to 100 dB
3007, 3053	± 0.3 dB
3010	± 0.3 dB up to 10 dB ± 0.3 dB or 1.5% to 60 dB ± 2 % to 70 dB
3014	± 0.3 dB up to 10 dB ± 0.3 dB or 1.5% to 60 dB ± 3% to 110 dB
3054	± 0.3 dB or 2% (dc to 3 GHz) ± 0.3 dB or 3.5% (3 to 6 GHz)

CONNECTOR: SMA female connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

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Specifications-Con't

SHAFT ROTATION: counter clockwise for increasing attenuation

STEP ANGLE: 32.7°

DRUM CONFIGURATIONS:

Single Drum: 3003, 3006, 3007, 3053
Dual Drum: 3010, 3014, 3054

MAXIMUM SWR & ZERO INSERTION LOSS:

Model	Frequency (GHz)	SWR	Loss (dB)
3003	dc - 2.5	1.20	< 0.3
3006	dc - 1.25	1.20	< 0.2
3007	dc - 2.5	1.30	< 0.3
3010	dc - 2.5	1.35	< 0.7
3014	dc - 1.25	1.30	< 0.5
3053	dc - 3.0	1.30	< 0.3
	3.0 - 6.0	1.40	< 0.7
3054	dc - 3.0	1.30	< 0.8
	3.0 - 6.0	1.55	< 1.3

SWITCHING LIFE: 1,000,000 steps

REPEATABILITY: ±0.1 dB over frequency range and rated life

ROTATION STOPS: Supplied on 10 dB step drums (not supplied on 1 dB drums).

INCREMENTAL PHASE SHIFT: ~0.25° per dB x f(GHz)

CONSTRUCTION: Shafting and external hardware and connector shells: CRES Type 303, per ASTM-A582 passivated per QQ-P-35. Housing: AL ALLOY Gold Flash. Knob is included with each unit.

TEST DATA: Test data is available at additional cost.

WEIGHT:
Single drum: Net 125 g (4.4 oz)
Dual drum: Net 201 g (9.9 oz)

MODEL NUMBER DESCRIPTION:

Example:

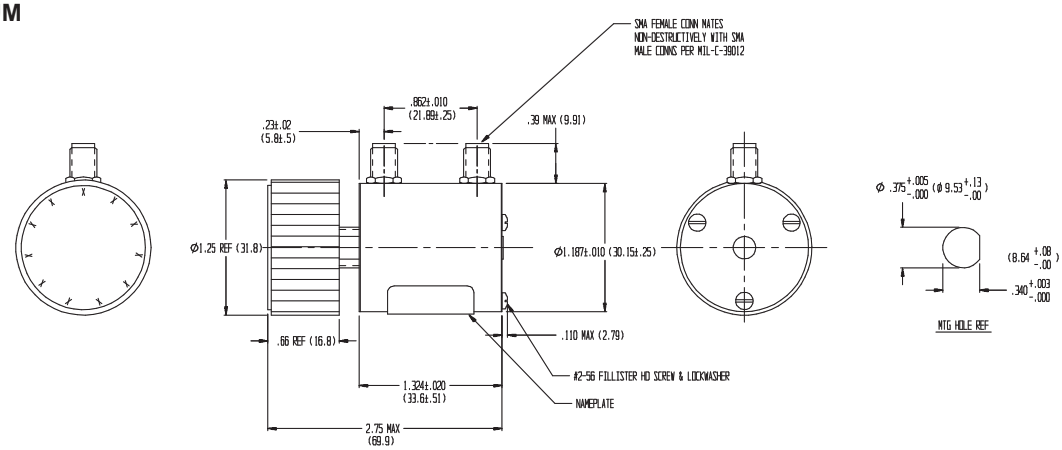
3010 - 100

Basic Model Number

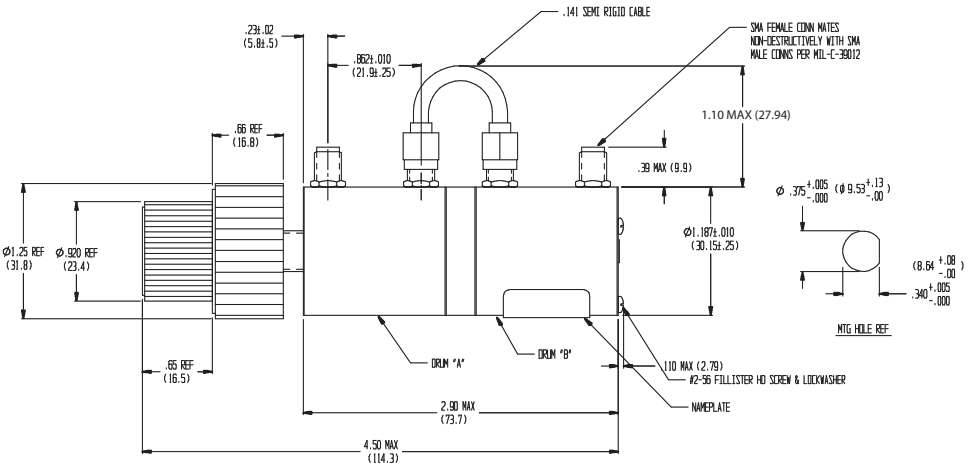
Additional Options no longer available. Add -100 Only!

PHYSICAL DIMENSIONS:

SINGLE DRUM



DUAL DRUM



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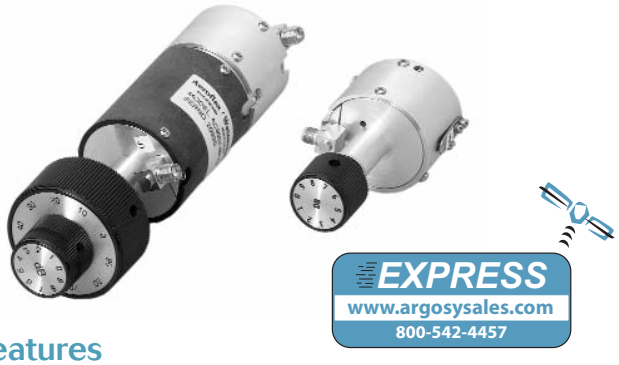
AEROFLEX WEINSCHEL

Models 9003, 9004, 9009, 9010 & 9011 Manual Step Attenuators

dc to 18.0 GHz
2 Watt

Ruggedized SMA Connector



Features

- **Broadband** - Available in a choice of frequency ranges: dc to 4, dc to 8, dc to 12.4 and dc to 18 GHz.
- **Available *Express* Models:** AC-9003-69-31, AF-9003-9-12, AF-9003-69-31

  Other models may be available for Express delivery.
- **Wide Choice of Attenuation Ranges** - A choice of five standard attenuation ranges is available: 0 to 9.0, 0 to 69 and 0 to 99 dB in 1 dB steps, and 0 to 60 and 0 to 90 dB in 10 dB steps.
- **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 are set parallel with 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 flat frequency response and small deviation from nominal attenuation at all settings (e.g., 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.

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 for the precision control of signal levels. The Model 9000 series can be used either as input or output attenuators in signal sources, receivers, field strength meters, spectrum analyzers, etc.

The SMA connector furnished on all models are available in either standard or right-angle configuration. The sex of 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 Ω

FREQUENCY RANGE (add Model No. Prefix to Designate Range):

All Models: dc to 4.0 GHz (AC)
dc to 18.0 GHz (AF)

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:

Frequency Range (GHz)	9009, 9010 9011	9003 9004
dc - 4	1.25	1.35
dc - 18	1.60	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: < 0.005dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE:

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

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Variable Attenuators

Specifications--con't

TEST DATA: Insertion Loss data is supplied as follows. Other test data can be supplied at additional cost.

dc to 4 GHz: At 50 MHz and 4 GHz
dc to 18 GHz: At 50 MHz, 4, 8, 12 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 CONFIGURATIONS:

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

MAXIMUM INSERTION LOSS (dB):

Frequency Range (GHz)	Model No.				
	9009	9003	9004	9010	9011
dc - 4	0.3	0.6	0.6	0.4	0.5
dc - 18	1.0	1.5	1.5	1.0	1.0

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

Connector Options	Type/Description
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 (±dB):

Model Number	dB Range	Frequency Range (GHz)	
		dc-4	dc-18
9009	1-9	0.3	0.5
9003	1-9	0.3	0.5
	10-19	0.7	1.0
	20-29	0.9	1.2
	30-39	1.0	1.4
	40-49	1.1	1.5
	50-59	1.2	1.7
	60-69	1.3	1.9
9004	1-9	0.3	0.5
	10-19	0.7	1.0
	20-29	0.9	1.2
	30-39	1.0	1.4
	40-49	1.1	1.5
	50-59	1.2	1.7
	60-69	1.3	1.9
	70-79	1.4	2.1
	80-89	1.5	2.3
	90-99	1.6	2.5
9010	10	0.3	1.0
	20	0.3	1.0
	30	0.4	1.0
	40	0.5	1.2
	50	0.7	1.5
	60	0.8	1.8
9011	10	0.3	1.0
	20	0.3	1.0
	30	0.4	1.0
	40	0.5	1.2
	50	0.7	1.5
	60	0.8	1.8
	70	0.9	2.1
	80	1.0	2.3
	90	1.2	2.5

NA=Model no longer available.

MODEL NUMBER DESCRIPTION:

Example:

AC9011 - XX - XX

- AC9011 → Frequency Range (GHz)** / Basic Model Number
- XX → Maximum Attenuation Value (dB)
- XX → Connector Options*: 1st digit is J1 side (front); 2nd digit is J2 side (rear)

** Frequency Range	Available Models
dc-4.0 GHz (AC)	AC9003, AC9004, AC9009, AC9010, AC9011
dc-8.0 GHz (AD)	No longer available, order AF as replacement
dc-12.4 GHz (AE)	No longer available, order AF as replacement
dc-18.0 GHz (AF)	AF9003, AF9004, AF9009, AF9010, AF9011

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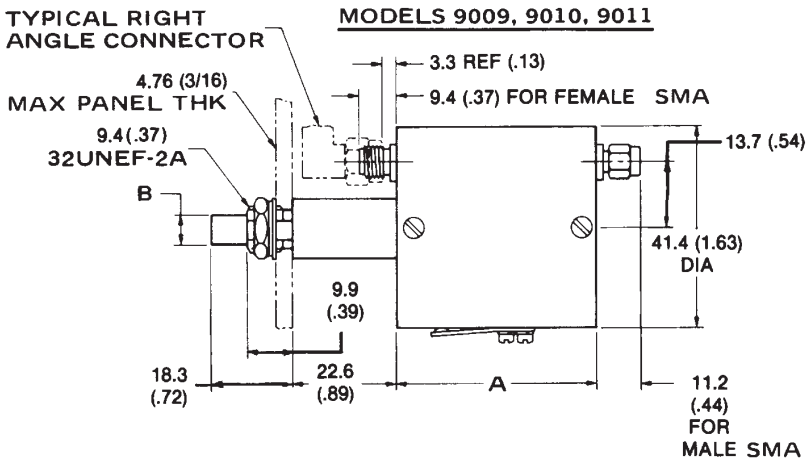
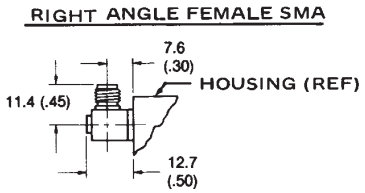
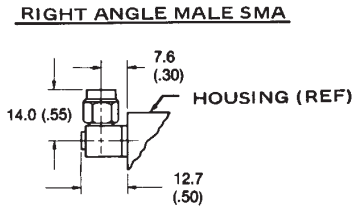
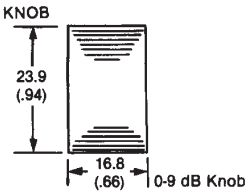
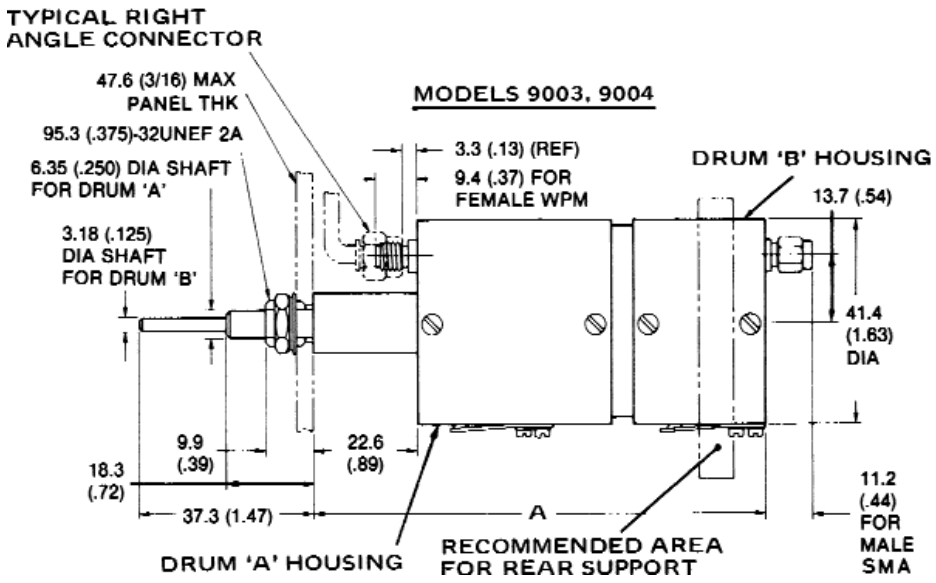
PHYSICAL DIMENSIONS:

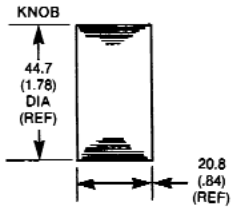


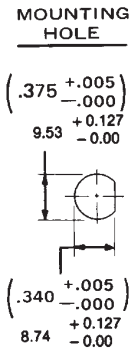












Model No.	DIM A	DIM B
9003	96.3 (3.79)	- - -
9004	106.4 (4.19)	- - -
9009	28.7 (1.13)	3.25 (0.125)
9010	41.4 (1.63)	6.35 (0.250)
9011	51.6 (2.03)	6.35 (0.250)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Models 115A thru 119A Manual Step Attenuators

dc to 18.0 GHz 2 Watt

Choice of Type N or SMA Connectors

Features

- **Safety Mechanical Stop** - A mechanical stop between maximum and 0 attenuation positions on all models prevents damage to the mechanical drive as well as preventing large power changes that could cause damage to sensitive equipment.
- **Choice of Attenuation Ranges** - Five standard attenuation ranges are available: 0-9 dB, 0-69 dB, and 0-99 dB in 1 dB steps, and 0-60 dB and 0-90 dB in 10 dB steps.
- **Broadband** - All models are available in a choice of 2 frequency ranges: dc-4 and dc-18 GHz.
- **Right-Angle Drive** - The center conductor of the connector is perpendicular to the control shaft, offering greater flexibility of applications: panel mounting or bench setup. All models are bidirectional.
- **Custom Configurations Available Upon Request.**
- **Low Deviation from Nominal Value** - These Mini Step Attenuators have flat frequency response over specified bands and excellent attenuation accuracy. Deviation from nominal value is low at all settings.
- **Excellent Repeatability and Long Life Switch** - Repeatability is better than 0.05 dB to 18.0 GHz for over 1,000,000 switchings of the drum.

Description

The Aeroflex / Weinschel Models 115A through 119A are a series of broadband, step attenuators in a right-angle drive configuration, where the center conductor of the connector is perpendicular to the control shaft. They feature excellent performance characteristics suitable for use in high reliability 50 ohm systems and applications requiring extra-small components for the precision control of power in discrete steps. They can be used either as input or output attenuators in signal sources, receivers, field strength meters, spectrum analyzers, etc.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE (add Model No. Prefix to Designate Range):

All Models: dc to 4.0 GHz (AC)
dc to 18.0 GHz (AF)

STANDARD INCREMENTAL ATTENUATION RANGE:

Model 115A:	0 to 9 dB in 1 dB steps
Model 116A:	0 to 60 dB in 10 dB steps
Model 117A:	0 to 69 dB in 1 dB steps
Model 118A:	0 to 90 dB in 10 dB steps
Model 119A:	0 to 99 dB in 1 dB steps

MAXIMUM SWR (Models 117A & 119A):

Frequency Range (GHz)	117A & 119A	115A, 116A & 118A
dc - 4	1.35	1.25
4 - 12.4	1.50	1.60
12.4 - 18.0	1.70	1.60

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/dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004/dB/dB/°C

TEMPERATURE RANGE: Operating: 0°C to +54°C
Nonoperating: -54°C to +54°C

INCREMENTAL PHASE SHIFT: ~0.5° per dB x f(GHz)

REPEATABILITY: Better than 0.05 dB across frequency band for switch life.

SWITCH LIFE: Over 1,000,000 steps

INDEXING: 36°

MAXIMUM INSERTION LOSS (dB):

Model Number	CONN Type	Frequency Range (GHz) dc-4	dc-18
115A	N	0.3	0.7
	SMA	0.3	1.0
116A	N	0.3	0.7
	SMA	0.4	1.0
117A	N	0.5	1.2
	SMA	0.6	1.5
118A	N	0.4	0.8
	SMA	0.5	1.0
119A	N	0.5	1.2
	SMA	0.6	1.5

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Specifications (Con't):

TEST DATA: Insertion Loss data is supplied as follows. Other test data can be supplied at additional cost.
dc to 4 GHz: At 50 MHz and 4 GHz
dc to 18 GHz: At 50 MHz, 4, 8, 12 and 18 GHz

RELATIVE HUMIDITY: 95%

ALTITUDE: to 10,000 ft.

SHOCK (non-operating): 8 g's, 100 ms, 1/2 sine

DRUM CONFIGURATIONS:
Single Drum: 115A, 116A, 118A
Dual Drum: 117A, 119A

VIBRATION (non-operating):
5 to 8 cps, 0.20 inch double amplitude
8 to 15 cps, 0.10 inch double amplitude
15 to 55 cps, 0.36 inch double amplitude
Supported rigidly front and back

SHAFT ROTATION: Clockwise for increasing attenuation

CONSTRUCTION:

Materials:	Housing: aluminum alloy, clear irridite, MIL-C-5541.
Dust Cover:	Painted aluminum alloy
Drum:	Aluminum alloy
Shaft:	Passivated stainless steel
Connector:	Stainless steel and beryllium copper contacts.

CONNECTOR: SMA and Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Connector sex is optional as follows:

Connector Options	Type/Description
1	SMA, Female
2	SMA, Male
3	Type N, Female
4	Type N, Male

WEIGHT:

115A	340 g (12 oz)
116A	340 g (12 oz)
117A	760 g (27 oz)
118A	450 g (16 oz)
119A	880 g (31 oz)

INCREMENTAL INSERTION LOSS (±dB):

Model Number	dB Range	Frequency Range (GHz) dc-4	dc-18
115A	1-9	0.3	0.5
117A	1-9	0.3	0.5
	10-19	0.7	1.0
	20-29	0.9	1.2
	30-39	1.0	1.4
	40-49	1.1	1.5
	50-59	1.2	1.7
	60-69	1.3	1.9
119A	1-9	0.3	0.5
	10-19	0.7	1.0
	20-29	0.9	1.2
	30-39	1.0	1.4
	40-49	1.1	1.5
	50-59	1.2	1.7
	60-69	1.3	1.9
	70-79	1.4	2.1
	80-89	1.5	2.3
	90-99	1.6	2.5
116A	10	0.3	1.0
	20	0.3	1.0
	30	0.4	1.0
	40	0.5	1.2
	50	0.7	1.5
	60	0.8	1.8
118A	10	0.3	1.0
	20	0.3	1.0
	30	0.4	1.0
	40	0.5	1.2
	50	0.7	1.5
	60	0.8	1.8
	70	0.9	2.1
	80	1.0	2.3
	90	1.2	2.5

MODEL NUMBER DESCRIPTION:

Example:

AC116A - XX - XX

- AC116A: Frequency Range (GHz) / Basic Model Number
- XX: Maximum Attenuation Value (dB)
- XX: Connector Options* — 1st digit is J1 side (front); 2nd digit is J2 side (rear)

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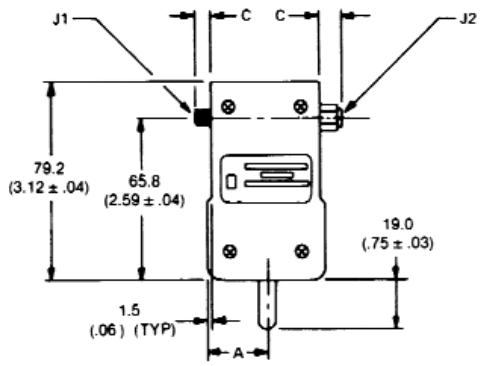
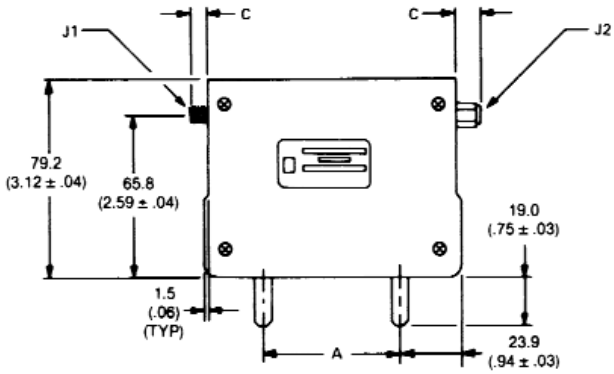
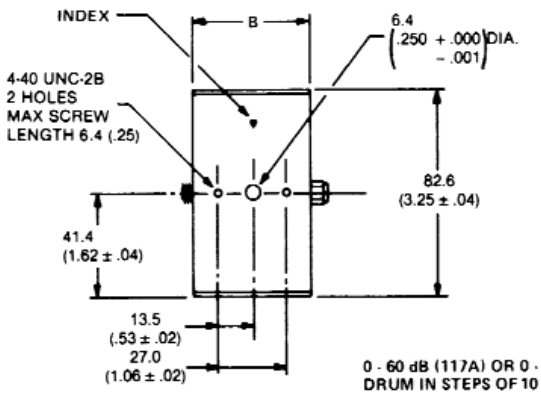
PHYSICAL DIMENSIONS:

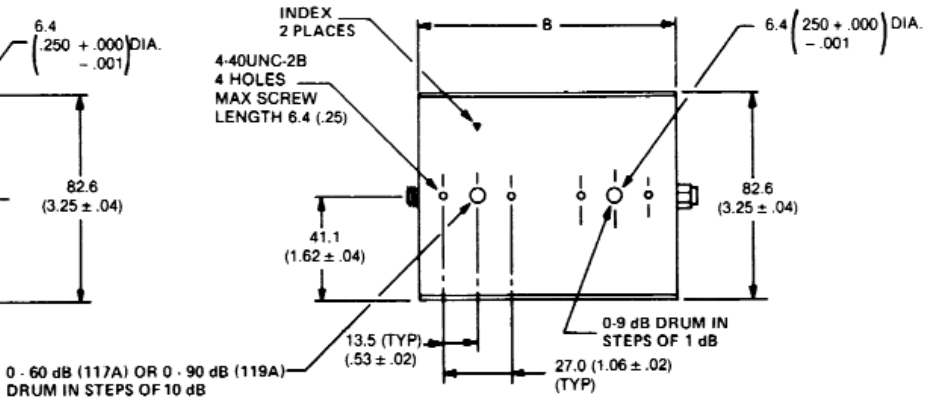
MODELS 115A, 116A, 118A



MODELS 117A, 119A







Model No.	DIM A	DIM B
119A	58.7 (2.31)	111.3 (4.38)
118A	29.0 (1.14)	57.7 (2.27)
117A	54.0 (2.11)	101.1 (3.98)
116A	23.9 (0.94)	47.5 (1.87)
115A	23.9 (0.94)	47.5 (1.87)

CONN Type	DIM C
Type N, Male	20.6 (0.81)
Type N, Female	18.3 (0.72)
SMA, Male	9.4 (0.37)
SMA, Female	7.9 (0.31)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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AEROFLEX WEINSCHEL

Model 9012
Manual Step Attenuators

dc to 26.5 GHz
2 Watts

2.92mm Connectors

Features

- **Choice of Attenuation Ranges and Step Sizes.**
- **Excellent Repeatability.**
- **Custom Configurations Available Upon Request.**
- **Highly Accurate Detent Stepping**
- **Ruggedized Connector -** Injection molded to provide consistent interface dimensions.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 9012: dc to 26.5 GHz
Model 9015: dc to 40.0 GHz

INCREMENTAL ATTENUATION RANGE/STEPS:

Model 9012-9:	0-9 dB in 1 dB steps
Model 9012-70:	0-70 dB in 10 dB steps

INCREMENTAL ATTENUATION ACCURACY:

Model No.	Accuracy
9012-9, 9015-9	± 0.5 dB
9012-70	± 1.0 dB or 2%

MAXIMUM SWR:

Frequency Range (GHz)	9012
dc - 18	1.40
18 - 26.5	1.50

MAXIMUM ZERO INSERTION LOSS (±dB):

Frequency Range (GHz)	9012
dc - 18	1.00
18 - 26.5	1.50

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 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE:

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

REPEATABILITY: ±0.5 dB to 60 dB

TEST DATA: Insertion loss and SWR data supplied at selected frequencies between 50 MHz and 26.5/40 GHz. Other test data can be provided at additional cost.

CONNECTOR: 2.92mm female connector - mate nondestructively with SMA connector per MIL-C-39012, SMK, 3.5mm, and other 2.92mm connector.

CONSTRUCTION: Stainless steel connector; gold plated beryllium copper contacts. Knob is included with each unit.

WEIGHT: Net 270 g (9.6 oz)

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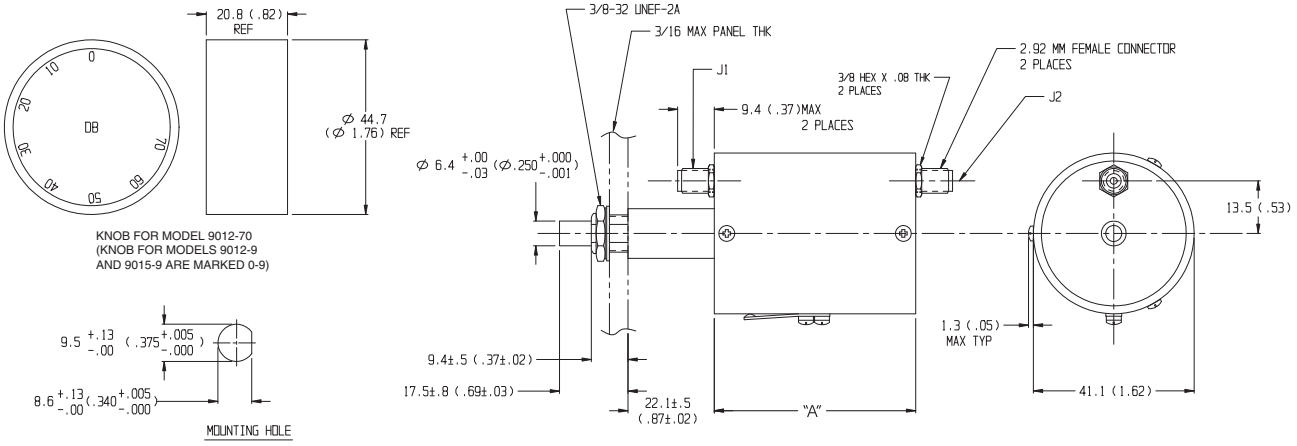
PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

Model No.	DIM A
9012-9, 9012-70	51.56 (2.03)

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Definitions & Conditions of Attenuator Related Parameters.....

Attenuation: A general term used to denote a decrease in magnitude in transmission from one point to another. NOTE: it may be expressed as a ratio, or by extension of the term, in decibels.

SWR: The ratio of voltage (or current) at a loop (maximum) on a transmission line to the value at a node (maximum). It is equal to the ratio of the characteristic impedance to the impedance of the load connected to the output end of the line.

Maximum Average Power: That maximum input power applied for a long time at the maximum operating temperature, with output terminated in the characteristic impedance, which will not permanently change the specifications of the attenuator after return to 20°C at 10 mW input. Rating, particularly for smaller attenuators, is influenced by structure(s) in thermal contact with unit. Heat sources and sinks can significantly alter the input power handling of an attenuator.

Power Coefficient of Insertion Loss: Variation in dB of insertion loss when input power is varied from 10 milliwatts to full rated power after steady state condition has been reached. To obtain dB, multiply power coefficient by dB and watts.

Maximum Peak Power: That peak power which when applied for a specified time at the maximum operating temperature at a pulse duration of 5 microseconds, while the output is terminated in the characteristic impedance, will not permanently change the specifications of the attenuator when returned to 20°C and 10 mW input.

Temperature Coefficient: Maximum change of insertion loss in dB/°C over maximum operating temperature range. To obtain, multiply temperature coefficient by dB and temperature change in °C.

Shock and Vibration: In the three major axes, case or body must be solidly supported when tested.

Frequency Sensitivity of Insertion Loss: Peak-to-peak variation in dB when swept through the frequency range at 20°C.

Operating Temperature Limit: Maximum temperature in °C at which attenuator will operate with full input power; derating function for maximum power vs temperature is specified if required.

Deviation of Insertion Loss from Nominal: At 20°C and an input power of 10 mW at a specified reference frequency.

Connector Life: Connected/disconnected cycles with complete axial engagement/disengagement without side thrust; all electric and mechanical specifications must be complied with after specified life cycle.

Intermodulation Distortion: Intermodulation distortion (IM) consists of the spurious signals which result from the mixing of nth order frequencies in the non-linear elements of a component. Third order intermodulation distortion is of particular interest because third order products typically represent the highest level distortion appearing close to the desired signal, and as such the highest level non-filterable distortion. Third order IM level (IM3) is tested by injecting two pure tones of equal magnitude (f1 and f2) into the component to be tested. The third order IM products will appear in the output spectrum at the frequencies 2f1-f2 and 2f2-f1. These products are characterized by defining their level (in dBc) relative to the fundamental output tones at either f1 or f2.

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Programmable Attenuators & Attenuator/Switch Controllers

AEROFLEX
A passion for performance.

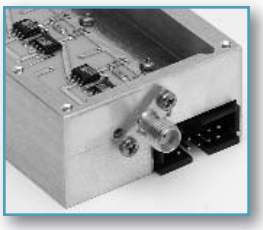
- Widest Selection of Attenuation Ranges & Steps Sizes
- ***Express*** shipment available on select models.
- Built-In TTL\CMOS Interface Driver Circuitry available.
- High Quality Construction & Connectors
- Special Configurations Available Upon Request
  - Custom Cell/Step Size Configurations
  - Higher Frequencies

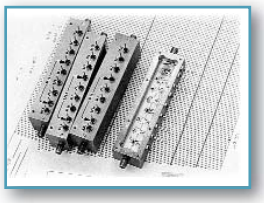
General Information

In this section of the catalog, each Programmable Attenuator is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the Programmable Attenuator(s) that fits your needs. The page number for each Programmable Attenuator data sheet is given in the quick reference guide.

This section includes all available accessories for the Aeroflex / Weinschel programmable attenuators such as our Model 8210A Attenuator / Switch Controller, product specific driver boards, and our programmable attenuators with our built-in microprocessor-based drivers. Also Included in this section are Aeroflex / Weinschel's wide variety of programmable attenuator units which includes the 8310, 8311 and 8312 series. Other subsystem solutions can be located in the Subsystem and Accessories section (pg 135).

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current product stocking quantities.





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Programmable Attenuators

Relay Switched Programmable Attenuators, Basic Models . . . DC-6 GHz

Model Number	Frequency Range (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss, Max. (dB)	Maximum SWR	Connector Type	Average Power (Watts)	Peak Power (Watts)	Page No.	
☆ 3200-1	dc-2.0	0-127	1	4.75	1.25-1.35*	SMA	1	50	89	
☆ 3200-2		0-63.75	0.25	4.75	1.25-1.35*					
☆ 3201-1		0-31	1	3.75	1.25					
☆ 3201-2		0-120	10	3.75	1.25					
3205-1		0-70	10	3.30	1.25					
3205-2		0-55	5	3.30	1.25					
3205-3		0-1.5	0.1	3.30	1.25					
☆ 3206-1		0-63	1	4.00	1.25					
3209-1		0-64.5	0.1	6.70	1.35					
☆ 3200-1E	dc-3.0	0-127	1	4.90	1.25-1.40*	SMA	1	50	89	
3200-2E		0-63.75	0.25	4.90	1.25-1.40*					
3201-1E		0-31	1	3.40	1.25-1.40*					
3205-3E		0-1.5	0.1	3.40	1.25-1.40*					
3206-1E		0-63	1	3.70	1.25-1.35*					
3209-1E		0-64.5	0.1	5.50	1.35-1.45*					
3250-63 (75 Ω)	dc-1.0	0-63	1	4.75	1.20-1.30*	BNC	1	50	98	
3406-55	dc-6.0	0-55	1	3.80	130	SMA	1	50	102	
3408-55.75		0-55.75	0.25	5.00						
3408-103		0-103	1							

Relay Switched Programmable Attenuators, with built-in Microprocessor-Base Driver . . . DC-3 GHz (For use with Aeroflex / Weinschel 8210A Controller)

Model Number	Frequency Range (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss, Max. (dB)	Maximum SWR	Connector Type	Average Power (Watts)	Peak Power (Watts)	Page No.	
3200T-1	dc-2.0	0-127	1	4.75	1.25-1.35*	SMA	1	50	95	
3200T-2		0-63.75	0.25	4.75	1.25-1.35*					
3201T-1		0-31	1	3.75	1.25					
3201T-2		0-120	10	3.75	1.25					
3205T-1		0-70	10	3.30	1.25					
3205T-2		0-55	5	3.30	1.25					
3205T-3		0-1.5	0.1	3.30	1.25					
3206T-1		0-63	1	4.00	1.25					
3209T-1		0-64.5	0.1	6.70	1.35					
3200T-1E	dc-3.0	0-127	1	4.90	1.20-1.40*	SMA	1	50	95	
3200T-2E		0-63.75	0.25	4.90	1.20-1.40*					
3201T-1E		0-31	1	3.40	1.20-1.40*					
3205T-3E		0-1.5	0.1	3.40	1.20-1.40*					
3206T-1E		0-63	1	3.70	1.25-1.35*					
3209T-1E		0-64.5	0.1	5.50	1.35-1.45*					
3250T-63 (75 Ω)	dc-1.0	0-63	1	4.75	1.20-1.30*	BNC	1	50	98	
3406T-55	dc-6.0	0-55	1	3.80	130	SMA	1	50	106	
3408T-55.75		0-55.75	0.25	5.00						
3408T-103 *(New)*		0-103	1							

* VARIES WITH FREQUENCY.

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Programmable Attenuators

AEROFLEX WEINSCHEL

Relay Switched Programmable Attenuators, with built-in Microprocessor-Based Driver . . . dc - 26.5 GHz (For use with Aeroflex / Weinschel 8210A Controller)

Model Number	Frequency Range (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss, Max. (dB)	Maximum SWR	Connector Type	Average Power (Watts)	Peak Power (Watts)	Page No.
150T-11	dc-18.0	0-11	1	2.2	1.50-1.90*	3.5mm	1	100	108
150T-15		0-15	1	2.2	1.50-1.90*				
150T-31		0-31	1	2.6	1.50-1.90*				
150T-62		0-62	2	2.6	1.50-1.90*				
150T-70		0-70	10	2.6	1.35-1.70*				
150T-75		0-75	5	2.2	1.50-1.90*				
150T-110		0-110	10	2.2	1.50-1.90*				
151T-11	dc-4.0	0-11	1	0.9	1.50	3.5mm	1	100	108
151T-15		0-15	1	0.9	1.50				
151T-31		0-31	1	0.9	1.50				
151T-62		0-62	2	1.1	1.50				
151T-70		0-70	10	0.7	1.35				
151T-75		0-75	5	0.9	1.50				
151T-110		0-110	10	0.9	1.50				
152T-55	dc-26.5	0-55	5	2.98	1.40-1.90*	3.5mm	1	100	108
152T-70		0-70	10	2.98	1.40-1.90*				
152AT-70		0-70	10	2.98	1.40-1.90*				
152T-75		0-75	5	2.98	1.40-1.90*				
152T-90		0-90	10	2.98	1.40-1.90*				

Relay Switched Programmable Attenuators, Basic Models . . . dc - 40.0 GHz

Model Number	Frequency Range (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss, Max. (dB)	Maximum SWR	Connector Type	Average Power (Watts)	Peak Power (Watts)	Page No.
150-11	dc-18.0	0-11	1	2.2	1.50-1.90*	3.5mm	1	100	112
150-15		0-15	1	2.2	1.50-1.90*				
150-31		0-31	1	2.6	1.50-1.90*				
150-70		0-70	10	2.6	1.35-1.70*				
150-75		0-75	5	2.2	1.50-1.90*				
150-110		0-110	10	2.2	1.50-1.90*				
151-11	dc-4.0	0-11	1	0.9	1.50	3.5mm	1	100	112
152-90	dc-26.5	0-90	10	2.98	1.40-1.80*	3.5mm	1	100	112
153-70	dc-40.0	0-70	10	3.00	1.30-2.10*	2.92mm	1	100	
153-110 *(New)*		0-110	10	4.00					

* VARIES WITH FREQUENCY.

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Programmable Attenuators

SOLID-STATE PROGRAMMABLES . . . to 3 GHz

Model Number	Frequency Range (GHz)	Attenuation Range (dB)	Step Size (dB)	Insertion Loss, Max. (dB)	Maximum SWR	Average Power	Connector Type	Page No.	
4216-63 4218-63.75 4218-127	0.8-2.3	0-63 0-63.75 0-127	1 0.25 1	2.40 - 3.40* 3.00 - 4.90* 3.00 - 4.90*	150 150 150	+28 dBm	SMA	117	
4226-63 4228-63.75 4228-103	0.8-3.0 0.8-2.5 0.8-3.0	0-63 0-63.75 0-103	1 0.25 1	3.75 4.50 5.50	1.50 1.50 1.50	+28 dBm	SMA	119	
4238-63.75 4238-103		0-63.75 103	0.25 1	6.75 - 9.25* 6.75 - 9.25*	1.60	+30 dBm	SMA	121	
4246-63 4248-63.75 4248-103 *(New)*	10 MHz-2.5	0-63 0-63.75 103/1	1 0.25	8.00 - 10.00* 10.50 - 13.00* 10.50 - 13.00*	2.00	+36 dBm	SMA	123	

* Varies with frequency.

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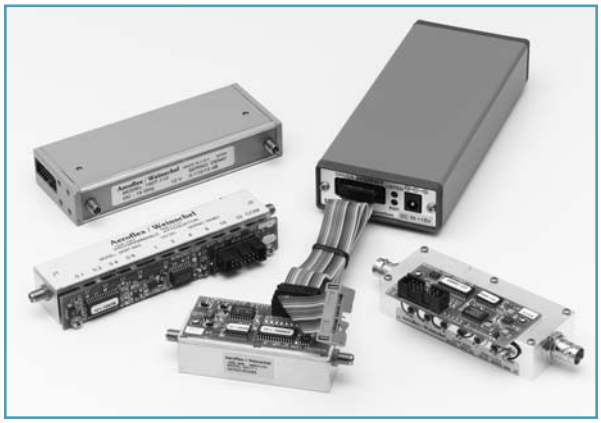
Programmable Attenuators

SmartStep® ATTENUATOR UNITS & CONTROLLERS. . . dc to 26.5 GHz, 100 Watts

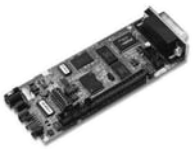


SmartStep® Programmable/Switch Controllers:

(pg 132-134)

The Model 8210A Attenuator / Switch Controller provides a flexible, low cost solution for the control and operation of electromechanical switches and programmable step attenuators using standard communication interfaces. The 8210A represents a new concept in device control applications for bench test and subsystem designs.

- Designed to interface with Aeroflex / Weinschel's line of programmable attenuators (3200T & 150T) and other electromechanical devices.
- Simplifies your bench test setups and subsystem design.



- Available in two standard communication interfaces:
  - Model 8210A-1:GPIB/IEEE-488 (HS-488 ready)
  - Model 8210A-2:RS-232, RS-422, RS-485

Each model contains similar capabilities and provides switch-selectable parameters to tailor the interface's operation.

SmartStep® 100 W Hot-Switchable High Power Attenuator Unit:

(pages 129-131)

- Available in 0-15 dB or 0-31 dB Configurations
- DC to 13 GHz Operation
- Power Handling up to 100 Watts average
- High Accuracy & repeatability
- IEEE-488 & Standard Serial Interfaces
- Relative vs. Nominal attenuation step function.
- Bus Controlled Programmable Attenuator Units

SmartStep® Programmable Attenuator Units for Rack or Bench Use:

(Pages 125-128)

Aeroflex / Weinschel's 8310 & 8311 Series Programmable Attenuator Units represent Aeroflex / Weinschel's newest concept in programmable attenuation for bench test and subsystem applications.

Standard 8310 Series designs house and control various Aeroflex / Weinschel Programmable Attenuator Models (3200T, 150T, and 4200 Series via front panel controls or standard communications interfaces including GPIB (IEEE-488) and RS-232/RS-422/RS485. The standard units combine the features of the Aeroflex / Weinschel 8210A Device Controller with a front panel user interface to form a flexible, easy to use solution.

Most 8310 Series are single channel configurations where RF signal is routed through either the front or rear mounted Ports A & B but can be configured for up to four channels of attenuation, RF switching, or other functions and other features such as:

- Multi-Channel attenuation paths (up to 4 input/ outputs).
- Relative vs. Nominal attenuation step function.
- Wide choice of Frequency & Attenuation Ranges.
  - dc to 1, 2, 3, 18 & 26.5 GHz
  - up to 127 dB
  - Solid-State (GaAs FET & PIN)
  - Relay Switched
  - 50 & 75 Ω Configurations
- High Accuracy & Repeatability.
- Easily mounted into racks or cabinets designed per EIA RS-310 or MIL-STD-189.

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Programmable Attenuators

Frequently Asked Questions about Programmable Attenuators....

What are the applications of Aeroflex / Weinschel programmable attenuators?

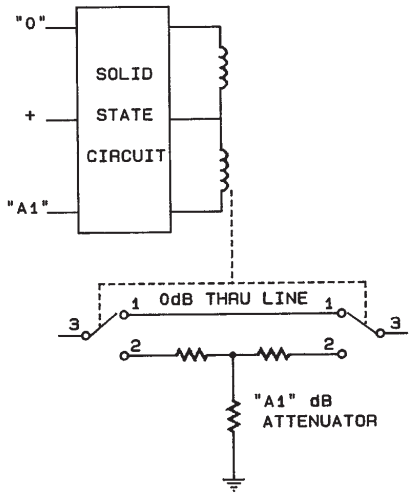
Aeroflex / Weinschel's programmable attenuators are used to control the power of radio frequency and microwave signals. Applications include control of input power to signal measuring systems, control of output power from signal generating systems, adjustment power for BIT error rate testing, controlling losses in a signal path and simulating the signal fading of a microwave communication system....to name just a few.

How do they work?

Aeroflex / Weinschel's programmable attenuators consist of a series of attenuation pads (cells) that are selectively inserted into the signal path via a control signal. An example is a series of cells such as 1, 2, 4, 8 and 16 dB arranged in a binary sequence. Such an attenuator is called a binary attenuator. Combinations of cells are switched "on" to provide attenuation steps from 0 dB to 31 dB. Another example is a unit having cell values of 10, 20 and 40 dB which will provide 10 dB steps between 0 dB and 70 dB.

How are the attenuators switched?

The basic structure of a programmable attenuator is shown below. There are several ways the attenuator pads are switched in and out of the RF path. Aeroflex / Weinschel's 3200 series uses TO-5 can relay switches. These are useful up to 2.0 GHz and higher. Aeroflex / Weinschel's 150 series operate up to 26.5 GHz and utilize reed switches housed within a precision machined cavity.



Aeroflex / Weinschel also manufactures programmable attenuators using solid state switching that offers faster switching speeds but their frequency range is more limited than mechanical step attenuators. Whereas mechanically switched attenuators operate from DC to their maximum frequency, solid state attenuators have a lower frequency limit. Solid state attenuators also have lower isolation between control and through path.

How fast do the attenuators switch?

Switching speed of mechanically switched attenuators is typically between 6 and 35 msec. This is the maximum time between the application of the switching command to the cell and the cessation of contact bounce. This time is a function of switch structure and size.

What is a latching and non-latching attenuator?

Non-latching is also called momentary or fail-safe. For the non-latching type, the attenuator is switched to the attenuation "on" position only so long as control power is applied to the switch. As soon as power is removed the switch reverts to it passive state or fail-safe state...usually the zero dB state. In latching attenuators each cell stays in the last setting even if power is removed. Latching attenuators have two control lines. One control line causes the attenuator to switch to the "attenuation on" setting while the other control line causes the attenuator to switch to the zero dB setting. There is normally a permanent magnet that holds the switch stable in either position.

Each version has its advantages and disadvantages. The non-latching switch requires constant power to the solenoid when in the "on" position. On the other hand the latching version requires greater switch current to overcome it's permanent magnet.

How are the attenuators controlled?

The Model 3200 and 3400 Series non-latching attenuators require only one 12 volt control line per cell. The direction of control current is not important.

The Model 150 Series is a latching version using one positive 5 volt or 24 volt common return line and two grounding control lines.

In order for switching to be guaranteed the voltage between common and control must be held within specified limits. Power supply regulation must be kept within range even while heavy switching current is being drawn. Any cable voltage drops must be added to the minimum control voltage to obtain the required power supply voltage at the attenuator.

Aeroflex / Weinschel's programmable attenuators, such as the Model 3200T, 3400T and 150T Series feature on-board TTL drivers. TTL driver boards are also available for most models.

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What is the switch life of these programmable attenuators?

Specified life for mechanical switches is normally in the range of 1 to 10 million switching. This specification is per switch, independent of the other switches in the attenuator. For the Model 150 series attenuators the specification is 5 million cycles, i.e. one cycle is the switch moving in both directions. These specifications are based on the mechanical life of the switch, however, other factors have an impact on attenuator life. High power operation can have an adverse effect on the switch contact surfaces. This can reduce the overall life of the switch by causing the attenuator performance to go outside it's specification.

What is monotonicity?

A programmable step attenuator is considered monotonic if it's attenuation always increases when it is commanded to increase. This applies on a per frequency basis. For instance the 20 dB setting at 1 GHz will always be less than the 21 dB setting at 1 GHz. This does not necessarily mean that the 20 dB setting at 1 GHz will always be less than the 21 dB setting 18 GHz. Monotonicity is influenced by the SWR of the individual attenuator cells as the cells are combined to form an attenuation value. It is also influenced by the summation of individual cell attenuation tolerances as the cells are combined.

What is the difference between insertion loss and incremental attenuation?

Programmable attenuators have insertion loss and also incremental attenuation. Insertion loss is the loss through the attenuator when all cells are switched to zero dB. It is the residual loss of the device itself. Insertion loss usually increases with frequency reaching several dB at the higher frequencies and generally has very flat frequency response. Incremental attenuation is the attenuation values of the attenuators cells relative to the insertion loss. Since insertion loss is always present, the performance of a programmable attenuator is always given as incremental attenuation relative to insertion loss. Insertion loss is considered part of the fixed performance of the system path in which the programmable attenuator is located.

What is the advantages of Attenuators with built-in driver circuitry?

These attenuators feature an internal microcontroller-based driver that provides a TTL-level digital interface for control of the attenuator relays (Figure 1). This card simplifies operation and interfacing requirements, while at the same time providing for greatly enhanced flexibility over past designs. User-selectable modes of operation include both parallel and serial bus.

The parallel mode provides a simple, one-bit per relay on/off control with internal pullups for use primarily in single attenuator applications. This mode allows the attenuator to be controlled via a variety of methods, such as a TTL-level digital output port, or mechanical toggle switches. The serial mode provides a two-wire serial bus structure and protocol for connecting a number of devices to a single host control interface, suitable for use in larger system and subsystem applications. The built-in driver™ contains non-volatile configuration memory that is used to hold a wide variety of attenuator and driver-dependent parameters, including serial number, attenuator cell dB values, relay configurations, and switching requirements, which are all accessible via the digital interface. This frees the system designer from such low-level details, allowing faster integration. In either operational mode, the microcontroller enters an idle condition during periods of inactivity, turning off all on-board clocks, reducing EMI concerns, and lowering power consumption. On-board regulation for the digital circuitry allows the programmable attenuator to operate from a single input supply voltage.

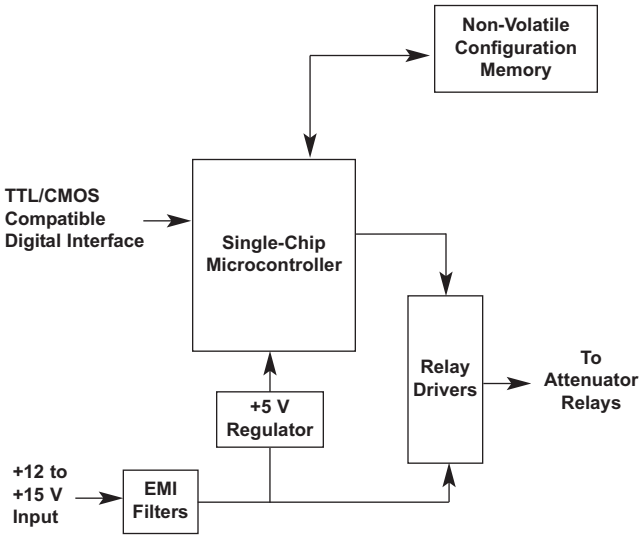

Figure 1. Digital Driver Circuitry

How can I control the Attenuators with built-in drivers?

The communications interface (Model 8210A) provides a flexible, low cost solution for the operation of programmable step attenuators and other electromechanical devices under computer control. Designed to interface to Aeroflex / Weinschel's line of programmable attenuators built-in intelligent drivers, the Model 8210A represents a new concept in device control applications for bench test and subsystem designs. The 8210A communications interface provides a high-level interface from various industry standard communications interfaces, including IEEE-488 and RS232 /RS422/RS485, to the programmable attenuators serial Driver Interface Bus.

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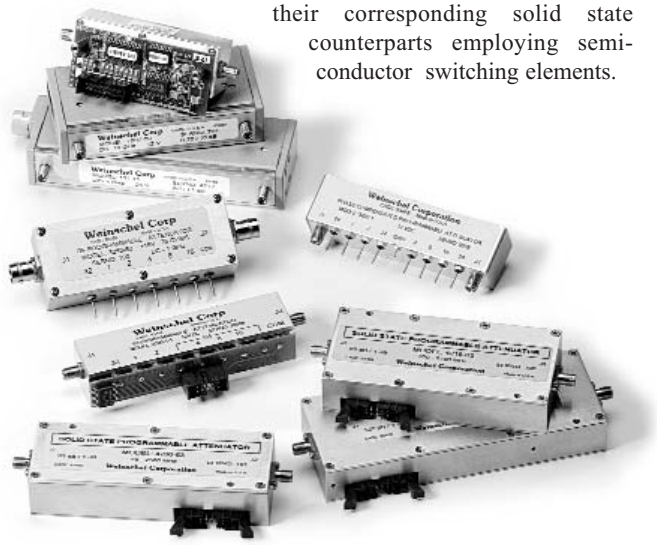
Intermodulation Distortion in Programmable Attenuators....

Weinschel has been a major supplier of programmable attenuators to the RF industry for over 25 years. Historically the most demanding specifications for these components have been low insertion loss and SWR, combined with a reasonable life expectancy of several million switching cycles. This was usually adequate for RF instruments like spectrum analyzers and signal generators, wherein the attenuator bandwidth rather than the switching speed was of prime concern. To achieve wide bandwidths the programmable attenuators were mostly of electromechanical design and the linearity of these passive components was not only assumed but never questioned by any customer. Intermodulation distortion discussions and problems were usually limited to components such as amplifiers, mixers and filters.

In recent years, however, wireless communication systems employing complex digital modulation schemes, increased channel capacity, high transmit power and extremely low receiver sensitivity have put into question the linearity of passive components. Even very low level multi-tone intermodulation products generated by attenuators can seriously degrade the efficiency of a system/ instrument if these products fall within the user passband. For two closely spaced tones at frequencies f1 and f2, the third order IM products at 2f1 - f2 and 2f2 - f1 , are the most harmful distortion products. They are harmful because they are located close to f1 and f2 and virtually impossible to filter out. In today's base stations the multicarrier power amplifier (MCPA) is replacing banks of single-channel amplifiers and their corresponding power combining network. MCPAs have the capability of carrying a number of modulation schemes simultaneously and can also employ schemes such as dynamic-channel-allocation (DCA) to use the allocated frequency spectrum more efficiently. The in-band intermodulation distortion (IMD) performance of these amplifiers is extremely critical and needs to be measured using low distortion programmable multi-tone generators whose IMD performance must be quite superior. This is discussed in the two case studies cited here.

Electromechanical programmable attenuators obviously provide a far superior IMD performance than their corresponding solid state counterparts employing semiconductor switching elements.



However, their slow switch speed, in the order of milliseconds, and short switch life in the order of 5-10 million cycles make them unattractive in some applications like cell phone testing and other ATE systems. Solid State programmable attenuators do overcome these two problems and are therefore included here for IMD performance comparison. It is not the intent of this brief article to go into the theory of intermodulation distortion. The goal here is to provide some good basic IMD test data for a variety of commercial programmable attenuators and let the end user select the most appropriate type for his application.

Measurement System and Parameters...

All test data presented here was generated using a commercially available Passive IM Analyzer, Summitek Model SI-800A which provides a fully integrated system for characterizing distortion produced by cables, attenuators and other passive devices. Although the system is capable of measuring both, through and reflected IM3, IM5, IM7 and IM9, the focus here is only on through IM for the most troublesome third order product, IM3. To carry out a meaningful comparison between different attenuators all measurements were carried out using two equal amplitude input tones at 869 MHz (f1) and 891 MHz(f2) , the IM3 frequency being 847 MHz (2f1-f2). Input carrier power was stepped in increments of 1 dB from -7dBm to +27dBm. All external adapters and cables were carefully selected to maintain the system's residual IM level of around -120 dBm. Although the system permitted receiver measurements between -70 to -120 dBm we restricted all measurements between -85 to -110 dBm by using a calibrated low IM coupler and attenuators at the output port of the DUT. One must be aware that the accuracy of such small signal measurements can easily be off by 2 to 3 dB so restricting the measurement dynamic range helps reduce the receiver non-linearity error. Measurements were done over several days to ensure stability and repeatability.

Distortion Comparison for Basic Types of Programmable Attenuators...

The programmable attenuators discussed here are the switched type with a discrete number of `cells'. Switching between the zero and attenuate state on each cell is achieved by a DPDT switch configuration. The cell values are usually in a binary sequence. For example a 6 cell/6 bit unit could have 1, 2, 4, 8, 16 and 32 dB sections providing a 63 dB dynamic range in 1dB increments. Four basic families of programmable attenuators are compared, each family being identified by the switch element used to achieve the transfer from zero to attenuate state.

For the purposes of distortion comparison it was deemed necessary to select units with similar electrical length and/or programmability. Both the electromechanical units, TO5 relay and edge-line type, had an electrical length of about 20 cms. The two solid state units had 6 cell programmability yielding 63 dB in 1 dB step size. All IM3 vs Pin measurements were done with the attenuators programmed to be in their characteristic zero insertion loss state. The zero state was selected because it generated the highest IM3 levels. The graph below shows the

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obvious compromise in IMD performance for the two solid state types. It is worth noting that the IM3 vs Pin slope is not exactly 3:1 as would be the case in a perfect third order device. The theoretical two tone third order intercept point, IP3, commonly used as a figure of merit for comparing linearity is shown in the following table at two different input power levels. The input IP3 is derived from the following relation:

$$\text{Input IP3} = \frac{3(\text{Pin}-\alpha)-\text{IM3}}{2} + \alpha$$

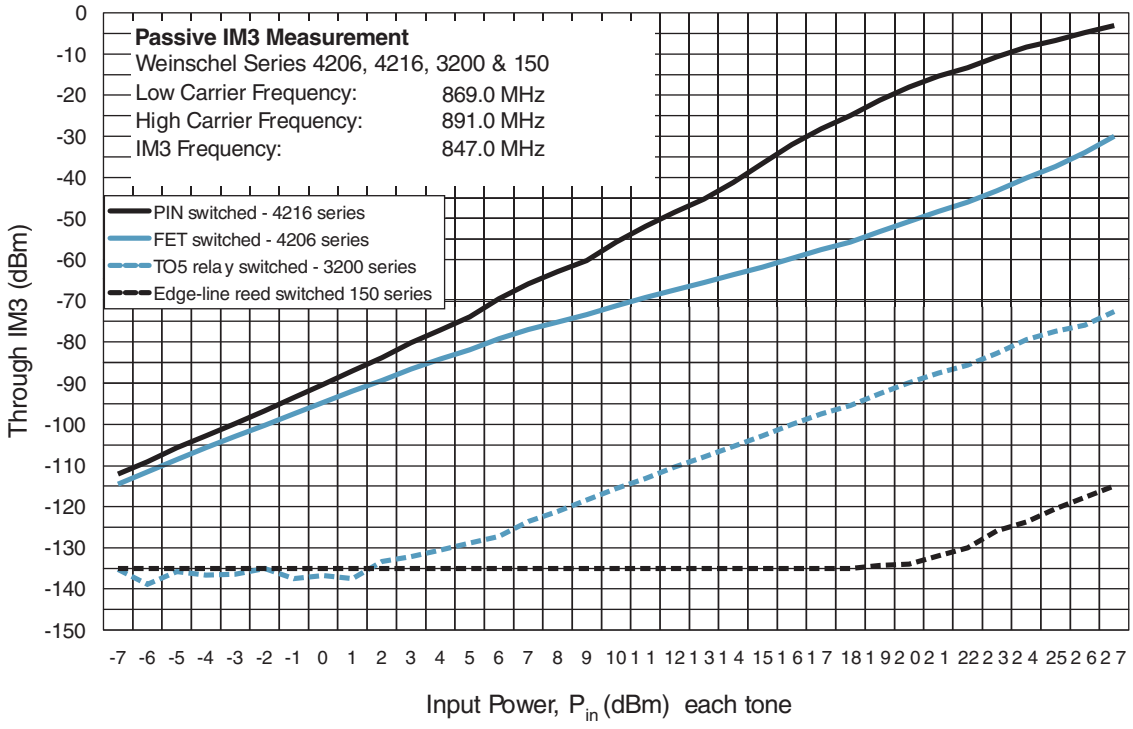
where α = zero insertion loss of each unit @ 847 MHz, the IM3 frequency. IM3 and Pin are selected from Table 1.

TABLE 1. SPECIFICATION COMPARISONS:

Parameter	Attenuator Type			
	PIN	FET	Relay	Edge-Line
IP3 @ 10 dBm	42.0 dBm	48.0 dBm	72 dBm	98 dBm*
IP3 @ 24dBm	39.0 dBm	53.5 dBm	75 dBm	98 dBm
I. Loss	2.0 dB	5.0 dB	1.5 dB	0 dB
Switching Time	2 µsec	2 µsec	5 msec	20 msec
Switch Life	∞	∞	10 million	5 million
Frequency (GHz)	0.8-2.3	0.01-2.5	dc-3	dc-26.5

* NOTE: Although the actual IM3 was not measurable the curve for the edge-line unit is linear and predictable unlike the two curves for the solid state attenuators. If we were to extrapolate this curve we would get the same IP3 figure of +98dBm as expected.

IM3 Performance of Electromechanical & Solid State Programmable Attenuators



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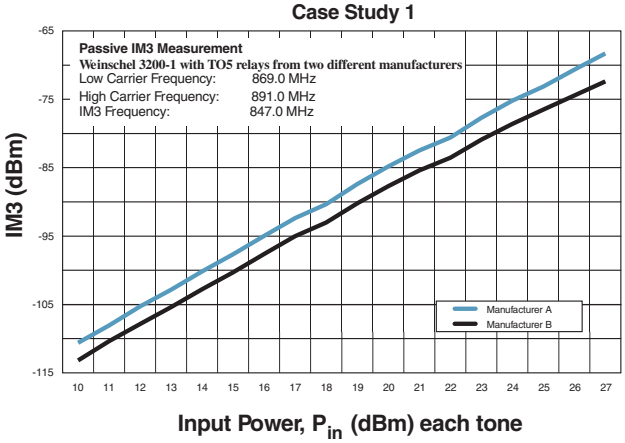
Case Study 1

Company A offers its IMD series Phase Aligned 8 tone generators to test intermodulation distortion in multi-carrier power amplifiers. The output level of these generators is accurately controlled using a Weinschel TO5 relay based programmable attenuator offering over 60 dB dynamic range. Eight +13 dBm carriers are input to the attenuator. In MCPAs with feedforward correction, in-band IMD levels could be as low as -75 dBc so Company A wanted at least -85 dBc at the output of their generator. The first problem was that Weinschel could not simulate the exact test conditions. This was readily resolved by establishing a good co-relation between our two tone IM3 measurement and Company A's 8 tone test. Having employed the best plating techniques and using good low IM connector design the attenuator was still short of the required IMD spec. The final improvement was achieved by extensive testing on relays from three different manufacturers. Figure 2 shows IM3 plots of the two best performers. Manufacturer B consistently provided a 4 to 5 dB improvement at the two tone level at Pin of +22 dBm and higher. This corresponded to an acceptable output distortion level for the Company A generator.

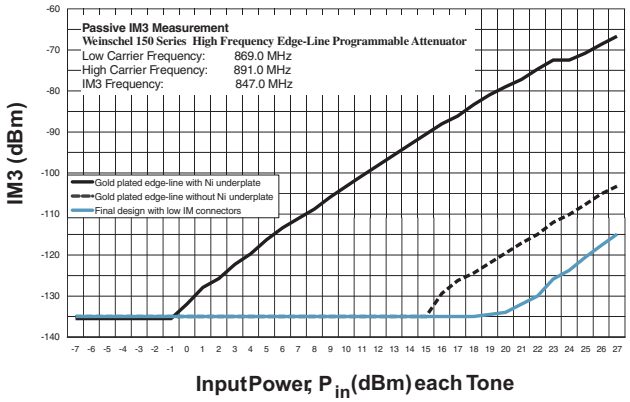
Input Power vs. Through IM3 Level
Case Study 1



Case Study 2

Company B manufactures ultra low distortion multi-tone signal generators. Their units offer up to 160 channels from 5 MHz through 1 GHz. Each carrier can be leveled as high as +10 dBm. One of their most stringent requirements is a cross modulation test. The Company B generator specification is -100 dB below the sideband of a 100% amplitude modulated carrier, which is -110 dBc. The actual components used in the critical path had to measure -120 dBc or better. Their generator needed an ultra linear attenuator to provide a programmed output level in 0.5 dB increments. Relay based units were tested and found to be unacceptable. The high performance edge-line attenuators were expected to solve the problem but at first they too fell short, but mainly in their zero attenuation state, which generates maximum distortion. Prior to supplying these units to Company B no customer had asked for a distortion specification on these supposedly passive attenuators. Environmental performance had warranted the use of nickel underplate on the edge lines. This was disclosed to the customer and suspected to be the prime cause of high IMD levels. Since the unit was going to be mounted in a benign environment, elimination of the nickel underplate was not thought to be a problem. Figure 3 demonstrates the tremendous reduction in IM3 levels upon elimination of the nickel underplate-a significant 40 dB! A further 10-15 dB improvement was achieved by redesigning the connectors to reduce their passive IMD. The IM improvement in these connectors would have served no purpose prior to the elimination of nickel. This is because the main source of distortion lay behind the connector back plane, along the edge transmission line, which had a far greater electrical length than the two connectors.

Input Power vs. Through IM3 Level
Case Study 2



Conclusion

Abundant intermodulation test data for four families of programmable attenuators has been presented in an easy format, together with their other key performance features. This should enable instrument and system designers to select the most suitable type for their application.

The two case studies have also demonstrated that an OEM component supplier cannot possibly simulate the different distortion test scenarios of every customer. Such tests would be extremely varied, complex and cost prohibitive. The IM analyzer used at Weinschel was indeed a narrow band instrument and one might be concerned about the unit's performance at other frequencies. This is a legitimate concern for the solid state types, in which the distortion mechanism is a strong function of the operating frequency. For the broadband electromechanical types this is not a major issue. However, with a meaningful two tone intermodulation measurement it is quite possible to get an excellent correlation with the customer's test conditions and thereby come up with a corresponding specification under the two tone test. It is helpful though, to be able to replicate the total power level that the unit would be subjected to in the field.

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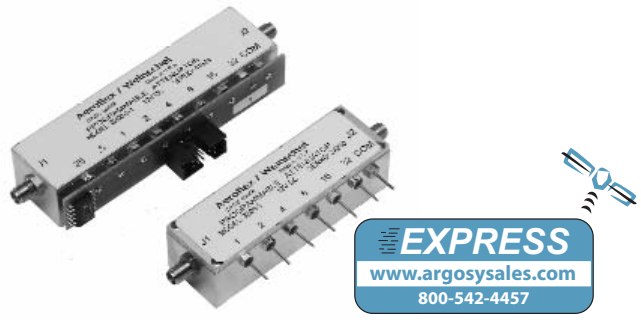
AEROFLEX WEINSCHEL

Model 3200 Series
Model 3200 (E Series)
Programmable Attenuators
with optional TTL Interface

dc to 2.0 GHz
dc t0 3.0 GHz
1 Watt



Features

- **Widest Selection of Attenuation Ranges & Step Sizes**
- **Available *Express* Models:** 3200-1, 3200-1E-2
  3200-2
  3201-1, 3201-2
  3206-1
  Other models may be available for Express delivery.
- **High Quality Construction & Connectors**
- **Special Configurations Available Upon Request**
  - Custom Cell/Step Size Configurations
  - 3.0 GHz and Higher Frequencies

Description

The 3200 Series Programmable Step Attenuators are designed for use in automatic test equipment and OEM systems operating in the dc to 3 GHz frequency range. This series is available in many standard attenuation ranges and cell configurations. Custom designed configurations are available upon request. Each cell contains a double-pole, double-throw relay that provides a zero path or attenuated path for the RF signal.

Microstrip circuitry and special compensation techniques produce flat attenuation versus frequency characteristics. The microstrip construction, using thick-film circuit elements, ensures product uniformity. To minimize RF leakage, the 3200 Series Attenuators are provided with gold-plated contact areas and feedthrough filters at each control terminal.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE:

dc to 2.0 GHz: 3200-1, 3200-2, 3201-1, 3201-2, 3205-1, 3205-2, 3205-3, 3206-1, 3209-1

dc to 3.0 GHz: 3200-1E, 3200-2E, 3201-1E, 3205-3E, 3206-1E, 3209-1E

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
3200-1 3200-1E	8	127/1	1, 2, 4, 8, 16, 32, 64*
3200-2 3200-2E	8	63.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 32
3201-1 3201-1E	5	31/1	1, 2, 4, 8, 16
3201-2	5	120/10	10, 20, 30, 60**
3205-1	4	70/10	10, 20, 20, 20
3205-2	4	55/5	5, 10, 20, 20
3205-3 3205-3E	4	1.5/0.1	0.1, 0.2, 0.4, 0.8
3206-1 3206-1E	6	63/1	1, 2, 4, 8, 16, 32
3209-1 3209-1E	10	64.5/0.1	0.1, 0.2, 0.4, 0.8, 1, 2, 4, 8, 16, 32

*64 dB cell comprised of two 32 dB cells
*60 dB cell comprised of two 30 dB cells

MAXIMUM SWR:

Freq Range (GHz)	3200-1 3200-2	3200-1E 3200-2E 3201-1E 3205-3E	3201-X 3205-X 3206-X	3206-1E	3209-1	3209-1E
dc - 0.2	1.30	1.25	1.30	1.25	1.35	1.35
0.2 - 1	1.25	1.25	1.25	1.25	1.35	1.35
1 - 2	1.35	1.25	1.35	1.25	1.35	1.35
2 - 3	- - -	1.40	- - -	1.35	- - -	1.45

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
dc - 0.5	± 0.2 dB or 0.5%
0.5 - 1	± 0.2 dB or 1.0%
1 -3	± 0.3 dB or 2.0%

MONOTONICITY: dc to 3.0 GHz

INCREMENTAL TEMPERATURE COEFFICIENT:

30 and 32 dB Cells:	0.00005 dB/dB/°C
All other cells:	0.00002 dB/dB/°C

POWER RATING: 1 watt average to 25°C ambient temperature, derated linearly to 0.25 watt @ 71°C. 50 watts peak (5 µsec pulse width; 1% duty cycle)

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Revision Date: 12/10/09

AEROFLEX WEINSCHEL

Programmable Attenuators

Specifications - Con't

MAXIMUM INSERTION LOSS (dB):

Frequency Range (GHz)	3200-1 3200-2	3200-1E 3200-2E	3201-1 3201-2	3205-X	3201-1E	3205-3E	3206-1	3206-1E	3209-1	3209-1E
dc - 0.5	2.80	2.20	1.80	1.80	1.50	1.25	2.00	1.50	3.50	3.00
0.5 - 1.0	3.50	3.00	2.40	2.30	1.80	1.75	2.70	2.00	4.50	3.50
1.0 - 1.5	4.25	3.20	3.00	2.80	2.25	2.25	3.30	2.50	5.60	4.00
1.5 - 2.0	4.75	3.70	3.75	3.30	2.50	2.50	4.00	2.80	6.70	4.50
2.0-3.0	- - -	4.90	- - -	- - -	3.40	3.40	- - -	3.70	- - -	5.50

POWER COEFFICIENT: <0.005 dB/dB/watt

RATED SWITCH LIFE: 5 million cycles operations per cell @ 0 dBm

SWITCHING TIME: 6 msec. maximum at nominal rated voltage

RELEASE TIME: 3 msec maximum

CYCLING RATE: 5 Hz maximum per relay

OPERATING VOLTAGE: +12V (+ 16V maximum; +10V minimum)

OPERATING CURRENT:

2 GHz Models: 14 mA typical per cell @ +12V
3 GHz Models: 30 mA typical per cell @ +12V

TEMPERATURE RANGE (Operating): -55°C to +71°C

TEST DATA: Test data is available at additional cost.

CONNECTORS: SMA female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONTROL TERMINALS: 0.040 inch. (1 mm) diameter solderable leads. May be used with PC board sockets/ receptacles.

CONSTRUCTION:

Housing:	Aluminum
Connectors:	Stainless steel body and beryllium copper contacts.
Control terminals:	Brass/Copper, Silver plated

WEIGHT (Typical):

3200-1, 3200-2, 3200-1E & 3200-2E:	117 g (4.1 oz)
3201-1 & 3201-1E:	89 g (3.1 oz)
3201-2:	96 g (3.4 oz)
3205-1, 3205-2, 3205-3, 3205-3E:	77 g (2.7 oz)
3206-1, 3206-1E:	99 g (3.5 oz)
3209-1, 3209-1E:	159 g (5.6 oz)

MODEL NUMBER DESCRIPTION:

Example, DC-2 GHz models:

320X-Y	For a basic 2 GHz model*
320X-Y-1	Add -1 for TTL driver board with a 10 pin ribbon cable connector.
320X-Y-2	Add -2 for TTL driver board with a 15 pin D type connector.

Example, DC-3 GHz models:

Add E as in:

320X-YE	For a basic 3 GHz model*
320X-YE-1	Add -1 for a TTL driver board with a 10 pin ribbon cable connector
320X-YE-2	Add -2 for a TTL driver board with a 15 pin D connector

* Use the Cell Configuration table to determine X and Y for available attenuation ranges.

CONTROL CONFIGURATION:

Standard Unit: One terminal is connected to case ground and the remaining terminals are provided for activation of individual cells. Attenuation is fail-safe to "0" setting in the absence of a control voltage. Application of a voltage (+) to a particular cell causes it to switch to the attenuate position.

Units with TTL Option: Units with this option are supplied with a very low profile connectorized TTL interface board mounted directly to the control terminals. This TTL interface option is available with either a 10 pin ribbon cable connector or a 15 pin "D" connector (**limited models**), refer to list below. Each type is supplied with a mating connector. Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

To order 3200 Series Attenuators with this option add -1 to basic model number for ribbon cable connector and -2 for the "D" connector. Example: Model 3201-1 with a TTL interface board would be 3201-1-1. Mating connector is provided. To order a TTL Driver board separately for an existing 3200 Series Attenuator, use the following:

Basic Model No.	TTL BD Kit Part No. 10 Pin Ribbon	TTL BD Part No. 15 Pin "D" CONN
3200-1, 3200-1E	101-1781	101-1798-000**
3200-2, 3200-2E	101-1781	101-1798-000**
3201-1, 3201-2E	101-1780	101-1798-001**
3201-2	101-1780	101-1798-001**
3205-1	101-1780	101-1798-001**
3205-2	101-1780	101-1798-001**
3205-3, 3205-3E	101-1780	101-1798-001**
3206-1, 3206-3E	101-1780	N/A
3209-1, 3209-1E	101-1804-000*	N/A

* 14 pin ribbon connector.

** 3 FT TTL Interface Cable Part No. 101-1805 supplied with unit.

Note: Control is non-latching and requires a continuous control signal for the period of time in which attenuation is required.

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Programmable Attenuators

TTL DRIVER SPECIFICATIONS:

INTERFACE CONNECTOR: Option -1(Models 3200, 3201, 3205 and 3206): 10 pin .025 square post header on .1 center, mates with Amp connector 746285-1 or equivalent. Option -1 (3209): 14 pin .025 square post header on .1 center, mates with Amp connector 746285-2 or equivalent. Option -2: 15 pin D Socket Connector, mates with Cannon connector DA-15S or equivalent.

INPUT VOLTAGE: V_{IN} High= +2.0V minimum
+5.0V typical
Vcc maximum
V_{IN} Low = 0 minimum
0.8 maximum

INPUT CURRENT: I_{IN} (V_{IN}=2.4 V) = 55 µA
I_{IN} (V_{IN}=3.85 V) = 280 µA

SUPPLY CURRENT (Digital Section): I_{CC}=25.0 mA maximum

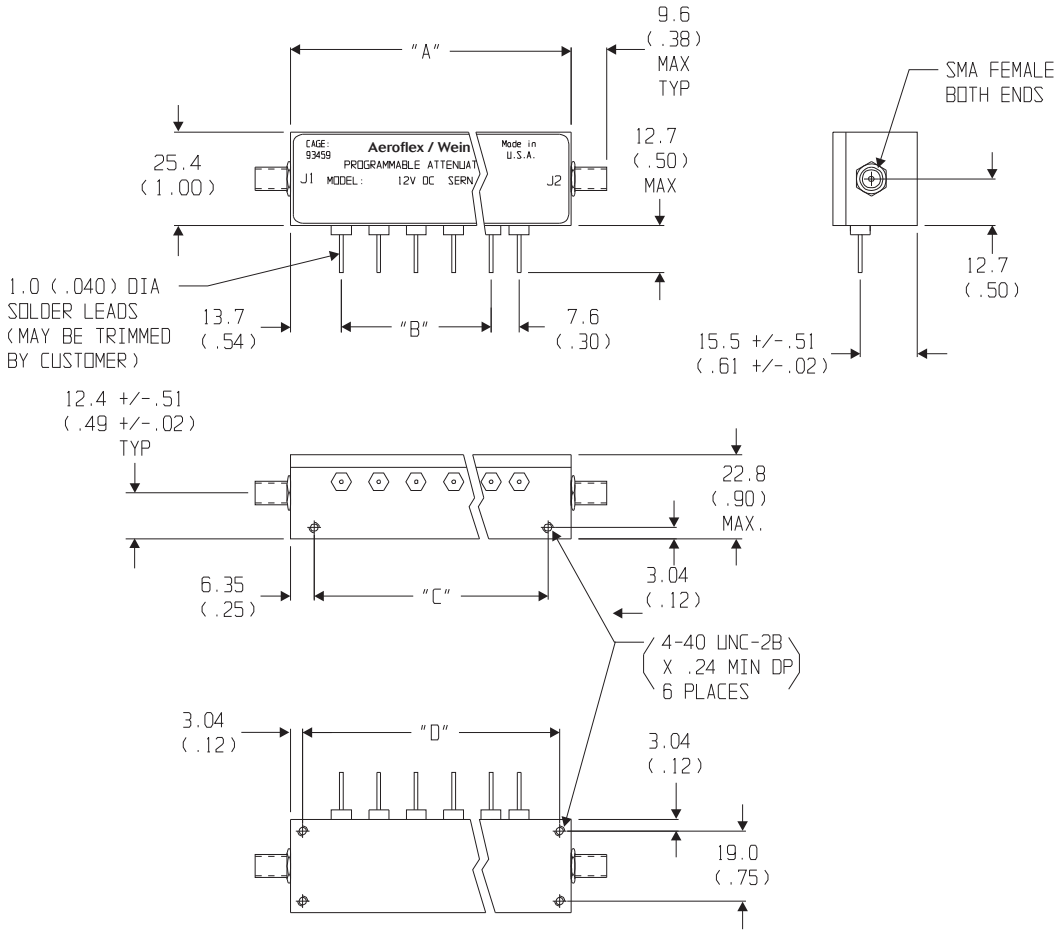
SUPPLY CURRENT (per cell continuos): I_{CC}=25.0 mA maximum for 2 GHz models and 30 mA per cell for 3 GHz models.

SUPPLY VOLTAGE: Vcc=+12.0 to +15V

TEMPERATURE RANGE (Operating): -40°C to +70°C

MODELS WITH BUILT-IN DRIVERS: Most 3200s are available with an intelligent interface\driver cards. These are designed to interface with our 8210A Series Controllers which greatly simplifies computer control applications. Refer to Model 3200T and 3201T data sheet for more information.

PHYSICAL DIMENSIONS:



Model No.	No. Cells	A	B	C	D
3200-X	8	101.6 (4.0	7 EQ SPCS @ 10.16 (.40) = 71.1 (2.80)	88.9 (3.50)	95.2 (3.75)
3201-X	5/4	76.2 (3.00)	4 EQ SPCS @ 10.16 (.40) = 40.64 (1.60)	63.5 (2.50)	69.8 (2.75)
3205-X	4	58.9 (2.32)	3 EQ SPCS @ 10.16 (.40) = 30.5 (1.20)	46.2 (1.82)	52.6 (2.07)
3206-X	6	81. 3±0.5 (3.20±0.02	5 EQ SPCS @ 10.16 (.40) = 50.8 (2.00)	68.6 (2.70)	75.18 (2.96)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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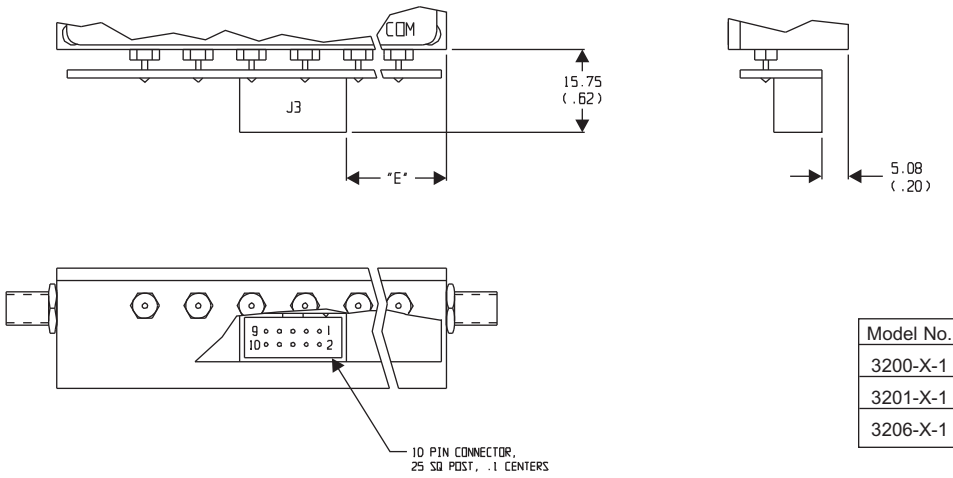
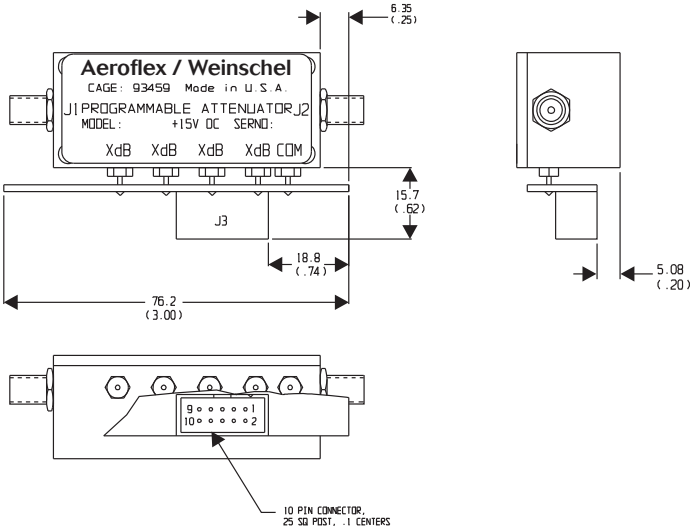
PHYSICAL DIMENSIONS:

TTL OPTION -1 (3200, 3201, 3206):



Model No.	E
3200-X-1	37.8 (1.49)
3201-X-1	18.8 (0.74)
3206-X-1	18.8 (0.74)

TTL OPTION -1 (3205):



Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	3200-1-1 dB (Cell)	3200-2-1 dB (Cell)	3201-1-1 dB (Cell)	3201-2-1 dB (Cell)	3205-1-1 dB (Cell)	3205-2-1 dB (Cell)	3205-3-1 dB (Cell)	3206-1-1 dB (Cell)
1	32	0.25	NC	NC	NC	NC	NC	NC
2	1	0.5	NC	NC	NC	NC	NC	NC
3	2	1	1	30	NC	NC	NC	1
4	32*	2	2	10	10	5	0.1	2
5	4	4	4	30**	20	10	0.2	4
6	8	8	8	20	20	20	0.4	8
7	16	16	16	30**	20	20	0.8	16
8	32*	32	NC	NC	NC	NC	NC	32
9	COM	COM	COM	COM	COM	COM	COM	COM
10	+Vcc	+Vcc	+Vcc	+Vcc	+ Vcc	+ Vcc	+Vcc	+ Vcc

*64 dB cell comprised of two 32 dB cells
**60 dB cell comprised of two 30 dB cells
NC = Not Connected

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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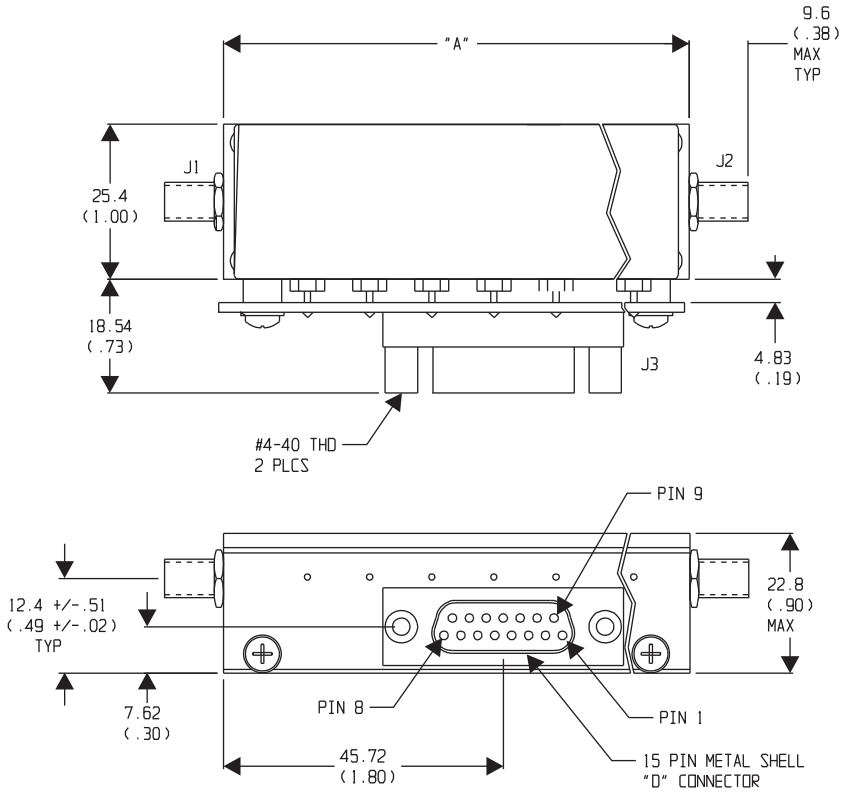
PHYSICAL DIMENSIONS:

TTL Driver Option -2 (3200, 3201, 3205):



Model No.	A
3200-X-2	101.6 (4.00)
3201-X-2	76.2 (3.00)
3205-X-2	76.2 (3.00)

Control Connector J3 Pin Locations:

"D" Conn PIN No. (J3)	3200-1-2 dB (Cell)	3200-2-2 dB (Cell)	3201-1-2 dB (Cell)	3201-2-2 dB (Cell)	3205-1-2 dB (Cell)	3205-2-2 dB (Cell)	3205-3-2 dB (Cell)	Cable (P/N 101-1805) Color Code
1	32	32	NC	NC	NC	NC	NC	BRN
2	16	16	NC	NC	NC	NC	NC	YEL
3	8	8	NC	NC	NC	NC	NC	GRN
4	4	4	16	30**	20	20	0.8	LT BLU
5	32	0.25	1	30**	NC	NC	NC	VIO
6	1	0.5	2	10	10	5	0.1	GRY
7	2	1	4	30	20	10	0.2	WHT
8	32*	2	8	20	20	20	0.4	WHT/BLK
9	NC	NC	NC	NC	NC	NC	NC	RED
10	GND	GND	GND	GND	GND	GND	GND	BLK
11	NC	NC	NC	NC	NC	NC	NC	- - -
12	NC	NC	NC	NC	NC	NC	NC	- - -
13	NC	NC	NC	NC	NC	NC	NC	- - -
14	NC	NC	NC	NC	NC	NC	NC	- - -
15	+Vcc	+Vcc	+Vcc	+Vcc	+Vcc	+Vcc	+Vcc	ORN

*64 dB cell comprised of two 32 dB cells
**60 dB cell comprised of two 30 dB cells
NC = Not Connected

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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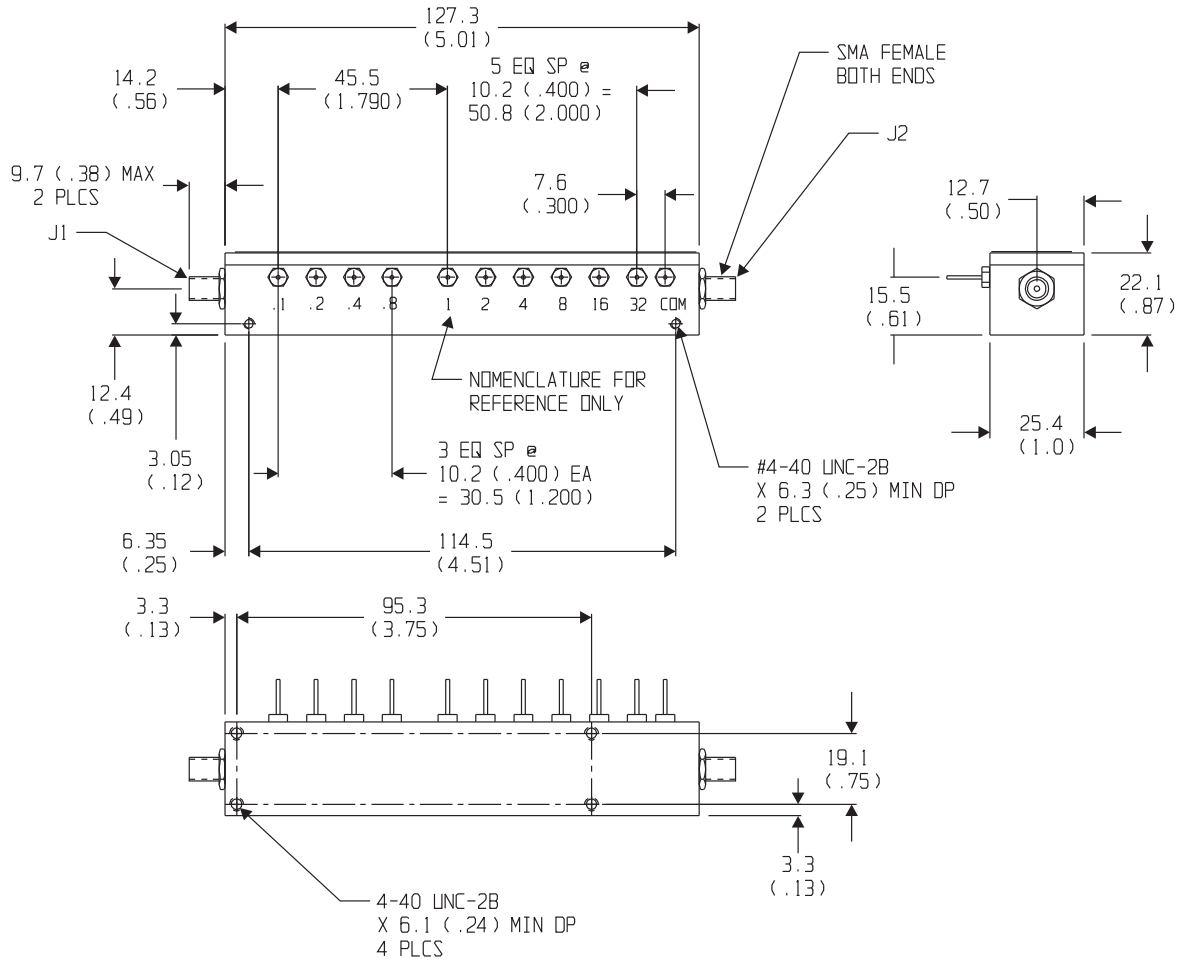
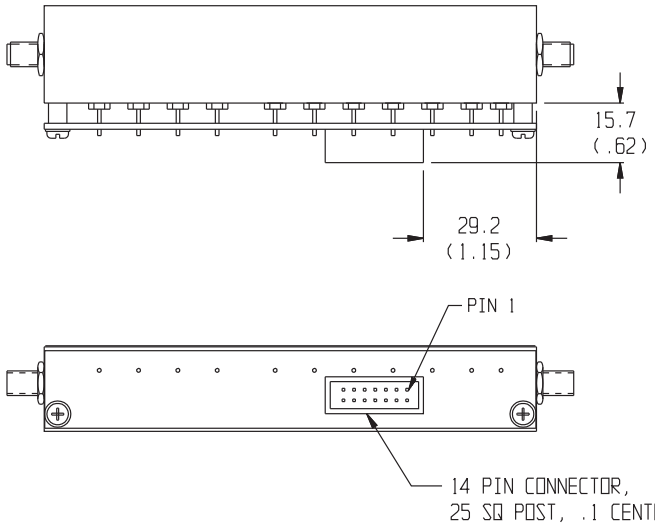
PHYSICAL DIMENSIONS:

Model 3209-1:



Model 3209-1-1 (TTL Option -1):



CONN	SIGNAL DES
J3-14	GND
J3-13	+12V
J3-12	N/A
J3-11	N/A
J3-10	32dB
J3-9	16dB
J3-8	8dB
J3-7	4dB
J3-6	2dB
J3-5	1dB
J3-4	.8dB
J3-3	.4dB
J3-2	.2dB
J3-1	.1dB

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Programmable Attenuators

AEROFLEX WEINSCHEL

Model 3200T — dc to 2.0 GHz
Model 3200T (E Series) — dc to 3.0 GHz
SmartStep® Programmable Attenuators — 1 Watt
with built-in Microprocessor-Based Driver

For Use with Weinschel 8210A Controller

Features

- **Widest Selection of Attenuation Ranges & Steps Sizes**
- **Built-In TTL\CMOS Interface Driver Circuitry**
- **High Quality Construction and Connectors**
- **Special Configurations Available Upon Request**
  - Custom Cell/Step Size Configurations
  - 3.0 GHz and Higher Frequencies

Description

This line of intelligent programmable step attenuators with a built-in digital interface are designed to simplify the control and integration of these devices into subsystem and bench applications. This series of Programmable Step Attenuators is designed for use in automatic test equipment and OEM systems operating in the dc to 3 GHz frequency range. These models are available in many standard attenuation ranges and cell configurations. Each cell contains a double-pole, double-throw relay that provides a minimum loss or attenuated path for the RF signal.

Microstrip circuitry and special compensation techniques produce flat attenuation versus frequency characteristics. The microstrip construction, using thick-film circuit elements, ensures product uniformity. To minimize RF leakage, the 3200T Series Attenuators are provided with gold-plated contact areas and feedthrough filters at each control terminal.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE:

dc to 2.0 GHz: 3200T-1, 3200T-2, 3201T-1, 3201T-2, 3205T-1, 3205T-2, 3205T-3, 3206T-1, 3209T-1

dc to 3.0 GHz: 3200T-1E, 3200T-2E, 3201T-1E, 3205T-3E, 3206T-1E, 3209T-1E

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
3200T-1 3200T-1E	8	127/1	1, 2, 4, 8, 16, 32, 64*
3200T-2 3200T-2E	8	63.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 32
3201T-1 3201T-1E	5	31/1	1, 2, 4, 8, 16
3201T-2	5	120/10	10, 20, 30, 60**
3205T-1	4	70/10	10, 20, 20, 20
3205T-2	4	55/5	5, 10, 20, 20
3205T-3 3205T-3E	4	1.5/0.1	0.1, 0.2, 0.4, 0.8
3206T-1 3206T-1E	6	63/1	1, 2, 4, 8, 16, 32
3209T-1 3209T-1E	10	64.5/0.1	0.1, 0.2, 0.4, 0.8, 1, 2, 4, 8, 16, 32

*64 dB cell comprised of two 32 dB cells
**60 dB cell comprised of two 30 dB cells

MAXIMUM SWR:

Freq Range (GHz)	3200T-1 3200T-2	3200T-1E 3200T-2E	3201T-X 3205T-X 3206T-X	3201T-1E 3205T-3E 3206T-1E	3209T-1	3209T-1E
dc - 0.2	1.30	1.25	1.30	1.25	1.35	1.35
0.2 - 1	1.25	1.25	1.25	1.25	1.35	1.35
1 - 2	1.35	1.25	1.35	1.25	1.35	1.35
2 - 3	- - -	1.40	- - -	1.35	- - -	1.45

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
dc - 0.5	± 0.2 dB or 0.5%
0.5 - 1	± 0.2 dB or 1.0%
1 -3	± 0.3 dB or 2.0%

MONOTONICITY: dc to 3.0 GHz

INCREMENTAL TEMPERATURE COEFFICIENT:

30 and 32 dB Cells:	0.00005 dB/dB/°C
All other cells:	0.00002 dB/dB/°C

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Revision Date: 12/10/09

AEROFLEX WEINSCHEL

Programmable Attenuators

Specifications - Con't

MAXIMUM INSERTION LOSS (dB):

Frequency Range (GHz)	3200T-1 3200T-2	3200T-1E 3200T-2E	3201-1 3201-2	3205T-X	3201T-1E 3205T-3E	3206T-1	3206T-1E	3209T-1	3209T-1E
dc - 0.5	2.80	2.00	1.80	1.80	1.25	2.00	1.50	3.50	3.00
0.5 - 1.0	3.50	2.70	2.40	2.30	1.75	2.70	2.00	4.50	3.50
1.0 - 1.5	4.25	3.00	3.00	2.80	2.25	3.30	2.50	5.60	4.00
1.5 - 2.0	4.75	3.50	3.75	3.30	2.50	4.00	2.80	6.70	4.50
2.0-3.0	- - -	4.30	- - -	- - -	3.40	- - -	3.70	- - -	5.50

POWER RATING: 1 watt average to 25°C ambient temperature, derated linearly to 0.25 watt @ 71°C. 50 watts peak (5 µsec pulse width; 1% duty cycle)

POWER COEFFICIENT: < 0.005 dB/dB/watt

RATED SWITCH LIFE: 5 million cycles operations per cell @ 0 dBm

CYCLING RATE: 5 Hz maximum per relay

DRIVER INTERFACE:

Input Supply Voltage:	+12.0 to +15. V
Control Signals:	TTL/CMOS compatible
Interface Modes:	parallel / serial

DC Characteristics (at 25 °C):

Parameter		Specification
V_{IL}	Low-level input V:	-0.5V min, 0.8V max
V_{IH}	High-level input V:	2.0V min, 5.25V max
I_{PU}	Pullup current	50 µA min, 400 µA max
V_{IN}	Supply Voltage:	+12.0 to +15.0V
I_{IN}	Supply current: (digital section)	25 mA
I_{CELL}	Supply current:	15 mA (2 GHz Units)
	(per cell) continuous	30 mA (3 GHz Units)

TEMPERATURE RANGE (Operating): -20°C to +70°C

TEST DATA: Test data is available at additional cost.

CONNECTORS: SMA female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

INTERFACE CONNECTOR: 14 pin .025 square post header on .1 center. Mates with Amp connector 746285-2 or equivalent.

CONSTRUCTION:

Housing:	Aluminum
Connectors:	Stainless steel body and beryllium copper contacts.

WEIGHT:

3200T-X	165 g (8.4 oz)
3201T-X	132 g (7.3 oz)
3205T-X	132 g (7.3 oz)
3206T-X	132 g (7.3 oz)
3209T-X	218 g (9.7 oz)

ACCESSORIES

Programmable Attenuator/Switch Controller: The Model 8210A Programmable Attenuator/Switch Controller provides a flexible, low cost solution for the operation of programmable step attenuators and other electromechanical devices under computer control. Designed to interface to Aeroflex / Weinschel's intelligent programmable attenuators, the 8210A represents a new concept in device control applications for bench test and subsystem designs. The 8210A provides a high-level interface from various industry standard communications interfaces, including IEEE-488 and RS232/RS422/RS485, to the programmable attenuator's serial Driver Interface Bus.

CONTROL CONFIGURATION

These programmable attenuators feature an internal microcontroller-based driver that provides a TTL-level digital interface for control of the attenuator relays. This card simplifies operation and interfacing requirements, while at the same time providing for greatly enhanced flexibility over past designs. User-selectable modes of operation include both parallel and serial bus. The parallel mode provides a simple, one-bit per relay on/off control with internal pullups for use primarily in single attenuator applications. This mode allows the attenuator to be controlled via a variety of methods, such as a TTL-level digital output port, or mechanical toggle switches. The device bus provides a two-wire serial bus structure and protocol for connecting a number of devices to a single host control interface, suitable for use in larger system and sub-system applications. The digital interface contains non-volatile configuration memory that is used to hold a wide variety of attenuator and driver-dependent parameters, including serial number, attenuator cell dB values, relay configurations, and switching requirements, which are all accessible via the digital interface.

In either operational mode, the microcontroller enters an idle condition during periods of inactivity, turning off all on-board clocks, reducing EMI concerns, and lowering power consumption. On-board regulation for the digital circuitry allows the attenuator to operate from a single input supply voltage.

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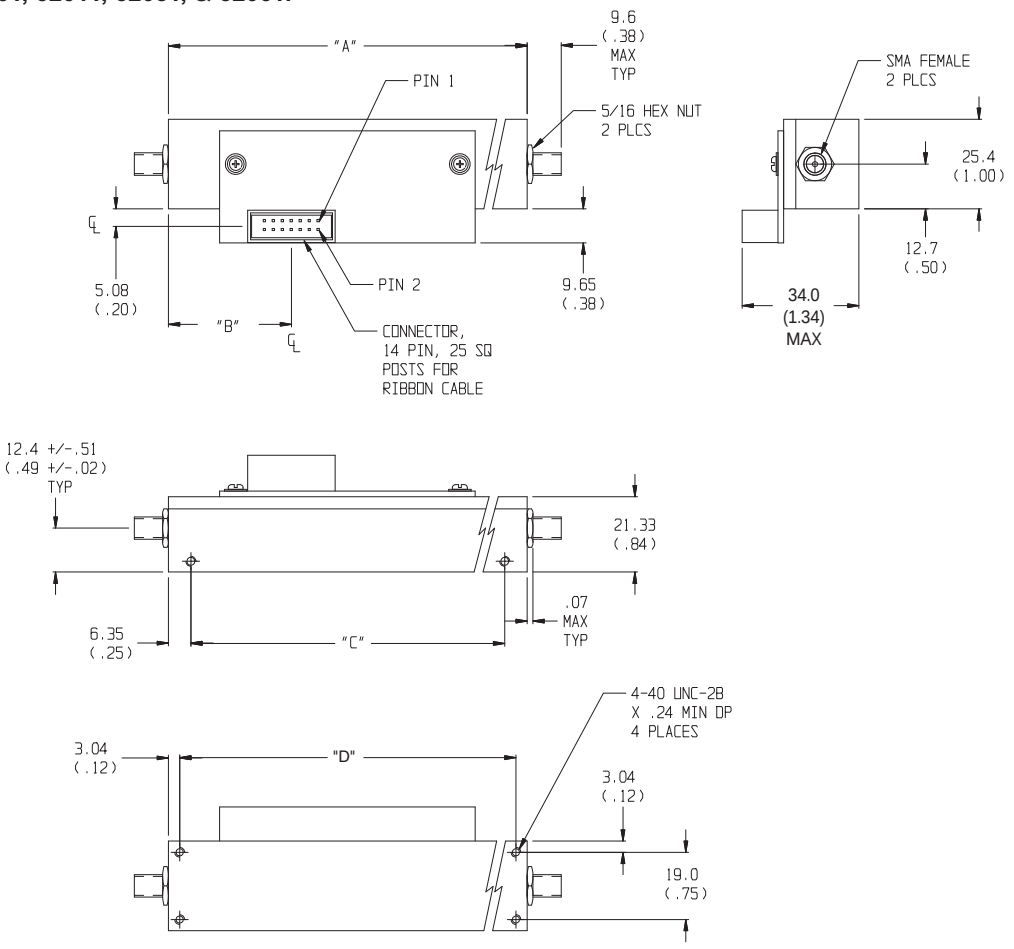
Programmable Attenuators

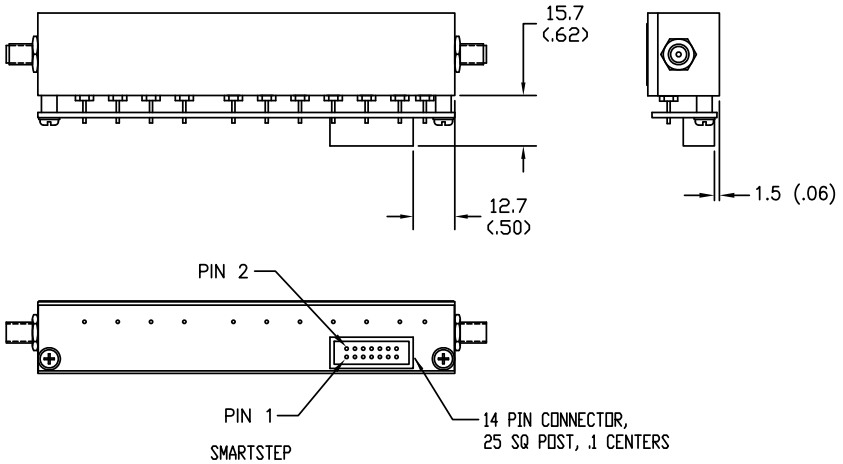
PHYSICAL DIMENSIONS:

Model 3200T, 3201T, 3205T, & 3206T:



Model No.	No. Cells	A	B	C	D
3200T-X	8	101.6 (4.0)	31.8 (1.25)	88.9 (3.50)	95.2 (3.75)
3201T-X	5/4	76.2 (3.00)	19.1 (0.75)	63.5 (2.50)	69.8 (2.75)
3205T-X	4	72.4 (2.85)	19.1 (0.75)	46.2 (1.82)	52.6 (2.07)
3206T-X	6	81. 3±0.5 (3.20±0.02	21.46 (0.85)	68.6 (2.70)	75.18 (2.96)

Model 3209T:



CONN	SIGNAL DES
J3-14	N/A
J3-13	N/A
J3-12	N/A
J3-11	N/A
J3-10	N/A
J3-9	N/A
J3-8	N/A
J3-7	N/A
J3-6	N/A
J3-5	N/A
J3-4	GND
J3-3	GND
J3-2	+V
J3-1	+V

SMARTSTEP SYSTEM ONLY
NO PARALLEL MODE OPERATION

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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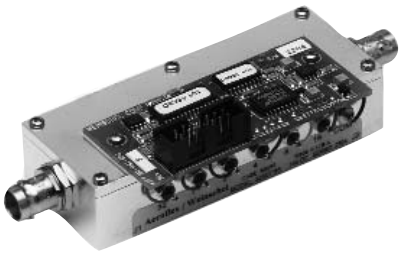
AEROFLEX WEINSCHEL

Model 3250 & 3250T Programmable Attenuators

with optional TTL Interface

dc to 1.0 GHz
1 Watt
75 Ω

T Series for use with Weinschel 8210A Controller



Features

- **Cost Effective design for Wireless/Cellular Applications.**
- **Optional Built-in Interface**
- **Custom Configurations including bus controlled attenuator subsystems**

Specifications

NOMINAL IMPEDANCE: 75 Ω
FREQUENCY RANGE: dc to 1.0 GHz:

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 0.5	1.60
0.5 - 1.0	1.40

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
3250-63	6	63/1	1, 2, 4, 8, 16, 32

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
dc - 0.5	± 0.3 dB or 2.0%
0.5 - 1.0	± 0.4 dB or 2.0%

MAXIMUM CHARACTERISTIC ZERO LOSS (dB):

Frequency Range (GHz)	Loss (dB)
dc - 0.5	2.25
0.5 - 1.0	5.00

RATED SWITCH LIFE: 5 million operations per cell (typ)
SWITCHING TIME: 8 msec. maximum @ nominal rated voltage.
CYCLING RATE: 5 Hz maximum
OPERATING VOLTAGE: +11V to +16V
+12V to +17V (TTL opt -1)
OPERATING CURRENT: 16 mA maximum per cell
TEMPERATURE RANGE (Operating): -40 to +70°C
POWER RATING: 1 watt average, 50 watts peak (5 µsec pulse width; 1% duty cycle)
CONNECTORS: BNC female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

CONTROL TERMINALS: 0.040 inch. (1 mm) diameter solderable leads
CONSTRUCTION:
Housing: Aluminum
Connectors: Nickel plated brass body and beryllium copper contacts.
WEIGHT: 3250 140 g (4.5 oz)
3250T 189 g (4.9 oz)

ACCESSORIES

Programmable Attenuator/Switch Controller: The Model 8210A Programmable Attenuator/Switch Controller provides a flexible, low cost solution for the operation of programmable step attenuators and other electromechanical devices under computer control. Designed to interface to Aeroflex / Weinschel's intelligent programmable attenuators, the 8210A represents a new concept in device control applications for bench test and subsystem designs. The 8210A provides a high-level interface from various industry standard communications interfaces, including IEEE-488 and RS232/RS422/RS485, to the programmable attenuator's serial Driver Interface Bus.

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Programmable Attenuators

CONTROL CONFIGURATION:

Standard Unit: One terminal is connected to case ground and the remaining terminals are provided for activation of individual cells. Attenuation is fail-safe to "0" setting in the absence of a control voltage. Application of a voltage (+) to a particular cell causes it to switch to the attenuate position.

Units with TTL Option: Units with this options are supplied with a very low profile connectorized TTL interface board mounted directly to the control terminals. This TTL interface option is available with a 10 pin ribbon cable connector and is supplied with a mating connector. Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

To order 3250 Series Attenuators with this option add -1 to basic model number for ribbon cable connector. Example: Model 3250-63 with a TTL interface would be 3250-63-1.

Note: Control is non-latching and requires a continuous control signal for the period of time in which attenuation is required.

TTL DRIVER SPECIFICATIONS:

INTERFACE CONNECTOR: Option -1: 10 pin .025 square post header on .1 center, mates with Amp connector 746285-1 or equivalent

INPUT VOLTAGE: V_{IN} High= +2.0V minimum
+5.0V typical
Vcc maximum
V_{IN} Low = 0 minimum
0.8 maximum

INPUT CURRENT: I_{IN} (V_{IN}=2.4 V) = 55 µA
I_{IN} (V_{IN}=3.85 V) = 280 µA

SUPPLY CURRENT: I_{CC}=25 mA maximum per cell

SUPPLY VOLTAGE: V_{CC}=+12.0 to +15 V

TEMPERATURE RANGE (Operating): -40 to +70 °C

Units with driver Circuitry (Figure 1): Model 3250T-63 features an internal microcontroller-based driver that provides a TTL-level digital interface for control of the attenuator relays. This card simplifies operation and interfacing requirements, while at the same time providing for greatly enhanced flexibility over past designs. User-selectable modes of operation include both parallel and serial bus. The parallel mode provides a simple, one-bit per relay on/off control with internal pullups for use primarily in single attenuator applications. This mode allows the attenuator to be controlled via a variety of methods, such as a TTL-level digital output port, or mechanical toggle switches. The built-in driver bus provides a two-wire serial bus structure and protocol for connecting a number of devices to a single host control interface, suitable for use in larger system and sub-system applications. This programmable attenuator contains non-volatile configuration memory that is used to hold a wide variety of attenuator

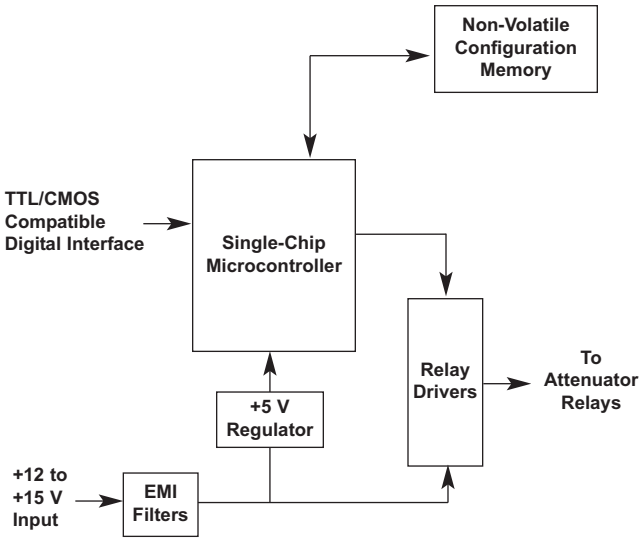

Figure 1. Built-In Driver Circuitry

and driver-dependent parameters, including serial number, attenuator cell dB values, relay configurations, and switching requirements, which are all accessible via the digital interface.

Digital Driver Interface Specifications:

Input Supply Voltage: +12.0 to +15.0V

Control Signals: TTL/CMOS compatible

Interface Modes: parallel/ I^2C serial

DC Characteristics (at 25°C):

Digital Interface:

Parameter		Specification
VI_L	Low Level input:	-0.5 min, 0.8V max
V_{IH}	High Level input:	2.0 min, 5.25V max
I_{PU}	Pullup Current	50 µA min, 400 µA max

Power Supply:

V_{IN}	Supply Voltage:	+12.0 to +15.0V
I_{IN}	Supply current:	25 mA
I_{CELL}	Supply Current:	150 mA (per cell, switching)

TEMPERATURE: -20° to +70°C operating
-55° to +85°C nonoperating

INTERFACE CONNECTOR: 14 pin .025 square post header on .1 center. Mates with Amp connector 746285-2 or equivalent (one mating connector included with each unit).

MODEL NUMBER DESCRIPTION:

Example:

3250* - XX - X

- 3250* — Basic Model Number
- XX — Attenuation Value (dB)
- X — TTL Option (Add -1)

Example: 3250-63-1

*Add T to Basic Model Number when ordering Digital Control Circuitry.

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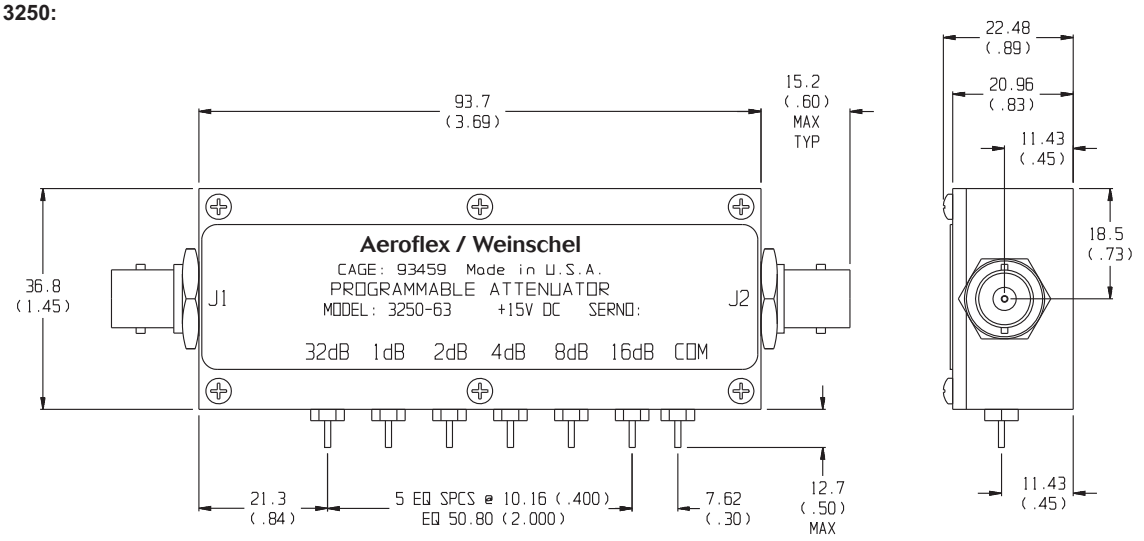
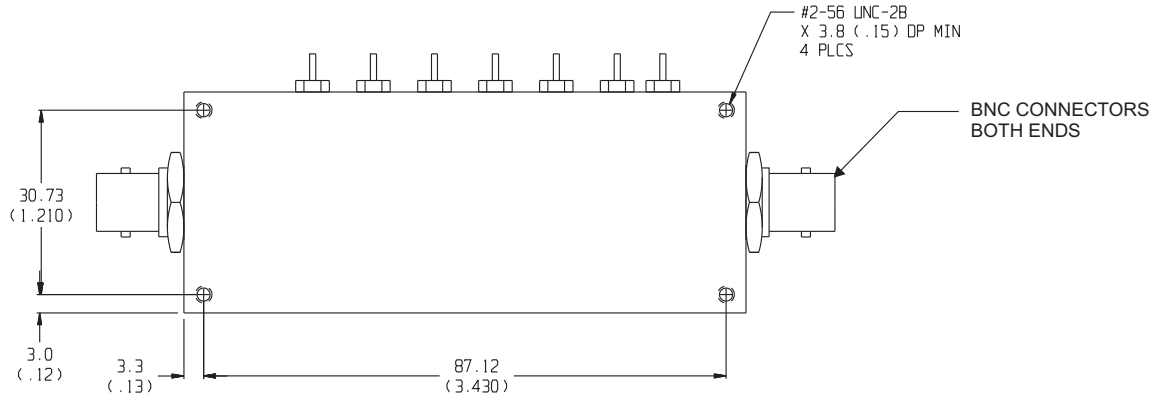
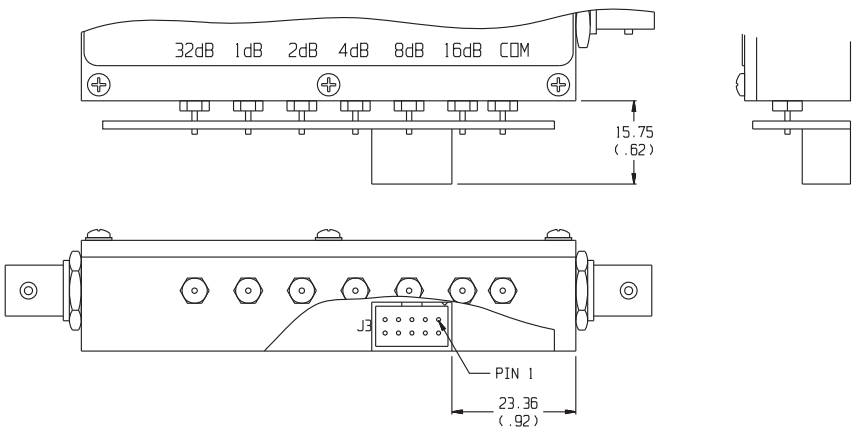
PHYSICAL DIMENSIONS:

Model 3250:





Model 3250 w/TTL Option -1:



Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	3250-63-1 dB (Cell)
1	NC
2	NC
3	32
4	1
5	2
6	4
7	8
8	16
9	COM
10	+Vcc

NC = Not Connected

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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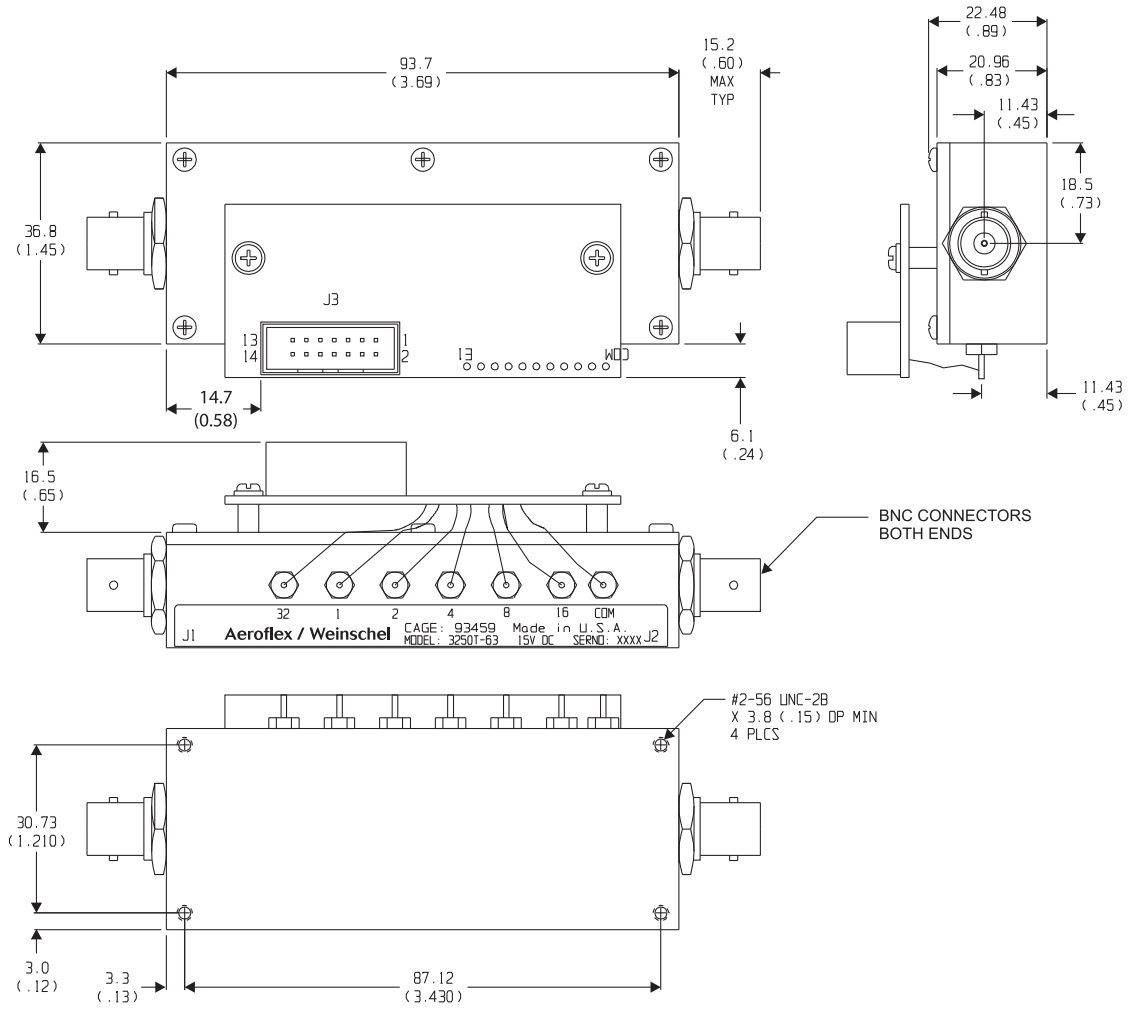
PHYSICAL DIMENSIONS:

Model 3250T:



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AEROFLEX WEINSCHEL

Models 3406 & 3408 Programmable Attenuators

dc to 6.0 GHz 1 Watt

Ideal for Wireless/Test Applications

Features

- **Higher Frequency range to 6 GHz.**
- **Wide Selection of Attenuation Ranges & Step Sizes**
  - 0 to 55 dB in 1 dB steps
  - 0 to 103 dB in 1 dB steps
  - 0 to 55.75 in 0.25 dB steps
- **High Quality Construction & Connectors**
- **Special Configurations Available Upon Request**

Description

The 3400 Series Programmable Step Attenuators are designed for use in automatic test equipment and OEM systems operating in the dc to 6 GHz frequency range. This series is available in many standard attenuation ranges and cell configurations. Custom designed configurations are available upon request. Each cell contains a double-pole, double-throw relay that provides a zero path or attenuated path for the RF signal.

Microstrip circuitry and special compensation techniques produce flat attenuation versus frequency characteristics. The microstrip construction, using thin-film circuit elements, ensures product uniformity. To minimize RF leakage, the 3400 Series Attenuators are provided with gold-plated contact areas and feedthrough filters at each control terminal.

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 6.0 GHz

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 3	1.30
3 - 6	1.45

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
3406-55	6	55/1	1, 2, 4, 8, 16, 24
3408-55.75	8	55.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 24
3408-103	8	103/1	1, 2, 4, 8, 16, 24, 48*

*48 dB cell comprised of two 24 dB cells

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
dc - 3	±0.3 dB or 2% whichever is greater
3 - 6	±0.4 dB or 3% whichever is greater

MAXIMUM INSERTION LOSS (dB):

Frequency Range (GHz)	3206-55	3408-55.75 3408-103
dc - 3	2.60	3.40
3 - 6	3.80	5.00

MONOTONICITY: dc to 6.0 GHz
POWER RATING: 1 watt average to 25°C ambient temperature, derated linearly to 0.25 watt @ 70°C. 50 watts peak (5 µsec pulse width; 1% duty cycle)
POWER COEFFICIENT: <0.005 dB/dB/watt
RATED SWITCH LIFE: 5 million cycles operations per cell @ 0 dBm
SWITCHING TIME: 6 msec. maximum at nominal rated voltage
RELEASE TIME: 5 msec maximum
CYCLING RATE: 5 Hz maximum per relay
OPERATING VOLTAGE: +12V (+13V maximum; +9V minimum)
OPERATING CURRENT: 17 mA typical per cell @ +12V
TEMPERATURE RANGE (Operating): -30°C to +70°C
TEST DATA: Test data is available at additional cost.

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SPECIFICATIONS - Con't

CONNECTORS: SMA female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. eads. May be used with PC board sockets/ receptacles.

CONTROL TERMINALS: 0.040 inch. (1 mm) diameter solderable leads. May be used with PC board sockets/ receptacles.

CONSTRUCTION:

Housing:	Aluminum
Connectors:	Stainless steel body and beryllium copper contacts.
Control terminals:	Brass/Copper, Silver plated

WEIGHT (Typical): 3406-X: 99 g (3.5 oz)
3408-X: 135 g (4.8 oz)

CONTROL CONFIGURATION:

Standard Unit: One terminal is connected to case ground and the remaining terminals are provided for activation of individual cells. Attenuation is fail-safe to "0" setting in the absence of a control voltage. Application of a voltage (+) to a particular cell causes it to switch to the attenuate position.

Units with TTL Option: Units with this options are supplied with a very low profile connectorized TTL interface board mounted directly to the control terminals. This TTL interface option is available with a 10 pin ribbon cable connector and is supplied with a mating connector. Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

To order 3400 Series Attenuators with this option add -1 to basic model number for ribbon cable connector. Example: Model 3406-63 with a TTL interface would be 3406-63-1.

Note: Control is non-latching and requires a continuous control signal for the period of time in which attenuation is required.

TTL DRIVER SPECIFICATIONS:

INTERFACE CONNECTOR: Option -1: 10 pin .025 square post header on .1 center, mates with Amp connector 746285-1 or equivalent

INPUT VOLTAGE: V_{IN} High= +2.0V minimum
+5.0V typical
Vcc maximum
V_{IN} Low = 0 minimum
0.8 maximum

INPUT CURRENT: I_{IN} (V_{IN}=2.4 V) = 55 µA
I_{IN} (V_{IN}=3.85 V) = 280 µA

SUPPLY CURRENT: I_{CC}=25 mA maximum per cell

SUPPLY VOLTAGE: V_{CC}=+12.0 to +15 V

MODELS WITH BUILT-IN DRIVERS: Most 3400s are available with an intelligent interface\driver cards. These are designed to interface with our 8210A Series Controllers which greatly simplifies computer control applications. Refer to Model 3406T and 3408T data sheet for more information.

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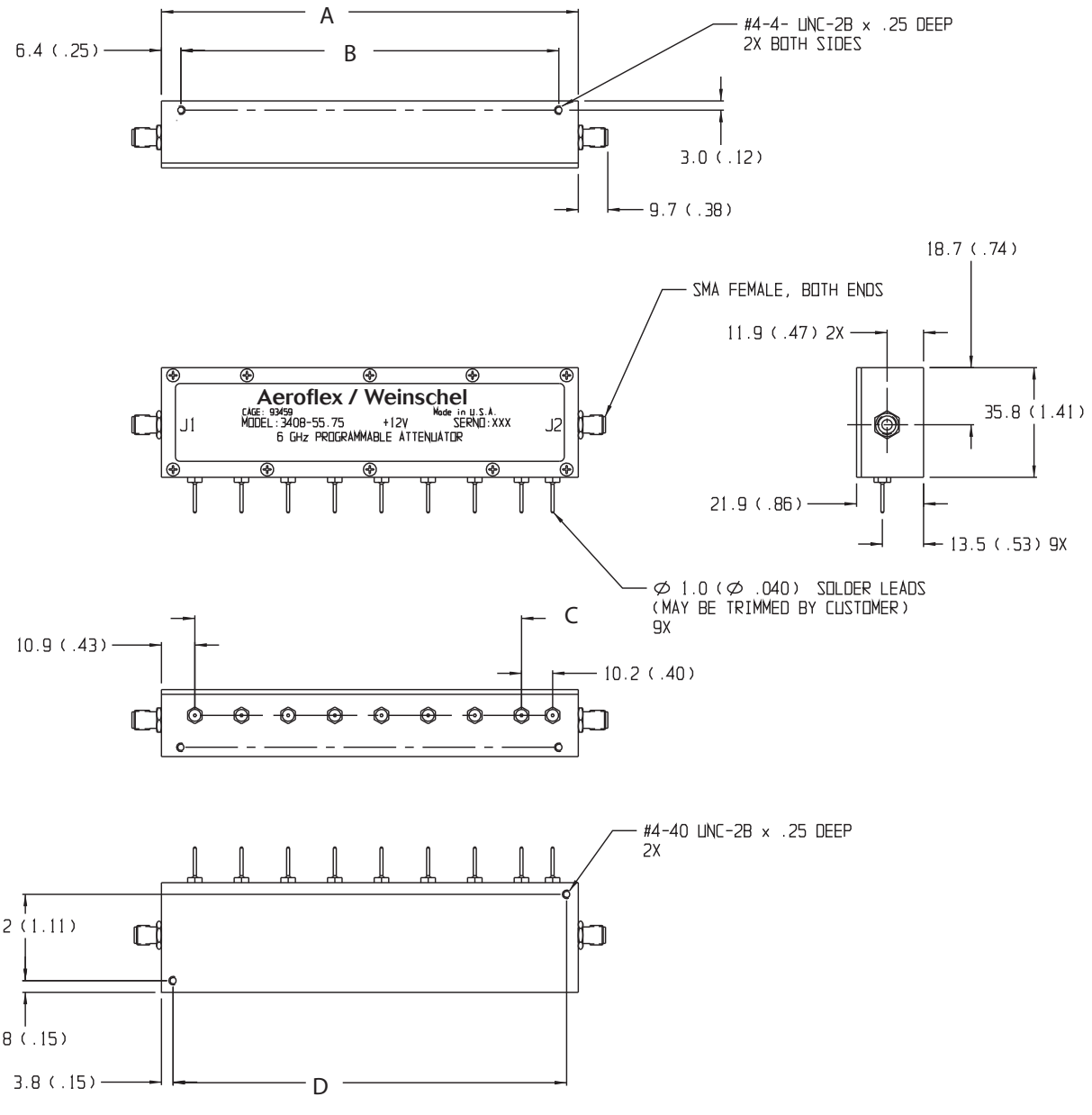
PHYSICAL DIMENSIONS:



Model No.	No. Cells	A	B	C	D
3408-X	8	136.1 (5.36)	123.4 (4.86)	7 EQ SPCS @ 15.20 (.60) = 106.7 (4.20)	128.5 (5.06)
3406-X	6	105.7 (3.66)	93.0 (3.66)	5 EQ SPCS @ 15.20 (.60) =76.0 (3.00)	98.0 (3.86)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

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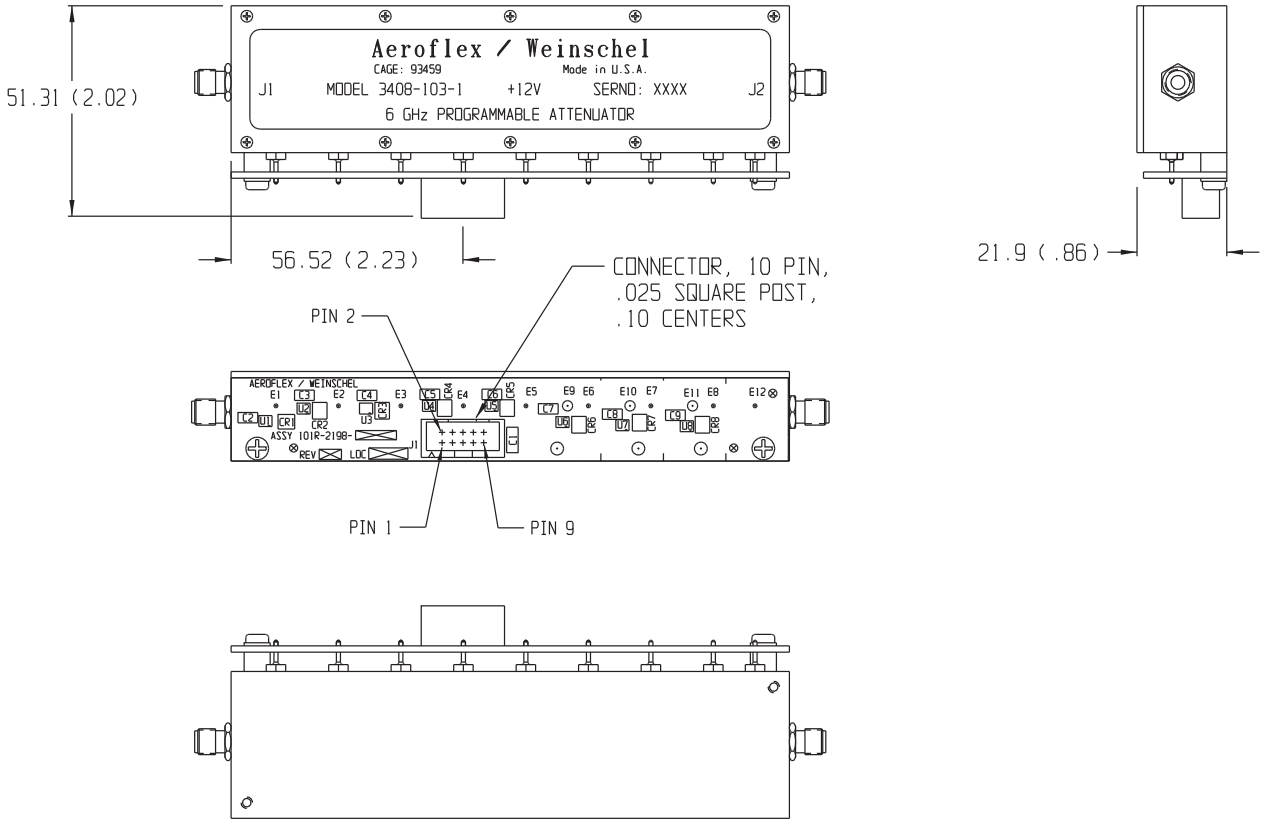
Programmable Attenuators

PHYSICAL DIMENSIONS:

TTL OPTION -1 (3406 & 3408)



Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	3408-103-1 dB (Cell)	3408-55.75-1 dB (Cell)	3406-55-1 dB (Cell)
1	24*	0.25	1
2	24	0.5	2
3	1	1	4
4	2	2	8
5	4	4	16
6	8	8	24
7	16	16	NC
8	24*	24	NC
9	+Vcc	+Vcc	+Vcc
10	COM	COM	COM

* 48 dB cell comprised of two 24 dB cells
NC = Not Connected

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

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AEROFLEX WEINSCHEL

Models 3406T & 3408T

dc to 6.0 GHz

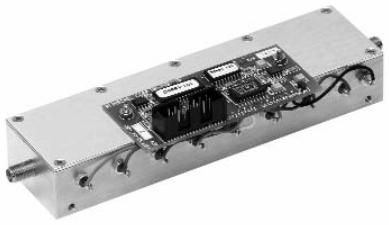
SmartStep® Programmable Attenuators

1 Watt

with built-in Microprocessor-Based Driver

NEW

For Use with Weinschel 8210A Controller



Features

- **Higher Frequency range to 6 GHz.**
- **Wide Selection of Attenuation Ranges & Step Sizes**
  - 0 to 55 dB in 1 dB steps
  - 0 to 103 dB in 1 dB steps
  - 0 to 55.75 in 0.25 dB steps
- **High Quality Construction & Connectors**
- **Built-In TTL\CMOS Interface Driver Circuitry**
- **Special Configurations Available Upon Request**

Description

This line of intelligent programmable step attenuators with a built-in digital interface are designed to simplify the control and integration of these devices into subsystem and bench applications. This series of Programmable Step Attenuators is designed for use in automatic test equipment and OEM systems operating in the dc to 6 GHz frequency range. These models are available in many standard attenuation ranges and cell configurations. Each cell contains a double-pole, double-throw relay that provides a minimum loss or attenuated path for the RF signal.

Microstrip circuitry and special compensation techniques produce flat attenuation versus frequency characteristics. The microstrip construction, using thick-film circuit elements, ensures product uniformity. To minimize RF leakage, the 3400T Series Attenuators are provided with gold-plated contact areas and feedthrough filters at each control terminal.

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 6.0 GHz

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 3	1.30
3 - 6	1.45

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
3406T-55	6	55/1	1, 2, 4, 8, 16, 24
3408T-55.75	8	55.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 24
3408T-103	8	103/1	1, 2, 4, 8, 16, 24, 48*

*48 dB cell comprised of two 24 dB cells

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
dc - 3	±0.3 dB or 2% whichever is greater
3 - 6	±0.4 dB or 3% whichever is greater

MAXIMUM INSERTION LOSS (dB):

Frequency Range (GHz)	3206-55	3408-55.75 3408-103
dc - 3	2.60	3.40
3 - 6	3.80	5.00

POWER RATING: 1 watt average to 25°C ambient temperature, derated linearly to 0.25 watt @ 70°C. 50 watts peak (5 µsec pulse width; 1% duty cycle)

POWER COEFFICIENT: <0.005 dB/dB/watt

RATED SWITCH LIFE: 5 million cycles operations per cell @ 0 dBm

SWITCHING TIME: 6 msec. maximum at nominal rated voltage

RELEASE TIME: 5 msec maximum

SWITCHING SPEED: 5 Hz maximum per relay

OPERATING VOLTAGE: +12V (+13V maximum; +9V minimum)

OPERATING CURRENT: 17 mA typical per cell @ +12V

TEMPERATURE RANGE (Operating): -30°C to +70°C

TEST DATA: Test data is available at additional cost.

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Programmable Attenuators

AEROFLEX WEINSCHEL

Specifications - Con't

DRIVER INTERFACE:

Parameter		Specification
V_{IL}	Low-level input V:	-0.5V min, 0.8V max
V_{IH}	High-level input V:	2.0V min, 5.25V max
I_{PU}	Pullup current:	50 µA min, 400 µA max
V_{IN}	Supply Voltage:	+12.0 to +15.0V
I_{IN}	Supply current: (digital section)	25 mA
I_{CELL}	Supply current:	16.6 mA @ 12V

CONNECTORS: SMA female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

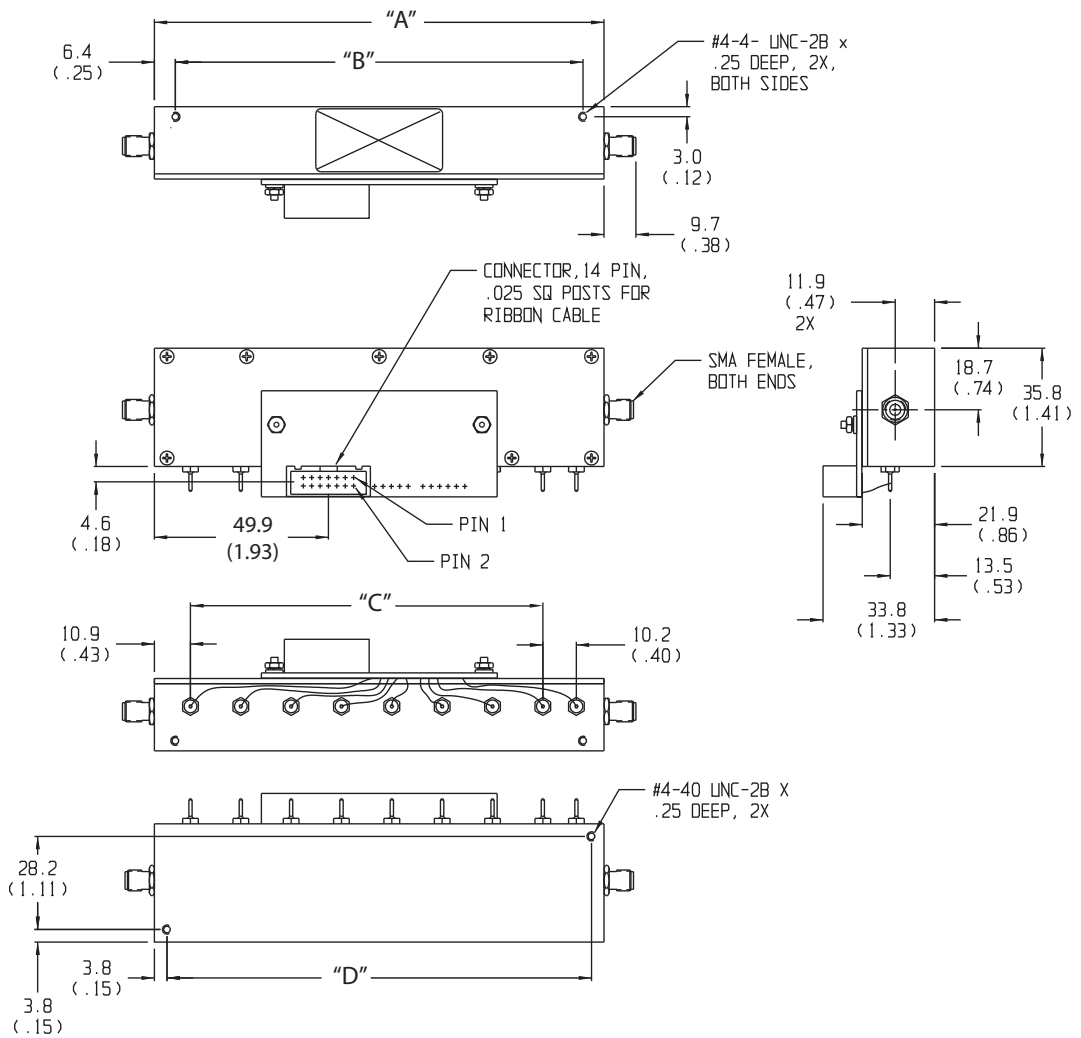
INTERFACE CONNECTOR: 14 pin .025 square post header on .1 center. Mates with Amp connector 746285-2 or equivalent.

CONSTRUCTION:

Housing:	Aluminum
Connectors:	Stainless steel body and beryllium copper contacts.
Control terminals:	Brass/Copper, Silver plated

WEIGHT (Typical): 3406T-X: 99 g (3.5 oz)
3408T-X: 135 g (4.8 oz)

PHYSICAL DIMENSIONS:



Model No.	No. Cells	A	B	C	D
3408T-X	8	136.1 (5.36)	123.4 (4.86)	7 EQ SPCS @ 15.20 (.60) = 106.7 (4.20)	128.5 (5.06)
3406T-X	6	105.7 (3.66)	93.0 (3.66)	5 EQ SPCS @ 15.20 (.60) =76.0 (3.00)	98.0 (3.86)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

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Model 150T dc to 18.0 GHz
Model 151T dc to 4.0 GHz
Model 152T dc to 26.5 GHz

SmartStep® Relay Switched Programmable Attenuators, with built-in Microprocessor-Based Driver

For Use with Weinschel 8210A Controller

RoHS

Description

Aeroflex / Weinschel's line of intelligent programmable step attenuators with a built-in TTL interface (Figure 1). These models are designed to simplify the control and integration of these devices into subsystem and bench applications. These intelligent attenuators offer the same long reliable operation with exceptional accuracy and repeatability as with our other 150 Series Programmable Attenuators. They provide programmable adjustments of RF signal levels in precise steps of 1 dB, 5 dB, 10 dB, or with custom steps available. Each attenuator consists of a cascaded assembly of switched attenuator cells and a internal TTL interface.

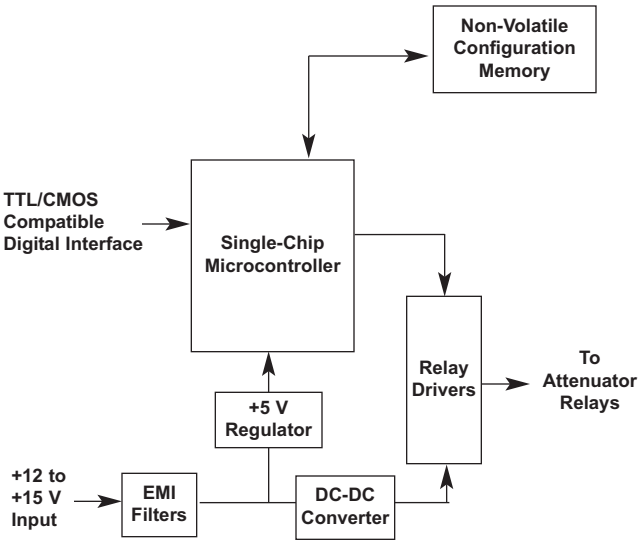

Figure 1. Built-In Driver Circuitry

The attenuator elements located in the attenuator cell are created by a thin-film process which provides exceptional long-term stability, low power and temperature coefficients. This series of step attenuators uses a reed switching structure that provides rapid switching together with low insertion loss.

BUILT-IN DRIVER CIRCUITRY: These programmable attenuators feature an internal microcontroller-based driver that provides a TTL-level digital interface for control of the attenuator relays. This card simplifies operation and interfacing requirements, while at the same time providing for greatly enhanced flexibility over past designs. User-selectable modes of operation include both parallel and serial bus. The parallel mode provides a simple, one-bit per relay on/off control with internal pullups for use primarily in single attenuator applications. This mode allows the attenuator to be controlled via a variety of methods, such as a TTL-level digital output port, or mechanical toggle switches. The device bus provides a two-wire serial bus structure and protocol for connecting a number of devices to a single host control interface, suitable for use in larger system and subsystem applications. The driver interface contains non-volatile configuration memory that is used to hold a wide variety of attenuator and driver-dependent parameters, including serial number, attenuator cell dB values, relay configurations, and switching requirements, which are all accessible via the digital interface. This frees the system designer from such low-level details, allowing faster integration. In either operational mode, the microcontroller enters an idle condition during periods of inactivity, turning off all on-board clocks, reducing EMI concerns, and lowering power consumption. On-board regulation for the digital circuitry allows the programmable attenuator to operate from a single input supply voltage.

Other features include:

- Wide Variety of Frequency & Attenuation Ranges
- Broadband Frequency Coverage
- High Accuracy and Repeatability
- Long Life, 5 Million Cycles Per Cell
- Common 14 pin Interface Connector
- Custom Attenuation Ranges

For additional information on the 150 Series, visit our website @ www.aeroflex.comw/weinschel/programmables

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Programmable Attenuators

AEROFLEX WEINSCHEL

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 151T: dc to 4 GHz
Model 150T: dc to 18 GHz
Model 152T: dc to 26.5 GHz

CELL CONFIGURATIONS:

Cell	11	15	31	55	62	70	70	75	90	110
1	1	1	1	5	2	10	10	5	10	10
2	4	8	16	10	32	20	40	40	30	40
3	2	2	2	20	16	20	20	20	20	20
4	4	4	8	20	4	20	--	10	30	40
5	--	--	4	--	8	--	--	--	--	--

DRIVER INTERFACE:

Input Supply Voltage: +12.0 to +15.0V

Control Signals: TTL/CMOS compatible

Interface Modes: parallel / serial

DC Characteristics (at 25 °C):

Digital Interface:

Parameter		Specification
V_{IL}	Low Level input:	-0.5 min, 0.8V max
V_{IH}	High Level input:	2.0 min, 5.25V max
I_{PU}	Pullup Current	50 µA min, 400 µA max

Power Supply:

V_{IN}	Supply Voltage:	+12.0 to +15.0V
I_{IN}	Supply current:	25 mA
I_{CELL}	Supply Current:	150 mA (per cell, switching)

POWER RATING: 1 watt average, 100 watts peak (5 µsec pulse width; 0.5% duty cycle)

TEMPERATURE: -20° to +70°C operating
-55° to +85°C nonoperating

TEMPERATURE COEFFICIENT: <0.0001 dB/dB/C

POWER SENSITIVITY: <0.001 dB/dB/ Watt

RATED SWITCH LIFE: 5 million cycles per cell

RF INPUT CONNECTORS: Rugged female 3.5 mm which mate nondestructively with SMA male connectors per MIL-STD-39012.

INTERFACE CONNECTOR: 14 pin .025 square post header on .1 center. Mates with Amp connector 746285-2 or equivalent (one mating connector included with each unit).

SWITCHING TIME: 20 msec (includes settling time)

CYCLING RATE: 4 Hz max per relay

CONTROL PULSE WIDTH: 20 msec (minimum)

REPEATABILITY: ±0.1 dB typical per cell

VIBRATION*: MIL-STD-202F, Method 204D Cond B

ALTITUDE*: MIL-STD-202F, Method 105C Cond B, 50,000 Ft.

SHOCK*: MIL-STD -202F, Method 213B Cond B, except 10G, 6 msec

HUMIDITY*: MIL-STD-202F, Method 103B, Cond. B (96 Hrs. @ 95%, RH).

MAXIMUM SWR (50 Ω Characteristic Impedance):

APPLICABLE MODELS	Frequency (GHz) dc-4	4-18	18-26.5
151T-11, 151T-15, 151T-31, 151-62T, 151T-75, 151T-110	1.50	- - -	- - -
150T-11, 150T-15, 150T-31 150T-62, 150T-75, 150T-110	1.50	1.90	- - -
151T-70 (3 cell)	1.40	- - -	- - -
150T-70 (3 cell)	1.40	1.60	- - -
152AT-70 (3 cell)	1.40	1.60	1.90
152T-55, 152T-70, 152-75, 152T-90	1.40	1.60	1.90

MAXIMUM INSERTION LOSS (dB):

APPLICABLE MODELS	Frequency (GHz) dc-4	4-18	18-26.5
151T-11, 151T-15, 151T-75, 151T-110	0.90	- - -	- - -
150T-11, 150T-15, 150T-75, 150T-110	0.90	2.20	- - -
151T-31, 151T-62 (5 cell)	1.10	----	----
150T-31, 150T-62 (5 cell)	1.10	2.60*	----
151T-70 (3 cell)	0.70	- - -	- - -
150T-70 (3 cell)	0.70	1.60	- - -
152AT-70 (3 cell)	0.90	2.00	2.98
152T-55, 152T-70, 152T-75, 152T-90	0.90	2.00	2.98

*4-12.4 is 1.80, 12.4-18 is 2.60

WEIGHT: 5 Cell 350 g (12 oz)
4 Cell 290 g (9.0 oz)
3 Cell 230 g (8.0 oz)

ACCESSORIES

Programmable Attenuator/Switch Controller: The Model 8210A Programmable Attenuator/Switch Controller provides a flexible, low cost solution for the operation of programmable step attenuators and other electromechanical devices under computer control. Designed to interface to Aeroflex / Weinschel's intelligent programmable attenuators, the 8210A represents a new concept in device control applications for bench test and subsystem designs. The 8210A provides a high-level interface from various industry standard communications interfaces, including IEEE-488 and RS232/RS422/RS485, to the programmable attenuator's serial Driver Interface Bus.

OPTIONAL TEST Data: Test Data is available at an additional cost for all programmable step attenuator models. Standard test Data can be provided in 250 MHz steps for all dc-4 GHz models and in 500 MHz steps for dc-18 and dc-26.5 GHz models.

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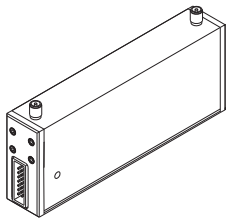
ATTENUATION ACCURACY (±dB with respect to 0 dB reference):



Model 150T/151T/152T-11 & 150T/151T/152T-15:

Frequency	Attenuation Setting (dB)														
Range (GHz)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
dc-4	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
4-12.4	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7
12.4-18	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
18-26.5	0.5	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Model 150T/151T-75:

Frequency	Attenuation Setting (dB)														
Range (GHz)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
dc-4	0.2	0.2	0.4	0.4	0.5	0.5	0.7	0.7	0.9	0.9	1.1	1.1	1.2	1.2	1.4
4-12.4	0.3	0.3	0.6	0.6	0.9	0.9	1.2	1.2	1.5	1.5	1.8	1.8	2.1	2.1	2.1
12.4-18	0.4	0.4	0.8	0.8	1.2	1.2	1.6	1.6	2.0	2.0	2.4	2.4	2.8	2.8	2.8

Model 150T/151T-31:

Frequency	Attenuation Setting (dB)															
Range (GHz)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
dc-4	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5
4-12.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7
12.4-18	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Frequency	Attenuation Setting (dB)														
Range (GHz)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dc-4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8
4-12.4	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.0	1.0	1.0	1.0	1.1	1.1
12.4-18	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.3

Model 150T/151T-62:

Frequency	Attenuation Setting (dB)															
Range (GHz)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32
dc-4	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6
4-12.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8
12.4-18	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.2	1.2

Frequency	Attenuation Setting (dB)														
Range (GHz)	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62
dc-4	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.2
4-12.4	1.0	1.0	1.1	1.1	1.3	1.4	1.4	1.4	1.5	1.6	1.6	1.6	1.8	1.8	1.8
12.4-18	1.4	1.4	1.6	1.6	1.8	1.8	2.0	2.0	2.0	2.2	2.2	2.2	2.4	2.4	2.4

Model 150T/151T/152T-75:

Frequency	Attenuation Setting (dB)														
Range (GHz)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
dc-4	0.2	0.2	0.4	0.4	0.5	0.5	0.7	0.7	0.9	0.9	1.1	1.1	1.2	1.2	1.4
4-12.4	0.3	0.3	0.6	0.6	0.9	0.9	1.2	1.2	1.5	1.5	1.8	1.8	2.1	2.1	2.1
12.4-18	0.4	0.4	0.8	0.8	1.2	1.2	1.6	1.6	2.0	2.0	2.4	2.4	2.8	2.8	2.8
18 - 26.5	0.5	0.5	0.9	0.9	1.2	1.2	1.6	1.6	2.0	2.0	2.4	2.4	2.8	2.8	2.8

Model 150T/151T-70, 150T/151T-110, 152AT-70:

Frequency	Attenuation Setting (dB)										
Range (GHz)	10	20	30	40	50	60	70	80	90	100	110
dc-4	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.9
4-12.4	0.4	0.7	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.0
12.4-18	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.0
18-26.5	0.6	0.7	0.9	1.5	1.6	2.2	2.9	---	---	---	---

Model 152T-55:

Frequency	Attenuation Setting (dB)										
Range (GHz)	5	10	15	20	25	30	35	40	45	50	55
dc-4	0.2	0.3	0.4	0.4	0.4	0.6	0.6	0.7	0.7	0.8	1.0
4-12.4	0.3	0.4	0.5	0.5	0.5	0.7	0.8	0.9	0.9	1.0	1.3
12.4-18	0.4	0.4	0.5	0.5	0.5	0.8	1.0	1.1	1.1	1.2	1.6
18-26.5	0.5	0.5	0.6	0.6	0.6	0.9	1.2	1.4	1.4	1.5	2.0

Model 152T-70, 152T-90:

Frequency	Attenuation Setting (dB)								
Range (GHz)	10	20	30	40	50	60	70	80	90
dc-4	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.1	1.2
4-12.4	0.4	0.5	0.7	0.9	1.0	1.3	1.5	1.6	1.7
12.4-18	0.5	0.6	0.8	1.1	1.2	1.4	1.7	1.8	2.1
18-26.5	0.5	0.6	0.9	1.4	1.5	1.8	2.3	2.4	2.8

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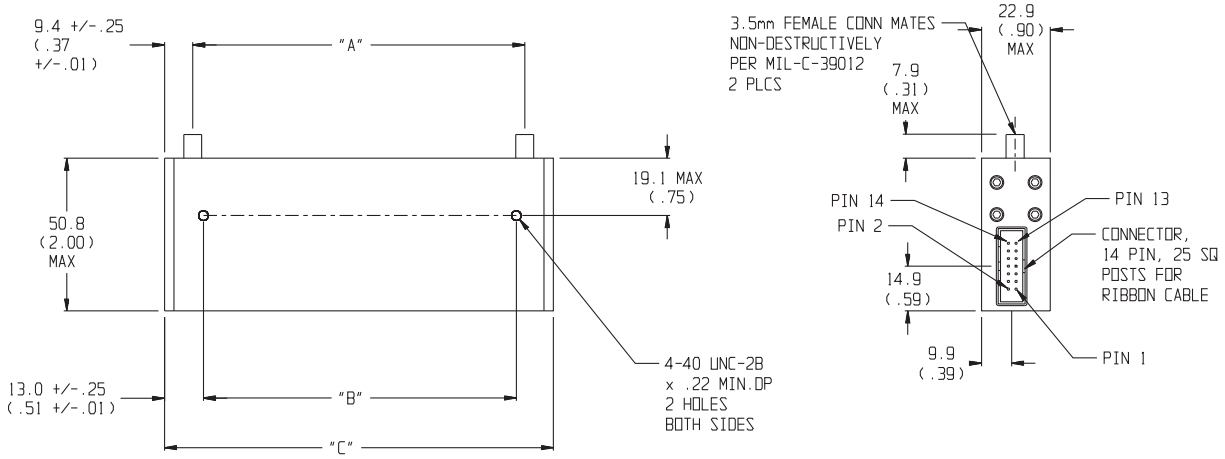
PHYSICAL DIMENSIONS:

Models 150T, 151T, & 152T:



DIM	A	B	C
3 cell	83.3 (3.28)	76.2 (3.0)	101.6 (4.00)
4 cell	110.7 (4.36)	103.6 (4.08)	129.2 (5.09)
5 cell	136.1 (5.36)	129.1 (5.08)	154.4 (6.08)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

150T Series Ordering Guide...

Frequency Range	NO. Cells	Attenuator Range/Step Size								
		11/1 dB	15/1 dB	31/1 dB	55/5 dB	62/2 dB	70/10 dB	75/5 dB	90/10 dB	110/10 dB
dc-4 GHz	4 3 5	151T-11	151T-15	 151T-31	N/A	 151T-62	 151T-70	151T-75	N/A	151T-110
dc-18 GHz	4 3 5	150T-11	150T-15	 150T-31	N/A	 150T-62	 150T-70	150T-75	N/A	150T-110
dc-26.5 GHz	4 3	N/A	NA	N/A	152T-55	NA	152T-70 152AT-70	152T-75	152T-90	N/A

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AEROFLEX WEINSCHEL

Programmable Attenuators

Model 150 dc to 18.0 GHz
Model 151 dc to 4.0 GHz
Model 152 dc to 26.5 GHz
Relay Switched Programmable Attenuators

RoHS

Description

The Model 150, 151 and 152 Programmable Step Attenuators represent the widest variety of programmable attenuators available. This attenuator design is the result of an extensive development program and offers long reliable operation with exceptional accuracy and repeatability. These attenuators can provide programmable adjustments of RF signal levels in precise steps of 1 dB, 5 dB, 10 dB, or with custom steps available. Each attenuator consists of a cascaded assembly of switched attenuator cells (Figure 1). The attenuator elements located in the attenuator cell are created by a thin-film process which provides exceptional long-term stability, low power and temperature coefficients. This series uses a reed switching structure that provides rapid switching together with low insertion loss.

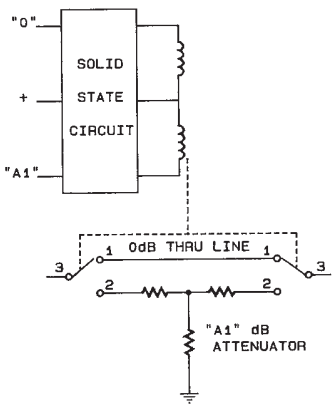

Figure 1. Cell Schematic

Other features include:

- Broadband Frequency Coverage
- High Accuracy and Repeatability
- Long Life, 5 Million Cycles Per Cell
- 3, 4, and 5 Cell Configurations

PROGRAMMABILITY: In each programmable step Attenuator, solenoids are used to switch the internal resistor card of each cell into and out of the circuit. Once the cell is switched, the solenoid is magnetically latched into position and is able to withstand extreme shock and vibration. Internal circuitry is included to interrupt the coil current after switching is complete. This reduces power dissipation even if power is continuously applied. The switching time for each cell is rated at 20 msec maximum which includes the contact settling time.

BROADBAND ACCURACY & LOW SWR: The use of Aeroflex / Weinschel's proprietary thin-film resistor process provides these programmable step attenuators with a high degree of accuracy and the lowest possible SWR uncertainty (refer to specifications for actual values). This thin film process permits the construction of circuits which are truly distributed and without stray reactances, even at the higher microwave frequencies.

RELIABILITY: Each programmable step attenuator is composed of 3 to 5 (4 in most models) cells. As with all mechanical designs, usable life becomes a primary concern to the user. With this in mind Aeroflex / Weinschel backs all these attenuators with a rated switch life of 5 million operations per cell. Standardized testing is also performed on each programmable step attenuator over its operating frequency range by a computer controlled Aeroflex / Weinschel Attenuation Measurement System which is traceable to NIST standards.

ENVIRONMENTAL: These Model 150 Programmable Step Attenuators have undergone an extensive environmental qualification program and have been subjected to temperature, shock, vibration, and humidity conditions per MIL-STD-202F. These programmable step attenuators operate within these specifications at an ambient temperature of -20° to +75°C. Operating beyond these limits will adversely affect the accuracy and could damage the internal circuitry.

For additional information on the 150 Series, visit our website @ www.aeroflex.com/weinschel/programmables

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Revision Date: 2/10/09

Programmable Attenuators

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150 Series Cell Configurations...

ATTN Value	Cells No.	Cell 1		Cell 2		Cell 3		Cell 4		Cell 5		
		Bypass	ATTN Element	Bypass	ATTN Element	Bypass	ATTN Element	Bypass	ATTN Element	Bypass	ATTN Element	Power +Vdc
11 dB	4	0 dB	1 dB	0 dB	4 dB	0 dB	2 dB	0 dB	4 dB	- - -	- - -	
15 dB	4	0 dB	1 dB	0 dB	8 dB	0 dB	2 dB	0 dB	4 dB	- - -	- - -	
31 dB	5	0 dB	1 dB	0 dB	8 dB	0 dB	2 dB	0 dB	16 dB	0 dB	4 dB	
55 dB	4	0 dB	5 dB	0 dB	10 dB	0 dB	20 dB	0 dB	20 dB	- - -	- - -	
70 dB	4	0 dB	10 dB	0 dB	20 dB	0 dB	20 dB	0 dB	20 dB	- - -	- - -	
	3	0 dB	10 dB	0 dB	40 dB	0 dB	20 dB	- - -	- - -	- - -	- - -	
75 dB	4	0 dB	5 dB	0 dB	40 dB	0 dB	20 dB	0 dB	10 dB	- - -	- - -	
90 dB	4	0 dB	10 dB	0 dB	30 dB	0 dB	20 dB	0 dB	30 dB	- - -	- - -	
110 dB	4	0 dB	10 dB	0 dB	40 dB	0 dB	20 dB	0 dB	40 dB	- - -	- - -	
Round Conn.	PIN #	5	6	9	10	7	8	11	12	3	4	1
3 & 4 Cell	Wire	Violet	Yellow	Orange	Blue	Black	Green	Brown	White	- - -	- - -	Red
5 Cell	Color	Black	White	Green	Orange	Blue	WHT/BLK	RED/BLK	GRN/BLK	ORN/BLK	BLU/BLK	Red
Ribbon Cable Conn.	PIN#	13	2	3	9	11	5	4	10	8	7	6
	Wire Color	Orange	Yellow	Blue	Brown	Purple	Black	Gray	White	Orange	yellow	Red

Table provides standard attenuation ranges, increments, and cell configurations for all Aeroflex / Weinschel Programmable Step Attenuators (Models 150, 151, 152, & 152A)

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: Model 151: dc to 4 GHz
Model 150: dc to 18 GHz
Model 152: dc to 26.5 GHz

OPERATIONAL VOLTAGE: + 24V Nominal (+20V minimum to +30V maximum) or +5V Nominal (+4V minimum* to +7V maximum)

*Minimum operating voltage derated to +4.25 V @ 55°C and further derated to +4.5 V @ 75°C

POWER RATING: 1 watt average, 100 watts peak (5 µsec pulse width; 0.5% duty cycle)

TEMPERATURE: -20° to +75°C operating
-55° to +85°C nonoperating

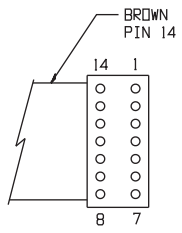
TEMPERATURE COEFFICIENT: < 0.0001 dB/dB/°C

POWER SENSITIVITY: < 0.001 dB/dB/ Watt

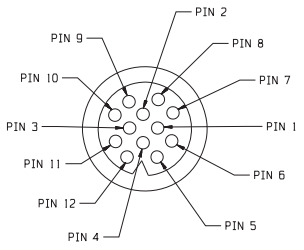
RATED SWITCH LIFE: 5 million cycles per cell

RF INPUT CONNECTORS: Rugged female 3.5 mm connectors which mate nondestructively with SMA male connectors per MIL-STD-39012.

CONTROL CONNECTOR: 12 pin Viking TNP12-101 connector with 5' cable or 14 conductor 16" ribbon cable with connector (shown below):



Ribbon Cable Models



Round (Viking)Cable Models

SWITCHING TIME: 20 msec (includes settling time)

CYCLING RATE: 4 Hz max per relay

CONTROL PULSE WIDTH: 20 msec (minimum)

SWITCHING CURRENT: 125 mA @ +24V per cell
300 mA @ +5V per cell

REPEATABILITY: ±0.1 dB typical per cell

VIBRATION: MIL-STD-202F, Method 204D Cond B

ALTITUDE: MIL-STD-202F, Method 105C Cond B, 50,000 Ft.

SHOCK: MIL-STD -202F, Method 213B Cond B, except 10G, 6 msec

HUMIDITY: MIL-STD-202F, Method 103B, Cond. B (96 Hrs. @ 95%, RH)

EMC: Radiated interference is within the requirements of MIL-STD-461 method RE02, VDE 0871 and CISPR Publication II.

WEIGHT: 5 Cell 350 g (12 oz)
4 Cell 290 g (9.0 oz)
3 Cell 230 g (8.0 oz)

VOLTAGE/CONNECTOR OPTIONS:

VOLTAGE	MODEL(S)
+ 24 V with Viking Connector	150-XX, 151-XX, 152-XX, 152A-XX
+ 24 V with Ribbon Cable	150-XX-1, 151-XX-1, 152-XX-1 152A-XX-1
+ 5 V with Viking Connector	150-XX-2, 151-XX-2, 152-XX-2 152A-XX-2
+ 5 V with Ribbon Cable	150-XX-3, 151-XX-3, 152-XX-3 152A-XX-3

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Programmable Attenuators

MAXIMUM SWR (50 Ω Characteristic Impedance):

APPLICABLE MODELS	Frequency (GHz) dc-4	4-18	18-26.5
151-11, 151-15, 151-31, 151-75, 151-110	1.50	- - -	- - -
150-11, 150-15, 150-31, 150-75, 150-110	1.50	1.90	- - -
151-70 (3 cell)	1.35	- - -	- - -
150-70 (3 cell)	1.35	1.70	- - -
152A-70 (3 cell)	1.40	1.70	1.80
152-55, 152-70, 152-90	1.40	1.60	1.90

MAXIMUM INSERTION LOSS (dB):

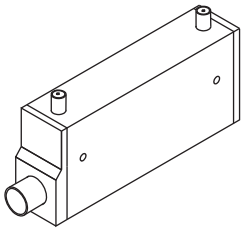
APPLICABLE MODELS	Frequency (GHz) dc-4	4-18	18-26.5
151-11, 151-15, 151-75, 151-110	0.90	- - -	- - -
150-11, 150-15, 150-75, 150-110	0.90	2.20	- - -
151-31 (5 cell)	1.10	- - -	- - -
150-31 (5 cell)	1.10	2.60*	- - -
151-70 (3 cell)	0.70	- - -	- - -
150-70 (3 cell)	0.70	1.60	- - -
152A-70 (3 cell)	0.90	2.00	2.98
152-55, 152-70, 152-90	0.90	2.00	2.98

*4-12.4 is 1.80, 12.4-18 is 2.60

ATTENUATION ACCURACY (±dB with respect to 0 dB reference):

Model 150/151/152-11 & 150/151/152-15:

Frequency Range (GHz)	Attenuation Setting (dB) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
dc-4	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
4-12.4	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7
12.4-18	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
18-26.5	0.5	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1



Model 150/151-75:

Frequency Range (GHz)	Attenuation Setting (dB) 5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
dc-4	0.2	0.2	0.4	0.4	0.5	0.5	0.7	0.7	0.9	0.9	1.1	1.1	1.2	1.2	1.4
4-12.4	0.3	0.3	0.6	0.6	0.9	0.9	1.2	1.2	1.5	1.5	1.8	1.8	2.1	2.1	2.1
12.4-18	0.4	0.4	0.8	0.8	1.2	1.2	1.6	1.6	2.0	2.0	2.4	2.4	2.8	2.8	2.8

Model 150/151-31:

Frequency Range (GHz)	Attenuation Setting (dB) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
dc-4	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5
4-12.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7
12.4-18	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Frequency Rang (GHz)	Attenuation Setting (dB) 17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dc-4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8
4-12.4	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.0	1.0	1.0	1.0	1.1	1.1
12.4-18	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.3

Model 150/151-70, 150/151-110, 152A-70:

Frequency Range (GHz)	Attenuation Setting (dB) 10	20	30	40	50	60	70	80	90	100	110
dc-4	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.9
4-12.4	0.4	0.7	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.0
12.4-18	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.0
18-26.5	0.6	0.7	0.9	1.5	1.6	2.2	2.9	---	---	---	---

Model 152-55:

Frequency Range (GHz)	Attenuation Setting (dB) 5	10	15	20	25	30	35	40	45	50	55
dc-4	0.2	0.3	0.4	0.4	0.4	0.6	0.6	0.7	0.7	0.8	1.0
4-12.4	0.3	0.4	0.5	0.5	0.5	0.7	0.8	0.9	0.9	1.0	1.3
12.4-18	0.4	0.4	0.5	0.5	0.5	0.8	1.0	1.1	1.1	1.2	1.6
18-26.5	0.5	0.5	0.6	0.6	0.6	0.9	1.2	1.4	1.4	1.5	2.0

Model 152-70 & 152-90:

Frequency Range (GHz)	Attenuation Setting (dB) 10	20	30	40	50	60	70	80	90
dc-4	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.1	1.2
4-12.4	0.4	0.5	0.7	0.9	1.0	1.3	1.5	1.6	1.7
12.4-18	0.5	0.6	0.8	1.1	1.2	1.4	1.7	1.8	2.1
18-26.5	0.5	0.6	0.9	1.4	1.5	1.8	2.3	2.4	2.8

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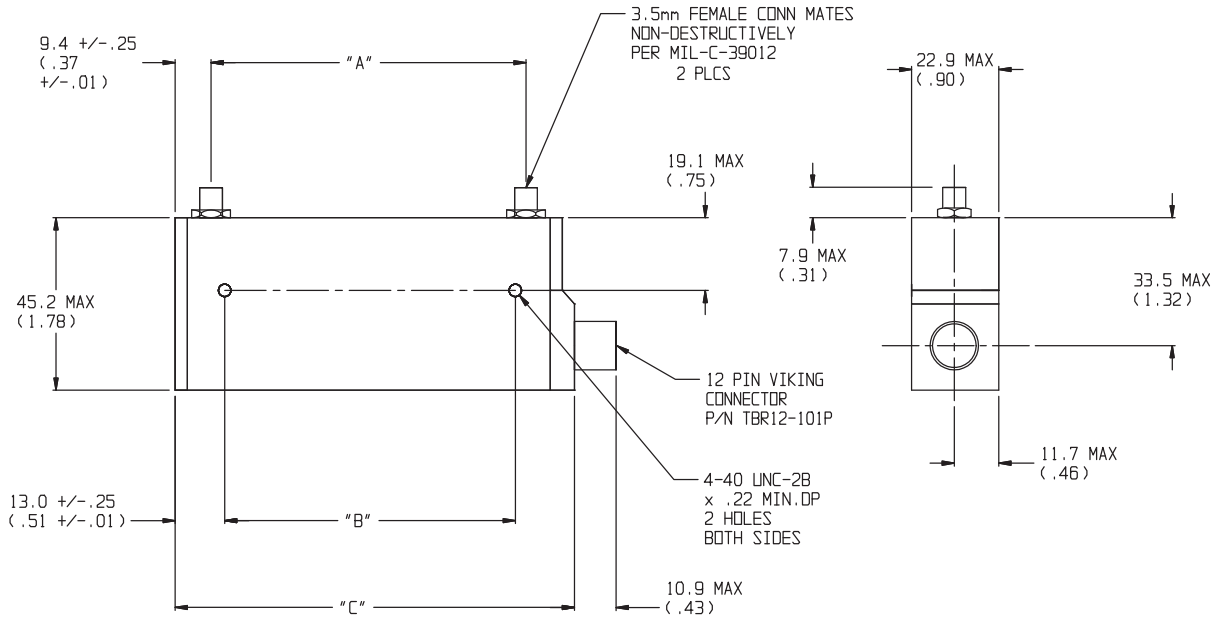
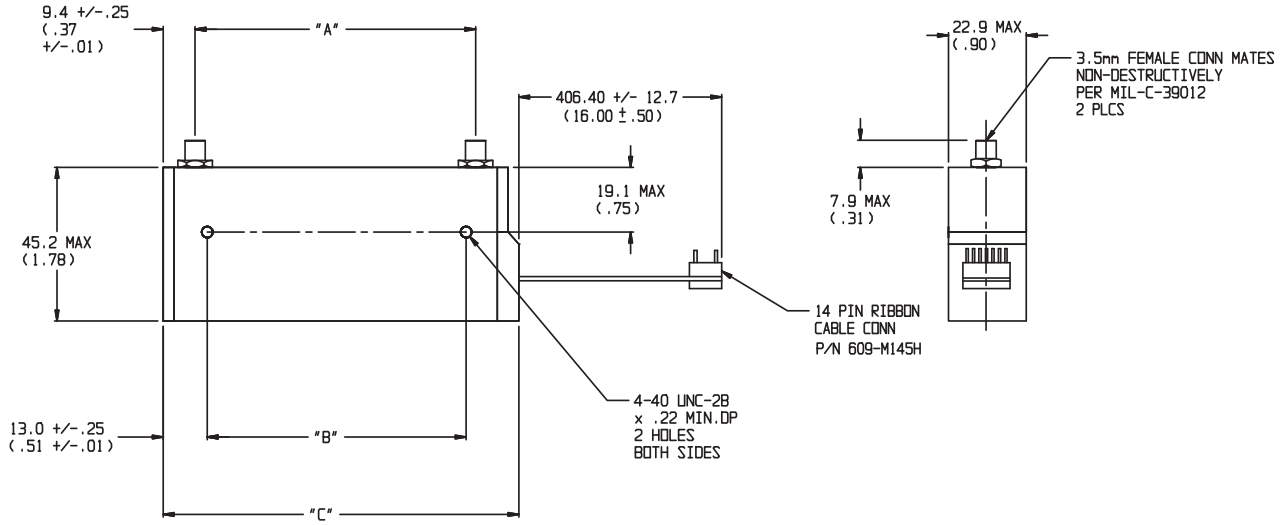
PHYSICAL DIMENSIONS:

Models 150, 151, & 152:





DIM	A	B	C
3 cell	82.3 (3.28)	76.2 (3.0)	104.6 (4.12)
4 cell	110.7 (4.36)	103.7 (4.08)	133.6 (5.25)
5 cell	136.1 (5.36)	129.1 (5.08)	159.5 (6.28)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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150 Series Ordering Guide...

Frequency Range/ Voltage/Connector	NO. Cells	Attenuator Range/Step Size							
		11/1 dB	15/1 dB	55/5 dB	31/1 dB	70/10 dB	75/5 dB	90/10 dB	110/10 dB
dc-4 GHz/+24 V/ Viking Connector	4 3 5	151-11	NA	N/A	151-31	N/A	151-75	N/A	151-110
dc-18 GHz/+24 V/ Viking Connector	4 3 5	150-11	150-15	N/A	150-31	150-70	150-75	N/A	150-110
dc-26.5 GHz/+24 V/ Viking Connector	4 3	N/A	N/A	152-55		N/A	N/A	152-90	N/A
dc-4 GHz/+24 V/ Ribbon Cable	4 3 5	151-11-1	NA	N/A	151-31-1	N/A	151-75-1	N/A	151-110-1
dc-18 GHz/+24 V/ Ribbon Cable	4 3 5	150-11-1	150-15-1	N/A	150-31-1	150-70-1	N/A	N/A	150-110-1
dc-26.5 GHz/+24 V/ Ribbon Cable	4 3	N/A	N/A	152-55-1	N/A	N/A	N/A	152-90-1	N/A
dc-4 GHz/+5 V/ Viking Connector	4 3 5	151-11-2	151-15-2	N/A	151-31-2	N/A	151-75-2	N/A	151-110-2
dc-18 GHz/+5 V/ Viking Connector	4 3 5	150-11-2	150-15-2	N/A	150-31-2	150-70-2	150-75-2	N/A	150-110-2
dc-26.5 GHz/+5 V/ Viking Connector	4 3	N/A	N/A	152-55-2	N/A	N/A	N/A	152-90-2	N/A
dc-4 GHz/+5 V/ Ribbon Cable	4 3 5	151-11-3	N/A	N/A	151-31-3	N/A	N/A	N/A	N/A
dc-18 GHz/+5 V/ Ribbon Cable	4 3 5	150-11-3	150-15-3	N/A	150-31-3	150-70-3	150-75-3	N/A	150-110-3
dc-26.5 GHz/+5 V/ Ribbon Cable	4 3	N/A	N/A	152-55-3	N/A	N/A	N/A	152-90-3	N/A

N/A = Not Available

ACCESSORIES

OPTIONAL TEST Data: Test Data is available at an additional cost for all programmable step attenuators models. Standard test date is sweep measurements which magitude and VSWR for each primary cell'.

MODELS WITH BUILT-IN TTL/CMOS INTERFACE\ DRIVER CIRCUIT: Aeroflex / Weinschel offers versions of the 150 series with built-in TTL/CMOS interfaces. This generation of intelligent attenuators will greatly simplify as well as provide an economical solution to 150 series driver problems. Refer to Model 150T, 151T, and 152T data sheet for more information.

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AEROFLEX WEINSCHEL

Model 153
Programmable Step Attenuator

dc to 40.0 GHz
1 Watt

NEW

Advanced Technology & Performance

Features

- **Higher Frequency range to 40 GHz.**
- **Choice of Attenuation Ranges**
  - 0 to 70 dB in 10 dB steps
  - 0 to 110 dB in 10 dB steps
- **Lowest insertion loss & Excellent Repeatability**
- **Life of 5 million operations**
- **Small rugged construction & light weight**

Description

This series of Programmable Step Attenuators provide attenuation from 0-70 dB or 0–110 dB in 10 dB steps. These attenuators provide programmable adjustments of RF signal levels in precise steps of 10 dB and consist of a cascaded assembly of switched attenuator cells (Figure 1). The attenuator elements located in the attenuator cell are created by a thin-film process which provides exceptional long-term stability, low power and temperature coefficients. This series uses a reed switching structure that provides rapid switching together with low insertion loss. The 153 series in available in three cell (153-70) and four cell (153-110) configurations.

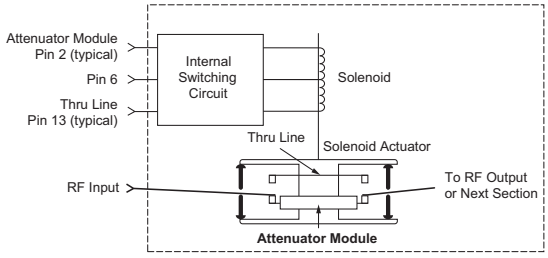

Figure 1. Cell Schematic

All models use in-line, female 2.92mm Connectors and contain a 14 pin Dip control connector that is plug-compatible with other competitive units.

PROGRAMMABILITY: In each programmable step attenuator, solenoid are used to switch the internal resistor card of each cell into and out of the circuit. With positive voltage applied to the common pin (#6) the state (attenuator card or thru line) of a particular section is determined by connecting it's attenuator card or thru pin to ground. Once the cell is switched, the solenoid is magnetically latched into position and is able to withstand extreme shock and vibration. Internal circuitry is included to interrupt the coil current after switching is complete. This reduces power dissipation even if power is continuously applied. The switching time for each cell is rated at 20 msec maximum which includes the contact settling time.

Also integrated in the design is solid state dc switching circuitry that avoids the relatively high failure rate of mechanical DC switches. Each attenuator section is controlled by its own driver circuit, which requires +24V nominal, 125 mA.

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM SWR (50 Ω Characteristic Impedance):

Frequency Range (GHz)	SWR
dc - 8	1.30
8 - 12	1.50
12 - 20	1.60
20 - 26.5	1.80
26.5 - 40	2.10

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
153-70	3	70/10	10, 20, 40
153-110	4	110/10	10, 20, 40, 40

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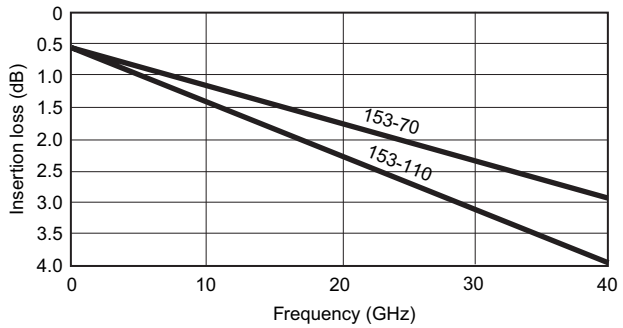
AEROFLEX WEINSCHEL

Programmable Attenuators

Specifications - Con't

MAXIMUM INSERTION LOSS (dB):



ATTENUATOR ACCURACY (± dB):

Frequency Range (GHz)	Attenuation (dB)							
	10	20	30	40	50	60	70	80-110
DC - 8	0.3	0.5	0.6	0.7	0.8	1.0	1.1	1.4
8 - 12	0.4	0.5	0.7	0.9	1.0	1.3	1.5	2.0
12 - 20	0.5	0.6	0.8	1.1	1.2	1.4	1.7	2.2
20 - 26.5	0.7	0.8	1.0	1.5	1.6	1.9	2.3	2.8
26.5 - 40	0.9	1.0	1.2	1.7	1.9	2.3	2.6	3.2

SWITCHING SPEED: 20 msec. maximum

OPERATING VOLTAGE: +24V nominal, +20V minimum; +30V maximum

SWITCHING CONTROL CURRENT: 125 mA typical per cell @ +24V nominal, Model 153-70 (3 cells) and 153-110 (4 cells).

SOLENOID COIL IMPEDANCE: 190 Ω

SOLENOID COIL INDUCTANCE: 65 mH

POWER RATING: 1 watt average, 100 watts peak (5 µsec pulse width, 0.5% duty cycle)

RF POWER SENSITIVITY: 0.001 dB/dB/W

SWITCH LIFE: 5 million (minimum operations per cell)

REPEATABILITY:

±0.03 dB to 18 GHz
±0.05 dB to 26.5 GHz
±0.08 dB to 40 GHz

TEMPERATURE RANGE:

Operating: -0°C to +70°C
Non-Operating: -55°C to +85°C

ALTITUDE: Operating: 4.6 km (440 mm Hg)
Non-operating: 15 km

SHOCK: Operating: 10g, 6 ms, on 6 sides, 3 blows
Non-operating: 500 g, 1.8 ms, in 6 directions

HUMIDITY: 0 to 95% relative humidity

EMC: MIL-STD-461, Method RE02, VDE 0871, CISPR#2

TEST DATA: Test data is available at additional cost.

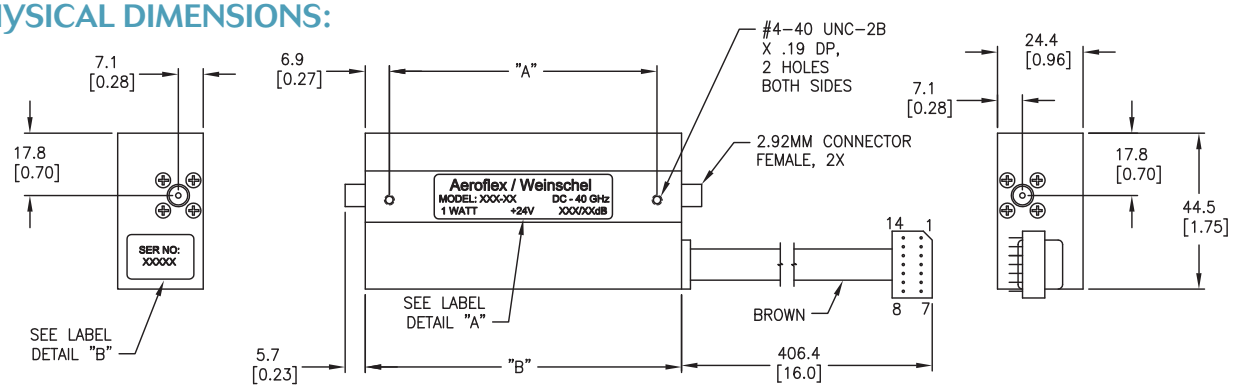
CONNECTORS: 2.92mm connectors - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.

CONTROL CONNECTOR: 14 conductor 16" ribbon cable with connector (shown below):

Pin Number	Wire Color	153-70	153-110
1	- - -	- - -	- - -
2	White	10 dB Cell Attenuator	10 dB Cell Attenuator
3	Violet	40 dB Cell Thru Line	40 dB Cell 1 Thru Line
4	Green	- - -	40 dB Cell 2 Thru Line
5	Orange	20 dB Cell Attenuator	20 dB Cell Attenuator
6	Brown	+24Vdc	+24Vdc
7	- - -	- - -	- - -
8	- - -	- - -	- - -
9	Red	40 dB Cell Attenuator	40 dB Cell 1 Attenuator
10	Yellow	- - -	40 dB Cell 2 Attenuator
11	Blue	20 dB Cell Thru Line	20 dB Cell Thru Line
12	Grey	- - -	- - -
13	Black	10 dB Cell Thru Line	10 dB Cell Thru Line
14	- - -	- - -	- - -

WEIGHT (Typical): 153-70: 170 g (6 oz)
153-110: 213 g (7.5 oz)

PHYSICAL DIMENSIONS:



Model No.	No. Cells	A	B
153-70	3	76.2 (3.0)	90.2 (3.55)
153-110	4	102.9 (4.05)	115.8 (4.6)

NOTE: All dimensions are given in mm (inches) and are nominal, unless otherwise specified.

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Revision Date: 2/10/09

AEROFLEX WEINSCHEL

Models 4216 & 4218 0.8 to 2.3 GHz
Pin Switched Programmable Attenuators 1 Watt

Low Insertion Loss, Fast Switching

Features

Ideal for use in Wireless/Cellular, RF Simulation/Emulation, & Communication Test Applications.

- **Available in 6 and 8 Cell Configurations -**
  127 dB/1 dB steps
  63 dB/1 dB steps
  63.75/0.25 dB steps
- **High accuracy & fast switching speed**
- **Built-in TTL Driver Circuitry**
- **Special Configurations Available Upon Request.**
  - Custom Cell/Step Size & Frequency Bands

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: 0.8 to 2.3 GHz

MAXIMUM SWR:

Frequency Range (GHz)	SWR
0.8 - 2.3	1.50

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
4218-127	8	127/1	1, 2, 4, 8, 16, 32, 64
4218-63.75	8	63.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 32
4216-63	6	63/1	1, 2,4, 8, 16, 32

INCREMENTAL ATTENUATION ACCURACY:

Frequency Range (GHz)	Accuracy
0.8 - 2.3	± 0.4 dB or 2.0%

INSERTION LOSS, Nominal (dB):

Frequency Range (GHz)	4218-X	4216-63
0.8 - 1.0	3.00	2.40
1.0 - 2.3	4.90	3.40

MONOTONICITY: 0.8 to 2.3 GHz
3rd ORDER INTERMODULATION (IM3): -55 dBm typical, measured with two +10 dBm tones @ 869 MHz (f1) and 894 MHz (f2), the IM3 frequency being 847 MHz (2f1-f2).

$$IP3 \text{ (input)} = +41.5 \text{ dBm}$$

The input IP3 is derived from the following relationship:

$$IP3 = \frac{3(Pin-\alpha)-IM3}{2} + \alpha$$

where α = the insertion loss (dB) at the IM3 frequency;
Pin=single tone input power (dBm).

POWER RATING: +24 dBm operating
+30 dBm (1 dB compression point)
SWITCHING TIME: 2 µsec. maximum
OPERATING VOLTAGE: +5 V ± 5% @ 160 mA for 6 cell/ 200 mA for 8 cell typical
TEMPERATURE RANGE (Operating): 0°C to +70°C
TEMPERATURE COEFFICIENT: < 0.002 dB/dB/°C
CONNECTORS: SMA female connectors - mate nondestructively with MIL-C-39012 connectors.

CONTROL CONNECTOR: AMP-Latch 10 pin ribbon cable connector mates with AMP P/N 746285-1 (supplied with each unit)

WEIGHT: 4216-X 175 g (6.1 oz)
4218-X 215 g (7.5 oz)

CONTROL CONFIGURATION: Units are supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

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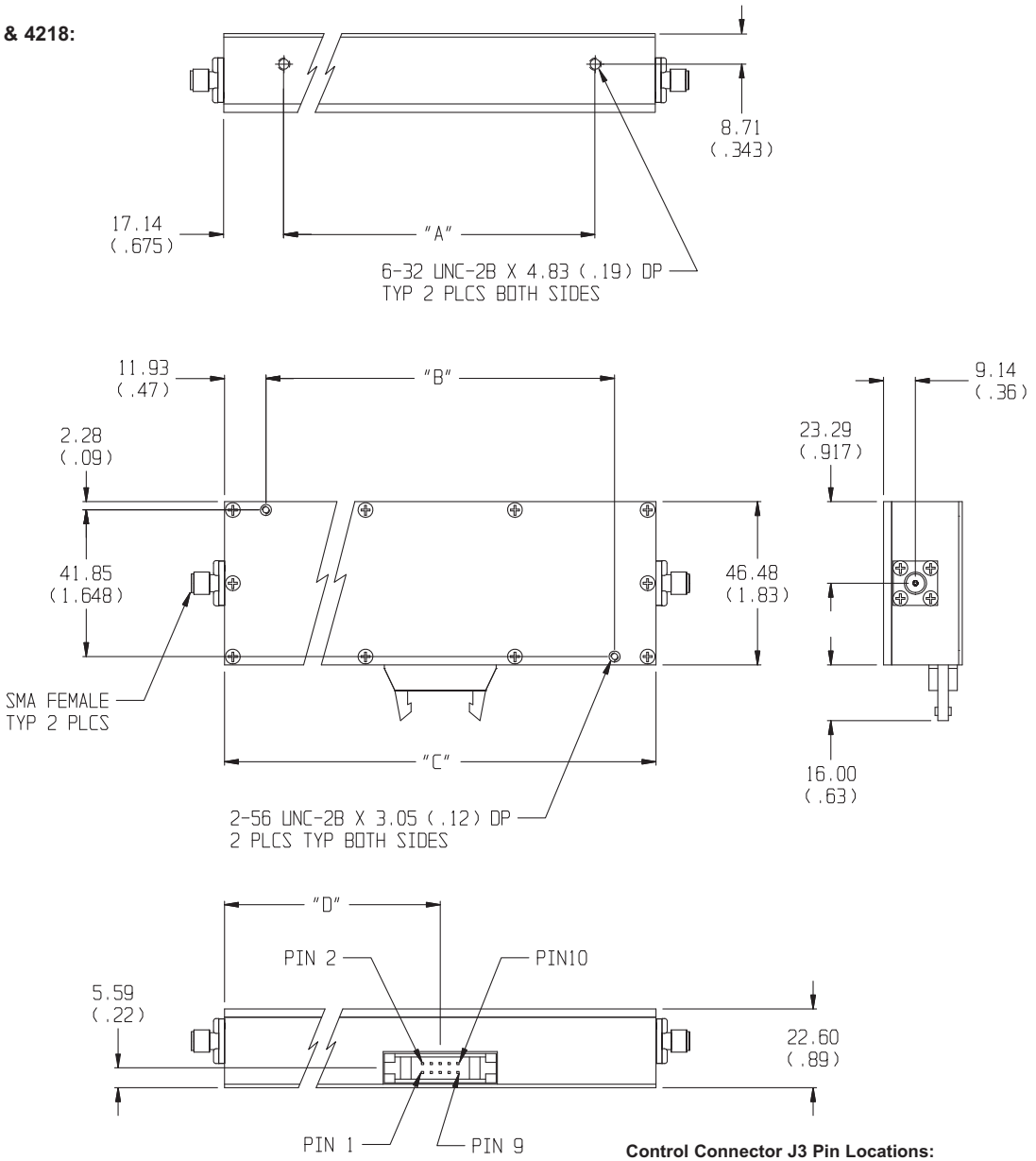
PHYSICAL DIMENSIONS:

Models 4216 & 4218:



Model No.	A	B	C	D
4216-X	63.50 (2.50)	71.12 (2.80)	94.74 (3.73)	47.49 (1.87)
4218-X	88.90 (3.50)	99.56 (3.92)	123.19 (4.85)	61.72 (2.43)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	4216-63 dB (Cell)	4218-63.75 dB (Cell)	4218-127 dB (Cell)
1	1	0.25	1
2	2	0.50	2
3	4	1	4
4	8	2	8
5	16	4	16
6	32	8	32
7	NC	16	32*
8	NC	32	32*
9	+5V	+5V	+5V
10	COM	COM	COM

NC = Not Connected
*Pins 7 and 8 combined to create 64 dB cell.

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Revision Date: 8/11/09

AEROFLEX WEINSCHEL

Models 4226 & 4228 0.8 to 2.5/3.0 GHz
Pin Switched Programmable Attenuators 1 Watt

Low Insertion Loss, Fast Switching

Features

Ideal for use in Wireless/Cellular, RF Simulation/Emulation, & Communication Test Applications.

- **Available in 6 and 8 Cell Configurations -**
  103 dB/1 dB steps
  63 dB/1 dB steps
  63.75/0.25 dB steps
- **High accuracy & fast switching speed**
- **Built-in TTL Driver Circuitry**
- **Special Configurations Available Upon Request.**
  - Custom Cell/Step Size & Frequency Bands

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE:

4226-63:	0.8 to 3.0 GHz
4228-63.75:	0.8 to 2.5 GHz
4228-103:	0.8 to 3.0 GHz

MAXIMUM SWR:

Frequency Range (GHz)	SWR
0.8 - 3.0 (2.5)	1.50

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
4228-103	8	103/1	1, 2, 4, 8, 16, 24, 48
4228-63.75	8	63.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 32
4226-63	6	63/1	1, 2, 4, 8, 16, 32

INCREMENTAL ATTENUATION ACCURACY:

CELL	0.25	0.50	1	2	4	8	16	24	32	48
dB	±0.1	±0.15	±0.2	±0.2	±0.2	±0.2	±0.3	±0.4	±0.6	±0.8

INSERTION LOSS, Maximum (dB):

Frequency (GHz)	4226-63	4228-63.75	4228-103
0.8 - 3.0 (2.5)	3.75	4.50	5.50

MONOTONICITY: 4226-63 & 4228-103: 0.8 to 3.0 GHz
4228-63.75: 0.8 to 2.5 GHz

3rd ORDER INTERMODULATION (IM3): -55 dBm typical, measured with two +10 dBm tones @ 869 MHz (f1) and 891 MHz (f2), the IM3 frequency being 847 MHz (2f1-f2).

IP3 (input) = +41 dBm

The input IP3 is derived from the following relationship:

$$IP3 = \frac{3(Pin-\alpha)-IM3}{2} + \alpha$$

where α = the insertion loss (dB) at the IM3 frequency;
Pin=single tone input power (dBm).

POWER RATING: +24 dBm operating
+30 dBm (1 dB compression point)

SWITCHING TIME: 2 µsec. maximum

OPERATING VOLTAGE: +5 V ± 5% @ 160 mA for 6 cell/ 200 mA for 8 cell typical

TEMPERATURE RANGE (Operating): 0°C to +70°C

TEMPERATURE COEFFICIENT: < 0.002 dB/dB/°C

CONNECTORS: SMA female connectors - mate nondestructively with MIL-C-39012 connectors.

CONTROL CONNECTOR: AMP-Latch 10 pin ribbon cable connector mates with AMP P/N 746285-1 (supplied with each unit)

WEIGHT: 4226-X 160 g (5.7 oz)
4228-X 210 g (7.4 oz)

CONTROL CONFIGURATION: Units are supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

DRIVER SPECIFICATIONS:

		minimum	maximum
V_{IH}	Input High Level	2.0 V	5.3 V
V_{IL}	Input Low Level	-0.3 V	0.8 V
I_{PU}	Input Pull-up Current	500 µA Typical	

Note: Inputs have 10K pull-up resistors.

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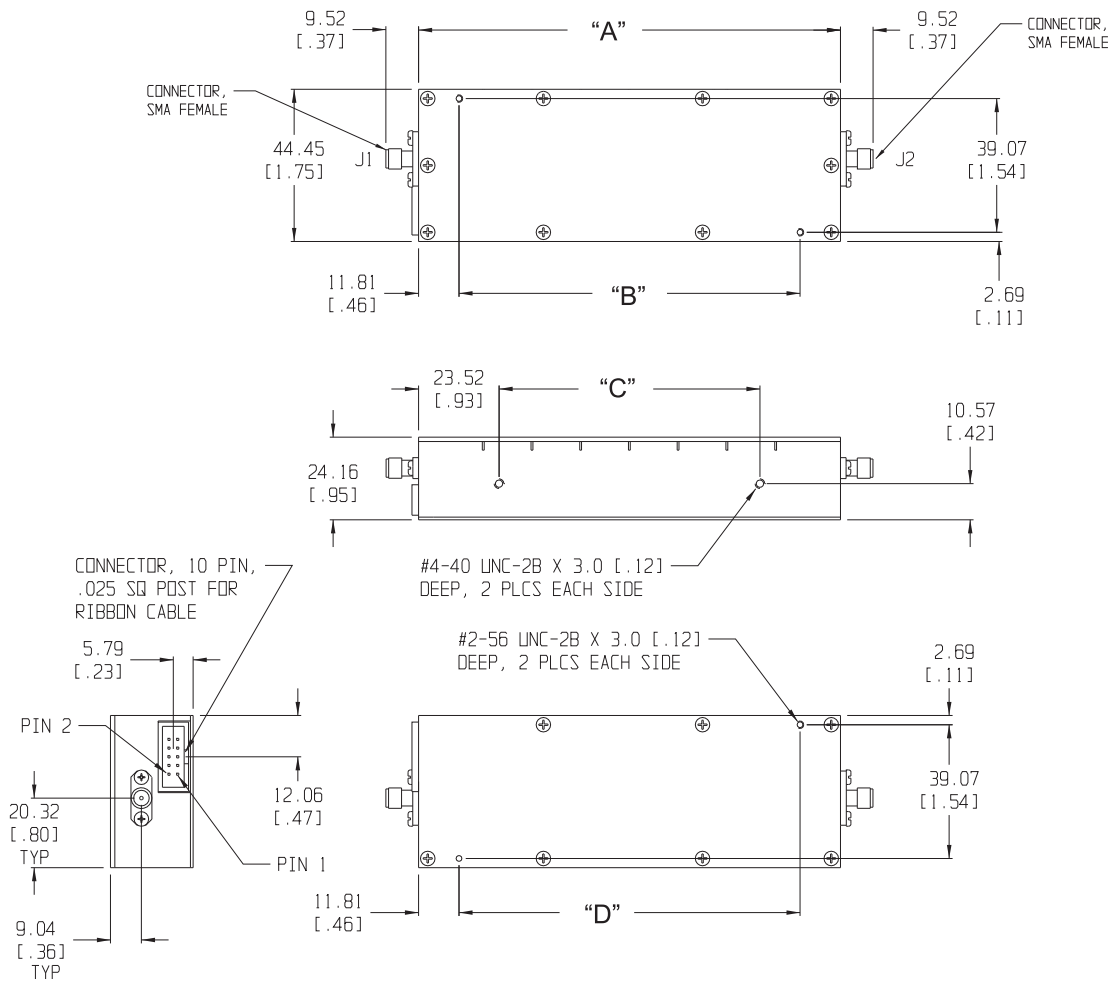
PHYSICAL DIMENSIONS:

Models 4226 & 4228:



Model No.	A	B	C	D
4226-X	94.79 (3.73)	71.15 (2.80)	76.20 (3.00)	71.15 (2.80)
4228-X	123.24 (4.85)	99.59 (4.85)	76.20 (3.00)	99.59 (4.85)

NOTE:

All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	4226-63 dB (Cell)	4228-63.75 dB (Cell)	4228-103 dB (Cell)
1	1	0.25	1
2	2	0.50	2
3	4	1	4
4	8	2	8
5	16	4	16
6	32	8	24
7	NC	16	48
8	NC	32	NC*
9	+5V	+5V	+5V
10	COM	COM	COM

NC = Not Connected

* For Factory use only.

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Revision Date: 8/11/09

AEROFLEX WEINSCHEL

Model 4238 GaAs Switched Programmable Attenuator

10 MHz to 2.5 GHz 1 Watt

Low Insertion Loss, High IP3

Features

Ideal for use in Wireless/Cellular, RF Simulation/Emulation, & Communication Test Applications.

- **Broadband Performance -** 10 MHz to 2.5 GHz usable dc to 10 MHz with reduced specifications
- **High IP3 and High Power Rating** - Utilizes MESFET Switching
- **Flexible DC Voltage (+5 to +15 V)**
- **Low DC Power Consumption** - Ideal for portable battery powered equipment.
- **Custom Configurations including bus controlled attenuator subsystems**

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: 10 MHz to 2.5 GHz

MAXIMUM SWR:

Frequency Range (GHz)	SWR
0.01 - 0.25	1.75
0.25 - 2.5	1.40

CELL CONFIGURATIONS:

Model Number	NO. Cells	Attenuation Range/Steps (dB)	Cell Increments (dB)
4238-63.75	8	63.75/0.25	0.25, 0.5, 1, 2, 4, 8, 16, 32
4238-103	8	103/1	1, 2, 4, 8, 16, 24, 48

INCREMENTAL ATTENUATION ACCURACY:

CELL	0.25	0.50	1	2	4	8	16	24	32	48
dB	±0.15	±0.15	±0.2	±0.2	±0.2	±0.2	±0.3	±0.4	±0.6	±0.8

INSERTION LOSS, Maximum (dB):

Frequency Range (GHz)	4238-X
0.01 - 1.0	6.75
1.0 - 2.0	8.25
2.0 - 2.5	9.75

MONOTONICITY: 10 MHz to 2.5 GHz
3rd ORDER INTERMODULATION (IM3): -60 dBm typical, measured with two +27 dBm tones @ 869 MHz (f1) and 894 MHz (f2), the IM3 frequency being 847 MHz (2fl-f2).

IP3 (input) = +65 dBm

The input IP3 is derived from the following relationship:

$$IP3 = \frac{3(Pin-\alpha)-IM3}{2} + \alpha$$

where α = the insertion loss (dB) at the IM3 frequency;
Pin=single tone input power (dBm).

INPUT POWER RATING: +30 dBm
SWITCHING TIME: 5 µsec. maximum
OPERATING VOLTAGE: + 5 to +15 V
OPERATING CURRENT: 25 mA typical
TEMPERATURE RANGE (Operating): 0°C to +70°C
TEMPERATURE COEFFICIENT: <0.002/dB/dB/°C
CONNECTORS: SMA female connectors - mate nondestructively with MIL-C-39012 connectors.
CONTROL CONNECTOR: AMP-Latch 10 pin ribbon cable connector mates with AMP P/N 746285-1 (supplied with each unit)
WEIGHT: 4238-X 150 g (5.3 oz)
CONTROL CONFIGURATION: Units are supplied with a built-in TTL interface. Each unit is supplied with a mating 10 pin connector (Amp 746285-1). Refer to Physical Dimensions for mating connector pin/wiring details. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular attenuation cell. A TTL high will energize a cell to the high attenuation state, whereas a TTL low will maintain a cell in its zero attenuation state.

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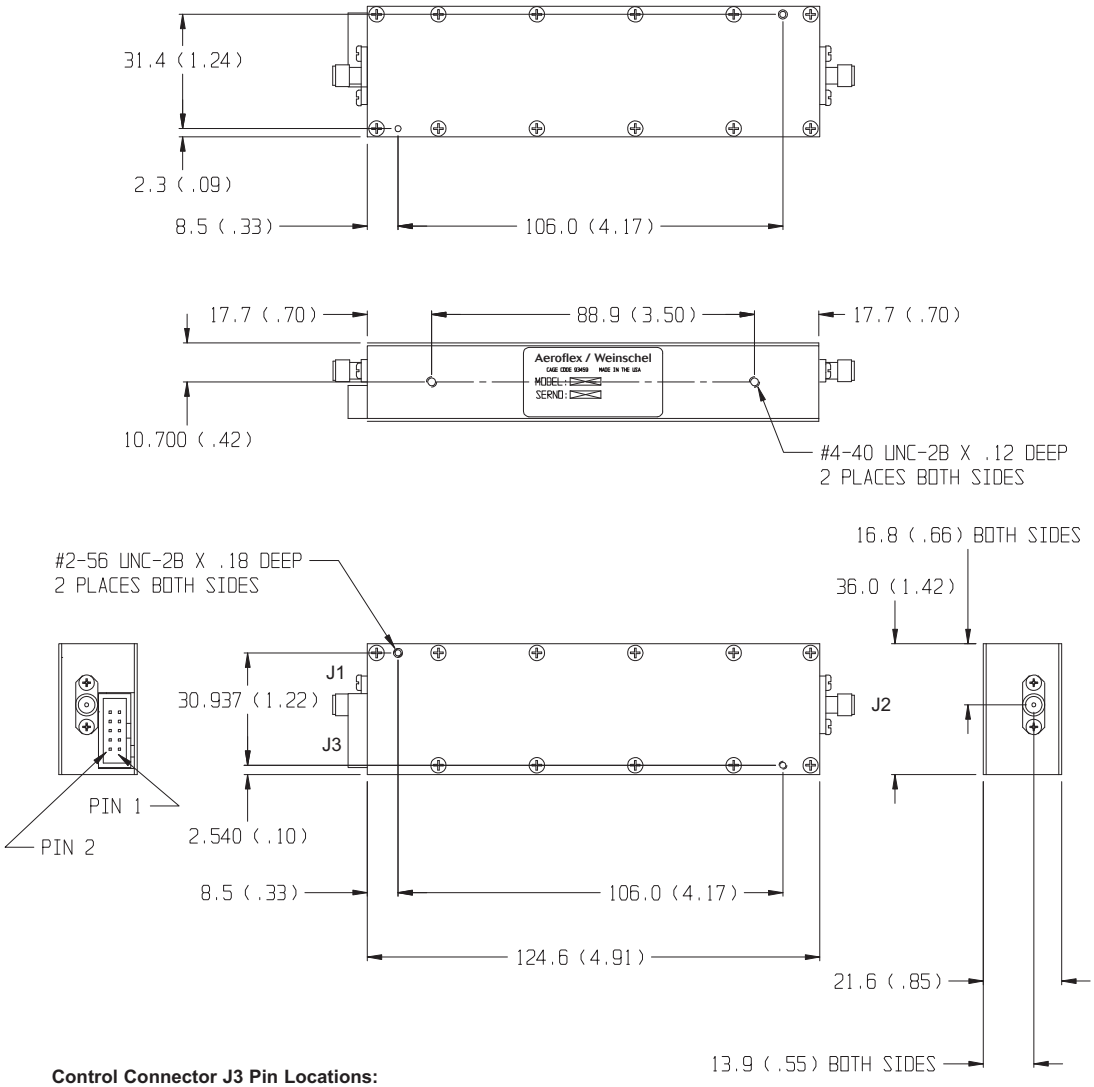
Revision Date: 8/11/09

PHYSICAL DIMENSIONS:

Model 4238:



Control Connector J3 Pin Locations:

TTL Conn PIN No. (J3)	4238-103 dB (Cell)	4238-63.75 dB (Cell)
1	1	0.25
2	2	0.50
3	4	1
4	8	2
5	16	4
6	24	8
7	48	16
8	NC*	32
9	+5 to 15V	+5 to 15V
10	COM	COM

NC = Not Connected
* For Factory use only.

NOTE:
All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 8/11/09

Programmable Attenuators

AEROFLEX WEINSCHEL

Models 8310 & 8311
SmartStep® Programmable Attenuator Units

IEEE-488

RS232\RS422/RS485

CE

A New Concept in Programmable Attenuation!

Features

- Provides a flexible, easy to program, low cost solution for your bench test/calibration setups and subsystem applications.
- Multi-Channel attenuation paths (up to 4 input/outputs for 8310 & up to 6 input/outputs for 8311)
- Relative vs. Nominal attenuation step function.
- Wide choice of Frequency & Attenuation Ranges.
  - dc to 1, 2, 3, 6 & 18 GHz
  - NEW dc to 6 GHz Models
  - up to 127 dB
  - Solid-State (GaAs FET *& PIN)
  - Relay Switched
- 75 Ω Configurations
- Accuracy & Repeatability.
- Designed to interface with Aeroflex / Weinschel's line of digitally controlled programmable attenuators and other electromechanical devices.
- Designed to interface with industry standard communication interfaces:
  - GPIB/IEEE-488 (HS-488 ready)
  - RS-232, RS-422, RS-485
- **Rack Configurable:** The Model 8310 or 8311 can be rack mounted either as a single unit using Rack Mounting Kit (P/N 193-8033-1) or two Model 8310's can be mounted together using Rack Mounting Kit (P/N 193-8033-2). These kits fit into any rack or cabinet that is designed per EIA RS-310 or MIL-STD-189.

Description

Aeroflex / Weinschel's 8310 and 8311Series Programmable Attenuator Units represent a new concept in programmable attenuation for bench test and subsystem applications. Standard 8310 Series designs house and control various Aeroflex / Weinschel Programmable Attenuator Models (3200T, 150T, and 4200 Series) via front panel controls or standard communications interfaces including GPIB (IEEE-488) and RS-232/RS-422 /RS485. This series combines the features of the Aeroflex / Weinschel 8210A Device Controller with a front panel user interface to form a flexible, easy to use solution.

Most 8310 Series are single channel configurations where RF signal is routed through either the front or rear mounted Ports A & B but can be configured for up to four channels of attenuation, RF switching, amplification or other functions. Multiple programmable attenuators can be used inconjuction with other coaxial devices such as switches, power combiners, directional couplers, and filters creating single or multichannel subsystems.

6 Channel 19" Rack Size Versions

Applications

Applications for the 8310 and 8311 Series range from providing control of a single Programmable Attenuator in a bench test/lab environment using a PC and a terminal emulator, to complex system applications where the 8310/8311 Series are employed to control many devices to create custom/ semi-custom subsystems to reduce overall design cost. Aeroflex / Weinschel can provide a variety of custom designed driver interfaces for various devices, such as RF switches, relays, pin attenuators, motorized step attenuators, displays, and other devices, as well as complete subsystem design and integration services. Contact us with your specialized needs.

For additional information on the Model 8310, visit our website @ www.aeroflex.com/weinschel/8310

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Revision Date: 12/10/09

Specifications

SPECIFICATION	DESCRIPTION	
Input Power Requirements	ac	100 to 240 Vac, 50/60 Hz, 50 Watts
Environmental	Operating Temperature Storage Temperature: Humidity: Altitude:	0 to +50°C 67° to +167 °F (-55° to +75°C) 96% 40,000' (12,192M)
IEEE-488 Bus	Connector: Protocols: Indicators:	24-pin per IEEE-488.1 per IEEE-488.2 Remote (RMT), Listen (LSN), Talk (TLK), SRQ (SRQ)
RS-232 Bus	Connector: Signals: Baud Rates: Data Bits: Handshaking: Parity: Indicators:	9-pin male D TXD, RXD, RTS, CTS, DTR, GND 2400, 9600, 19200, and 38400 8 None, RTS/CTS, XON/XOFF None, Odd, Even Tx (Transmit) and Rx (Receive)
RS-422 BUS(3) **RS-485 Bus(4)**	Connector: Signals: Baud Rates: Data Bits: Handshaking: Parity: Indicators:	9-pin male D TXD+, TDX-, RXD+, RTX-, RTS+, RTS-, CTS+, CTS-, and signal GND 2400, 9600, 19200, and 38400 8 None, RTS/CTS, XON/XOFF None, Odd, Even Tx (Transmit) and Rx (Receive)
RF Characteristics(5)	See ordering guide (pg 120 through 122)	

1. GPIB/IEEE-488 model allows user-selectable addresses.
2. RS-232 can be used with standard PC serial port for short and medium distances (up to approximately 50 ft).
3. RS-422, designed for very long distance communications (4000 ft) and & optimized as a single node protocol, typically with one device connected to a single port.
4. RS-485, designed for very long distance communications (4000 ft) & optimized for multi-drop connections that can used to create a low cost network.
5. Refer to Individual data sheet for detailed specifications on internal programmables.

Ordering Guide...8310 Series with 4200 Programmables

Model No	Attenuation Value (dB)	Frequency Range (GHz)	Insertion Loss (maximum)	SWR (Maximum)	No of Channels	Attenuator Model No.*	Connector Type	Conn Location
8310-136-F	63.75/0.25	0.8-2.5	6.0	1.6	1	4228-63.75	N/F	Front
8310-136-R	63.75/0.25	0.8-2.5	6.0	1.6	1	4228-63.75	N/F	Rear
8310-136-2-F	63.75/0.25	0.8-2.5	6.0	1.6	2	4228-63.75	N/F	Front
8310-136-2-R	63.75/0.25	0.8-2.5	6.0	1.6	2	4228-63.75	N/F	Rear
8310-137-F	63/1	0.8-3.0	4.7	1.6	1	4226-63	N/F	Front
8310-137-R	63/1	0.8-3.0	4.7	1.6	1	4226-63	N/F	Rear
8310-137-2-F	63/1	0.8-3.0	4.7	1.6	2	4226-63	N/F	Front
8310-137-2-R	63/1	0.8-3.0	4.7	1.6	2	4226-63	N/F	Rear
8310-138-F	103/1	0.8-3.0	6.0	1.6	1	4228-103	N/F	Front
8310-138-R	103/1	0.8-3.0	6.0	1.6	1	4228-103	N/F	Rear
8310-138-2-F	103/1	0.8-3.0	6.0	1.6	2	4228-103	N/F	Front
8310-138-2-R	103/1	0.8-3.0	6.0	1.6	2	4228-103	N/F	Rear
8310-138-3-T	103/1	0.8-3.0	6.0	1.6	3	4228-103	N/F	Front/Rear
8310-138-4-T	103/1	0.8-3.0	6.0	1.6	4	4228-103	N/F	Front/Rear

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Revision Date: 2/10/09

Programmable Attenuators

AEROFLEX WEINSCHEL

Ordering Guide...8310 Series with 3200 Programmables

Model No	Attenuation Value (dB)	Frequency Range (GHz)	Insertion Loss (maximum)	SWR (Maximum)	No of Channels	Attenuator Model No.*	Connector Type	Conn Location
8310-1-F	63/1	dc-1.0 (75Ω)	6.0 dB	1.6	1	3250T-63	BNC/F	Front
8310-1-R	63/1	dc-1.0 (75Ω)	6.0 dB	1.6	1	3250T-63	BNC/F	Rear
8310-1-2-F	63/1	dc-1.0 (75Ω)	6.0 dB	1.6	2	3250T-63	BNC/F	Front
8310-1-2-R	63/1	dc-1.0 (75Ω)	6.0 dB	1.6	2	3250T-63	BNC/F	Rear
8310-1-3-T	63/1	dc-1.0 (75Ω)	6.0 dB	1.6	1	3250T-63	BNC/F	Front to Rear
8310-2-F	63/1	dc-1.0 (75Ω)	6.75 dB	2.0	1	3250T-63	F/F	Front
8310-2-R	63/1	dc-1.0 (75Ω)	6.75 dB	2.0	1	3250T-63	F/F	Rear
8310-2-2-F	63/1	dc-1.0 (75Ω)	6.75 dB	2.0	2	3250T-63	F/F	Front
8310-2-2-R	63/1	dc-1.0 (75Ω)	6.75 dB	2.0	2	3250T-63	F/F	Rear
8310-35-F	127/1	dc-2.0	6.0 dB	1.4	1	3200T-1	N/F	Front
8310-35-F-E	127/1	dc-3.0	6.0 dB	1.4	1	3200T-1E	N/F	Front
8310-35-R	127/1	dc-2.0	6.0 dB	1.4	1	3200T-1	N/F	Rear
8310-35-R-E	127/1	dc-3.0	6.0 dB	1.4	1	3200T-1E	N/F	Rear
8310-35-2-F	127/1	dc-2.0	6.0 dB	1.4	2	3200T-1	N/F	Front
8310-35-2-R	127/1	dc-2.0	6.0 dB	1.4	2	3200T-1	N/F	Rear
8310-35-3-T	127/1	dc-2.0	6.0 dB	1.4	3	3200T-1	N/F	Front to Rear
8310-35-4-T	127/1	dc-2.0	6.0 dB	1.4	4	3200T-1	N/F	Front to Rear
8310-35-4-T-E	127/1	dc-3.0	6.0 dB	1.4	4	3200T-1E	N/F	Front to Rear
8310-36-F	64.5/0.1	dc-2.0	8.0 dB	1.4	1	3209T-1	N/F	Front
8310-36-R	64.5/0.1	dc-2.0	8.0 dB	1.4	1	3209T-1	N/F	Rear
8310-36-2-F	64.5/0.1	dc-2.0	8.0 dB	1.4	2	3209T-1	N/F	Front
8310-36-2-R	64.5/0.1	dc-2.0	8.0 dB	1.4	2	3209T-1	N/F	Rear
8310-36-3-T	64.5/0.1	dc-2.0	8.0 dB	1.4	3	3209T-1	N/F	Front to Rear
8310-37-F	63.75/0.25	dc-2.0	6.0 dB	1.4	1	3200T-2	N/F	Front
8310-37-R	63.75/0.25	dc-2.0	6.0 dB	1.4	1	3200T-2	N/F	Rear
8310-37-2-F	63.75/0.25	dc-2.0	6.0 dB	1.4	2	3200T-2	N/F	Front
8310-37-2-R	63.75/0.25	dc-2.0	6.0 dB	1.4	2	3200T-2	N/F	Rear
8310-37-3-T	63.75/0.25	dc-2.0	6.0 dB	1.4	3	3200T-2	N/F	Front to Rear
8310-37-4-T	63.75/0.25	dc-2.0	6.0 dB	1.4	4	3200T-2	N/F	Front to Rear
8310-38-F	63/1	dc-2.0	5.25 dB	1.4	1	3206T-1	N/F	Front
8310-38-F-E	63/1	dc-3.0	5.25 dB	1.4	1	3206T-1E	N/F	Front
8310-38-R	63/1	dc-2.0	5.25 dB	1.4	1	3206T-1	N/F	Rear
8310-38-2-F	63/1	dc-2.0	5.25 dB	1.4	2	3206T-1	N/F	Front
8310-38-2-R	63/1	dc-2.0	5.25 dB	1.4	2	3206T-1	N/F	Rear
8310-38-3-T	63/1	dc-2.0	5.25 dB	1.4	3	3206T-1	N/F	Front to Rear
8310-38-4-T	63/1	dc-2.0	5.25 dB	1.4	4	3206T-1	N/F	Front to Rear
8310-352-F	103/1	dc-6.0	6.00 dB	1.55	1	3408T-103	N/F	Front
8310-352-R	103/1	dc-6.0	6.00 dB	1.55	1	3408T-103	N/F	Rear
8310-352-2-F	103/1	dc-6.0	6.00 dB	1.55	2	3408T-103	N/F	Front
8310-352-2-R	103/1	dc-6.0	6.00 dB	1.55	2	3408T-103	N/F	Rear
8310-352-3-T	103/1	dc-6.0	6.00 dB	1.55	3	3408T-103	N/F	Front to Rear
8310-352-4-T	103/1	dc-6.0	6.00 dB	1.55	4	3408T-103	N/F	Front to Rear

Ordering Guide...8310 Series with 150 Programmables

Model No	Attenuation Value (dB)	Frequency Range (GHz)	Insertion Loss (maximum)	SWR (Maximum)	No of Channels	Attenuator Model No.*	Connector Type	Conn Location
8310-201-F	70/10	dc-18.0	3.25 dB	1.75	1	150T-70	SMA/F	Front
8310-201-R	70/10	dc-18.0	3.25 dB	1.75	1	150T-70	SMA/F	Rear
8310-201-2-F	70/10	dc-18.0	3.25 dB	1.75	2	150T-70	SMA/F	Front
8310-201-2-R	70/10	dc-18.0	3.25 dB	1.75	2	150T-70	SMA/F	Rear
8310-202-F	121/1	dc-18.0	5.25 dB	1.95	1	150T-11+150T-110	SMA/F	Front
8310-202-R	121/1	dc-18.0	5.25 dB	1.95	1	150T-11+150T-110	SMA/F	Rear
8310-204-F	62/2	dc-18.0	3.70 dB	1.95	1	150T-62	SMA/F	Front
8310-204-R	62/2	dc-18.0	3.70 dB	1.95	1	150T-62	SMA/F	Rear
8310-204-2-F	62/2	dc-18.0	3.70 dB	1.95	2	150T-62	SMA/F	Front
8310-204-2-R	62/2	dc-18.0	3.70 dB	1.95	2	150T-62	SMA/F	Rear

*Refer to Individual data sheet for detailed specifications on internal programmables.

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Revision Date: 12/10/09

AEROFLEX WEINSCHEL

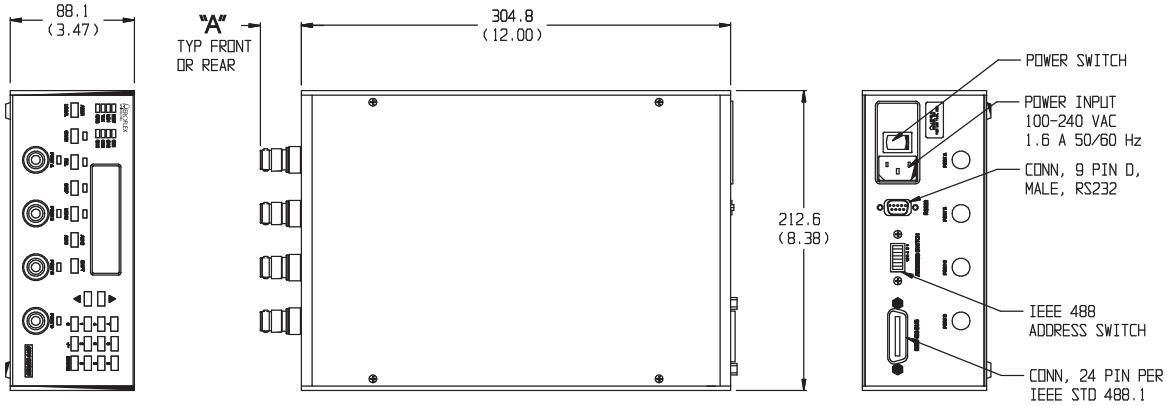
Programmable Attenuators

Ordering Guide...8311 Series!

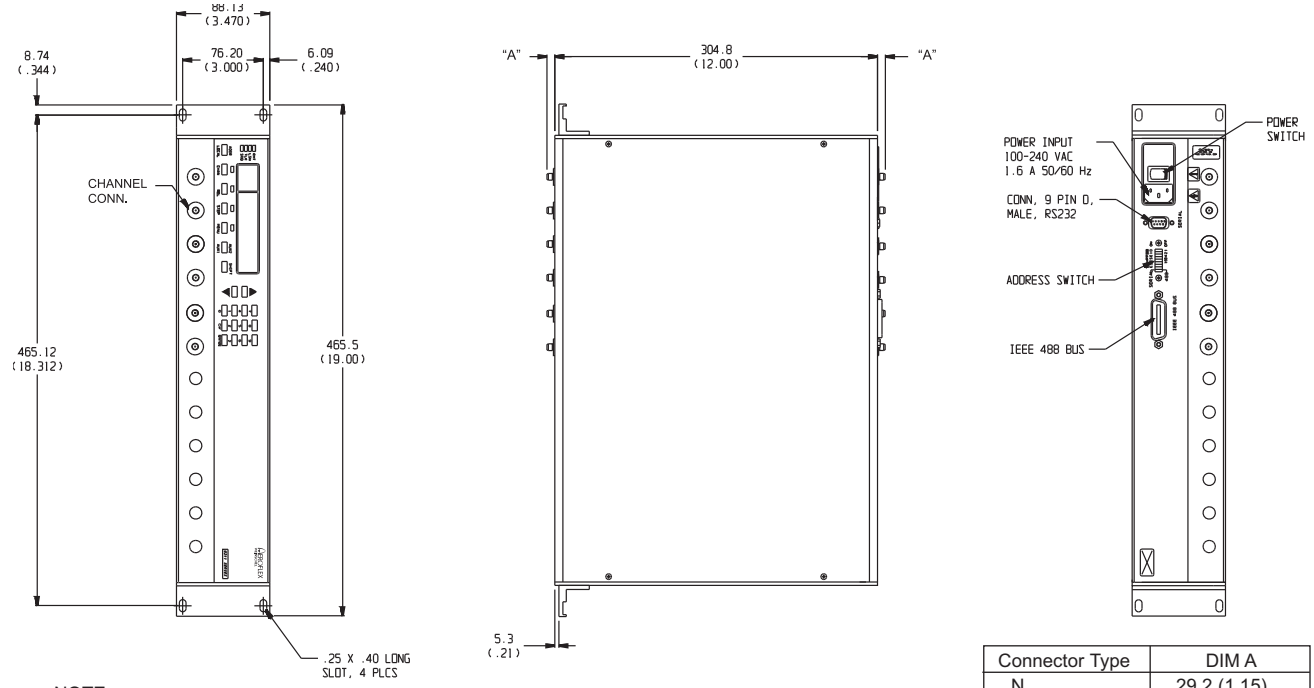
Model No	Attenuation Value (dB)	Frequency Range (GHz)	Insertion Loss (maximum)	SWR (Maximum)	No of Channels	Attenuator Model No.*	Connector Type	Conn Location
8311-1-6-F	63/1	dc-1.0 (75Ω)	6.00 dB	1.60	6	3250T-63	BNC/F	Front
8311-38-6-F	63/1	dc-2.0	5.25 dB	1.40	6	3206T-1	N/F	Front
8311-38-12-T	63/1	dc-2.0	5.25 dB	1.40	12	3206T-1	N/F	Front-Rear
8311-137-6-F	63/1	0.8-3.0	4.70 dB	1.60	6	4226-63	N/F	Front
8311-202-2-F	121/1	dc-18.0	5.25 dB	1.95	2	150T-11+150T-110	SMA/F	Front
8311-202-3-F	121/1	dc-18.0	5.25 dB	1.95	3	150T-11+150T-110	SMA/F	Front
8311-204-6-F	62/2	dc-18.0	3.70 dB	1.95	6	150T-62	SMA/F	Front
8311-352-6-F	103/1	dc-6.0	6.00 dB	1.55	6	3408T-103	SMA/F	Front
8311-352-9-T	103/1	dc-6.0	6.00 dB	1.55	9	3408T-103	SMA/F	Front-Rear

Physical Dimensions

8310 Series:



8311 Series:



Connector Type	DIM A
N	29.2 (1.15)
SMA	8.6 (0.34)
BNC	18.8 (0.74)
F	9.65 (0.38)

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Connector location (Front/Rear) may vary depending on Model ordered.

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Revision Date: 2/10/09

AEROFLEX WEINSCHEL

Model 8312
High Power Programmable Attenuator

IEEE-488

RS232\RS422

100 Watt Hot Switching Capability

Description

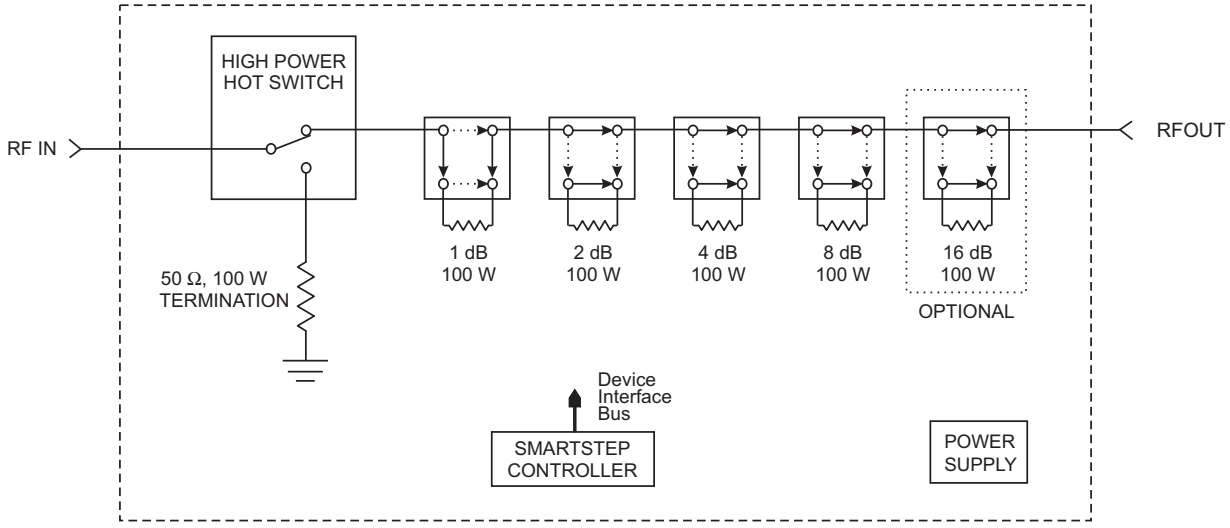
Aeroflex / Weinschel's design approach uses a highly adaptable platform that allows configuration of the step attenuator to the customers requirements. When the controller requests a new attenuation level the input switch terminates the input signal into a 50 Ohm load. (See Figure 1) This input switch is **hot switchable at 100 Watts** of input power. This will remove the high power signal from the main signal path. With no signal connected to the attenuator path the controller then commands the series of relays to configure the attenuator for the requested attenuation value. Then the input switch re-connects the input signal to the attenuator path. The system can be operated with either a remote controller (IEEE-488 or RS-232) or through front panel control.

Features

- Available in 0-15 dB or 0-31 dB Configurations.
- Provides a flexible, easy to program, low cost solution for your bench test/calibration setups and subsystem applications.
- Relative vs. Nominal attenuation step function.
- DC to 13.0 GHz Operation.
- High Accuracy & Repeatability.
- Power Handling up to 100 Watts average
- Designed to interface with industry standard communication interfaces:

  - GPIB/IEEE-488 (HS-488 ready)
  - RS-232, RS-422

- Built-in monitoring for switching input power into the load in case of fan failure.
- **Rack Configurable:** A Rack Mounting Kit is included for easily mounting the Model 8312 into any rack or cabinet that is designed per EIA RS-310 or MIL-STD-189.



Note: If power failure should occur, the unit will remain in the last selected attenuation state.

Figure 1. Model 8312 Block Diagram

For additional information on the Model 8312, visit our website @ www.aeroflex.com/weinschel/8312

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Revision Date: 12/10/09

Specifications

SPECIFICATION	DESCRIPTION		
Input Power Requirements	AC	100 to 240 Vac, 50/60 Hz, 50 Watts	
Environmental	Operating Temperature	0 to +50°C	
	Storage Temperature:	67° to +167 °F (-55° to +75°C)	
	Humidity:	96%	
	Altitude:	40,000' (12,192M)	
IEEE-488 Bus	Connector:	24-pin per IEEE-488.1	
	Protocols:	per IEEE-488.2	
	Indicators:	Remote (RMT), Listen (LSN), Talk (TLK), SRQ (SRQ)	
RS-232 Bus	Connector:	9-pin male D	
	Signals:	TXD, RXD, RTS, CTS, DTR, GND	
	Baud Rates:	2400, 9600, 19200, and 38400	
	Data Bits:	8	
	Handshaking:	None, RTS/CTS, XON/XOFF	
	Parity:	None, Odd, Even	
	Indicators:	Tx (Transmit) and Rx (Receive)	
RS-422 BUS(3)	Connector:	9-pin male D	
	Signals:	TXD+, TDX-, RXD+, RTX-, RTS+, RTS-, CTS+, CTS- and signal GND	
	Baud Rates:	2400, 9600, 19200, and 38400	
	Data Bits:	8	
	Handshaking:	None, RTS/CTS, XON/XOFF	
	Parity:	None, Odd, Even	
	Indicators:	Tx (Transmit) and Rx (Receive)	
RF Characteristics(4)	Connectors:	Type N, Female	
	Frequency Range:	dc - 13 GHz	
	Impedance:	50 Ω	
	SWR:	50 MHz - 5 GHz:	1.60 (Maximum)
		5 GHz - 13 GHz:	2.30 (Maximun)
	Attenuation Range:	15 dB/1 dB steps (8312-15-F)	
		31 dB/1 dB steps (8312-31-F)	
	RF Power Rating:	50 MHz - 5 GHz:	100 Watts (Maximum)
		5 GHz - 13 GHz:	50 Watts (Maximum)
	Attenuation Settings:	100, 000 selections (minimum)	
	Attenuation Update Rate:	1 second (Typical)	

Incremental Accuracy:	Frequency	1-15 dB	16-31 dB
	50 MHz - 3 GHz:	±0.6 dB	±0.8 dB
	3 GHz - 5 GHz:	±0.6 dB	±0.8 dB
	5 GHz - 13 GHz:	±2.5 dB	±3.0 dB

Insertion Loss (dB):	Frequency Range	8312-15-X	8312-31-X
	50 MHz - 3 GHz:	3.0	3.5
	3 GHz - 5 GHz:	4.0	4.5
	5 GHz - 13 GHz:	7.0	8.0

1. GPIB/IEEE-488 model allows user-selectable addresses.
2. RS-232 can be used with standard PC serial port for short and medium distances (up to approximately 50 ft).
3. RS-422, designed for very long distance communications (4000 ft) and & optimized as a single node protocol, typically with one device connected to a single port.
4. Refer to Individual data sheet for detailed specifications on internal programmables.

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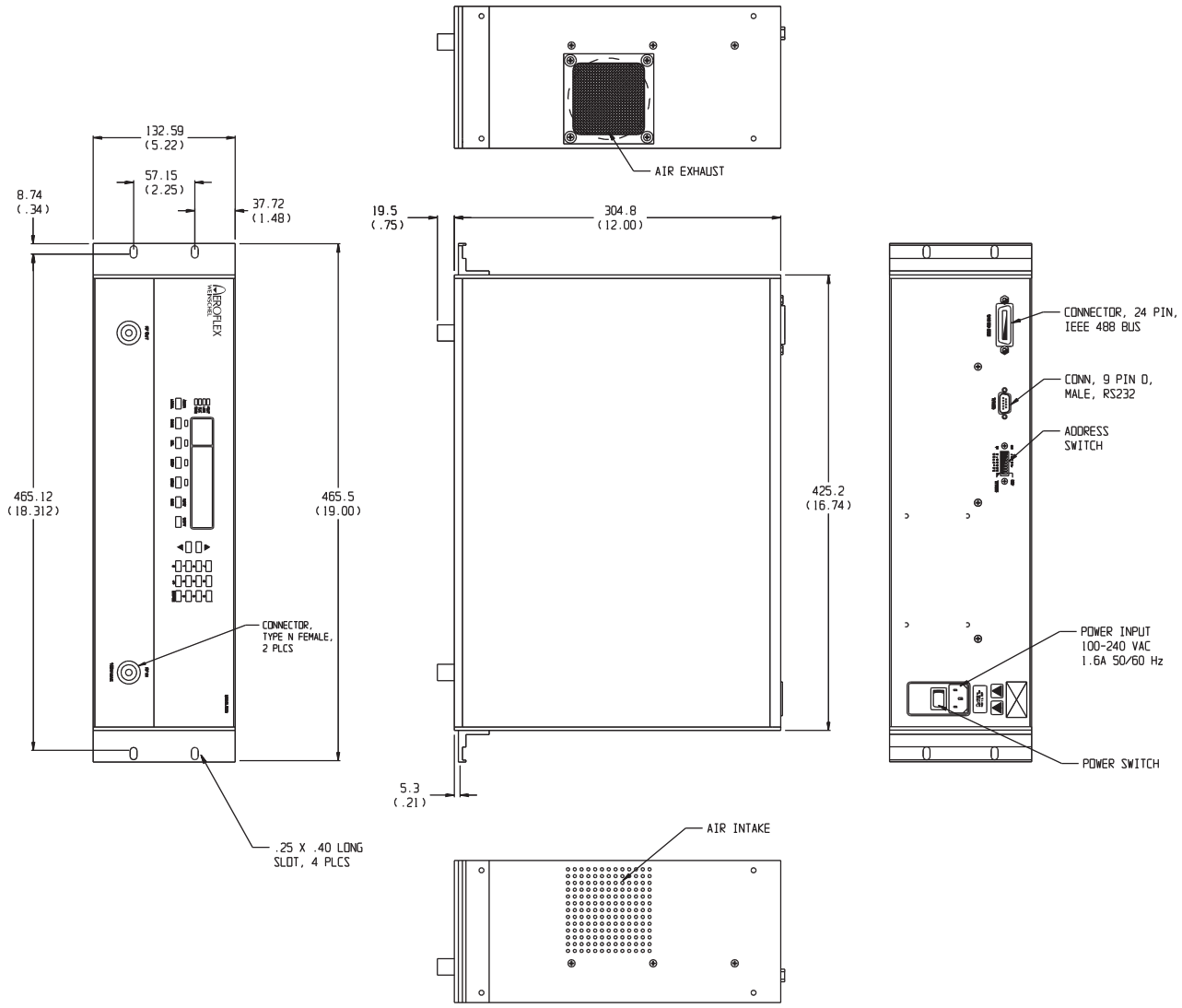
Physical Dimensions



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

8312 - XX - X

Basic Model Number	Attenuation Value (dB)*	Connector Location F = Front R = Rear

* Available in 0-15 dB and 0-31 dB configurations only!

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Revision Date: 12/10/09

AEROFLEX WEINSCHEL

Model 8210A
SmartStep® Programmable Attenuator/ Switch Controller

IEEE-488

RS232\RS422/RS485

CE

A Logical Interface for Switchable Devices!

Features

- Provides a flexible, powerful, low cost solution for bus control of programmable step attenuators and other switchable devices under computer control.
- Designed to interface with Aeroflex / Weinschel's line of intelligent programmable attenuators and other electromechanical devices.
- Simplifies your bench test setups and subsystem design.
- Available in two standard communication interfaces:
  - Model 8210A-1: GPIB/IEEE-488 (HS-488 ready)
  - Model 8210A-2: RS-232, RS-422, RS-485

Description

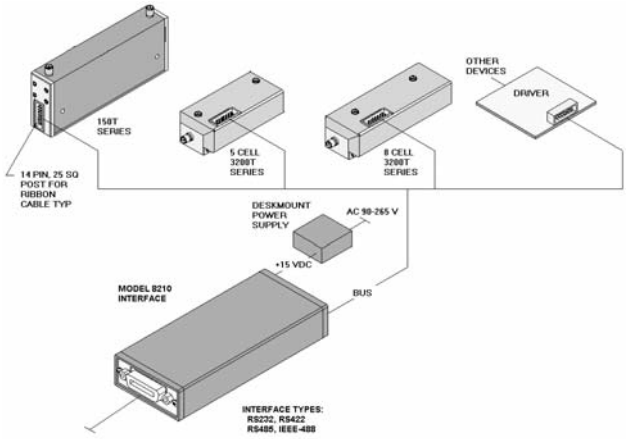
Model 8210A represents a new concept in device control applications and provides a high level interface from various industry standard communications interfaces to the serial Driver Interface Bus.

The Device Interface Bus (DIB) is a system for connecting a number of relatively low-speed I/O devices to a host, providing a simple, uniform and inexpensive way to control a variety of devices via a single port. The DIB is based on the two-wire serial bus and several software protocol layers that allow the Model 8210A to address up to 125 peripheral devices with serial data rates of up to 100 KHz. The DIB may also be used to supply DC power to the devices, resulting in a simple, low-cost interconnection system.

This Programmable attenuator/switch controller is available in two models, each providing a different type of communications interface to suit user configuration requirements. Each model contains similar capabilities, and provides switch-selectable parameters to the interfaces' operation.

Applications

Applications for the 8210A range from providing control of a single Programmable Attenuator in a bench test/lab environment using a PC and a terminal emulator, to complex system applications where the 8210A is employed to control many devices to create custom/semi-custom subsystems to reduce overall design cost. Aeroflex / Weinschel can provide a variety of custom designed driver interfaces for various devices, such as RF switches, relays, PIN attenuators, displays and other devices, as well as complete subsystem design and integration services. Contact us with your specialized needs.



Typical Capacity: **Control a subsystem consisting of 32 individual 8-cell programmable attenuators plus 16 DPDT switches.**

Accessories:

PART NUMBER	DESCRIPTION
001-378	Deskmount Power Supply, +15 V 95-250 Vac, 47-63 Hz ac input
193-8013	Interconnect Cable
193-8012	Attenuator Mounting Kit: This kit includes all hardware to allow the user to mount one attenuator onto the Model 8210A

For additional information on the Model 8210A, visit our website @ www.aeroflex.com/weinschel/8210A

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Programmable Attenuators

AEROFLEX WEINSCHEL

Specifications

SPECIFICATION	DESCRIPTION	
DC Input	Connector:	2.5mm barrel style
	Requirements:	+12 to +15 Vdc @ 250 mA
Driver Interface	Connector:	14-pin 0.025" square post header @ 0.1" centers. Mates with AMP 746285-2 or equivalent.
	Signals :	SDA serial data SDC serial clock VDC DC supply voltage GND ground
	VDC Output Current:	2 A maximum
	Maximum Cable Length:	10 Meters (1000 pF maximum capacitance)
	Data Transfer Rate:	100 KHz
Environmental	Operating Temperature:	0 to +50°C
	Storage Temperature:	-55° to +75°C (67° to +167°F)
	Humidity:	95%
	Altitude:	40,000' (12,192M)
IEEE-488 Bus(1)	Connector:	24-pin per IEEE-488.1
	Protocols:	per IEEE-488.2
	Indicators:	Remote, Listen
RS-232 Bus(2)	Connector:	9-pin male D
	Signals:	TXD, RXD, RTS, CTS, DTR, GND
	Baud Rates:	2400, 9600, and 19200, 38400
	Data Bits:	8
	Handshaking:	None, RTS/CTS, XON/XOFF
	Parity:	None, Odd, Even
	Indicators:	Tx (Transmit) and Rx (Receive Active)
RS-422 Bus(3) & RS-485 Bus(4)	Connector:	9-pin male D(Model 8210-2)
	Signals:	TXD+, TDX-, RXD+, RTX-, RTS+, RTS-, CTS+, CTS-, & signal GND
	Baud Rates:	2400, 9600, and 19200, 38400
	Data Bits:	8
	Handshaking:	None, RTS/CTS, XON/XOFF
	Parity:	None, Odd, Even
	Indicators:	Tx (Transmit) and Rx (Receive Active)

Notes:
1. GPIB/IEEE-488 model allows user-selectable addresses.
2. RS-232 can be used with standard PC serial port for short and medium distances (up to approximately 50 ft).
3. RS-422, designed for very long distance communications (4000 ft) & optimized as a single node protocol, typically with one device connected to a single port.
4. RS-485, designed for very long distance communications (4000 ft) & optimized for multi-drop connections that can used to create a low cost network.

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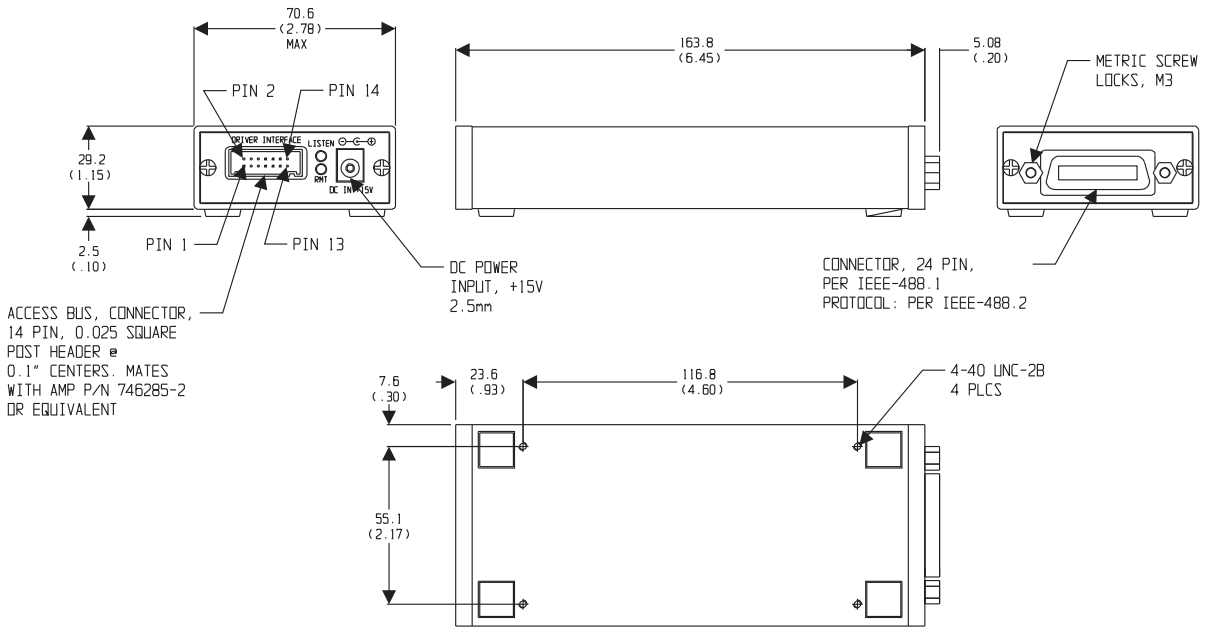
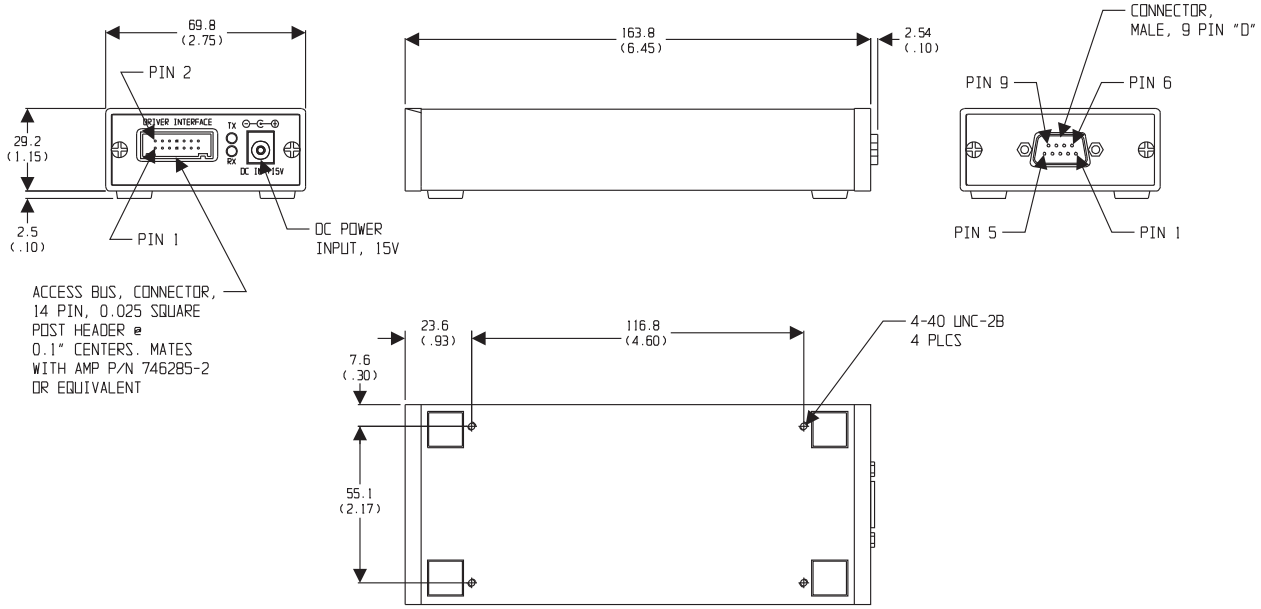
Physical Dimensions

Model 8210A-1 (IEEE-488):



Model 8210A-2 (RS-232/RS-422/RS-485):



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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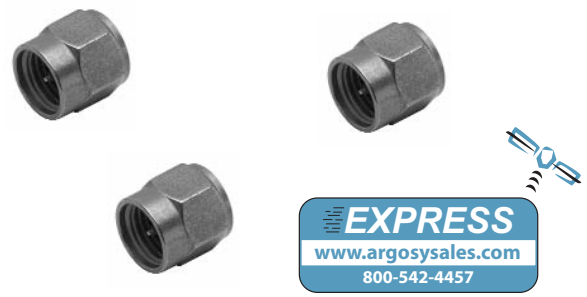
Revision Date: 2/10/09

Model 1437RA dc to 6.0 GHz / 2 Watts
Model RS3016 dc to 18.0 GHz / 1Watt
Subminiature Coaxial Terminations

Low Cost, SMA Connector

RoHS



Features

- **Subminiature Size and Lightweight**
- **Low Cost & SWR**
- **Cellular Applications:** Optimized for use in the wireless communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: M/F1437RA: dc to 6.0 GHz
RS3016: dc to 18.0 GHz

POWER RATING:

Model 1437RA: 2.0 watts **average** @ 25°C ambient temperature, derated linearly to 0.5 watts @ 125°C. 250 watts **peak** maximum (5 µsec pulse width; 0.05% duty cycle).

Model RS3016: 1.0 watts **average** @ 25°C ambient temperature, derated linearly to 0 watts @ 125°C. 250 watts **peak** maximum (5 µsec pulse width; 0.05% duty cycle).

MAXIMUM SWR:

Frequency Range (GHz)	1437RA	RS3016
dc - 4	1.05	1.05
4 - 8 (6)	1.10	1.10
8 - 12.4	- - -	1.15
12.4 - 18	- - -	1.20

TEMPERATURE RANGE: -65°C to +125°C

CONNECTOR: Model 1437RA: SMA connectors - mate nondestructively with MIL-C-39012 connectors. Choice of male or female connector, prefix model number with M for male and F for female. **Model RS3016** available in SMA male only!

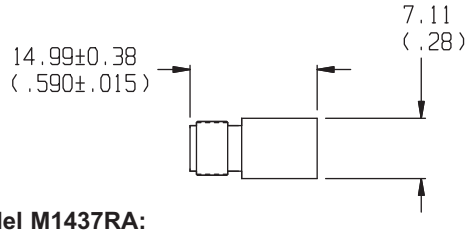
CONSTRUCTION: Passivated stainless steel connectors with gold plated beryllium copper contacts.

WEIGHT:

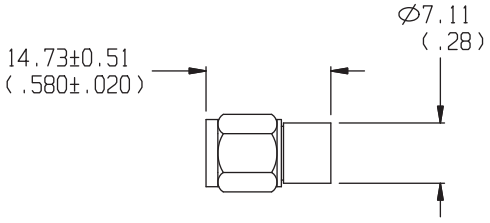
M1437RA:	3.0 g (0.11 oz)
F1437RA:	4.0 g (0.14 oz)
RS3016:	2.3 g (0.08 oz)

PHYSICAL DIMENSIONS:

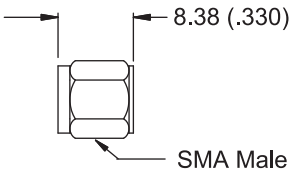
Model F1437RA:



Model M1437RA:



Model RS3016 (male only):



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. RS3016 available with RoHS compliant materials, specify when ordering.

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Revision Date: 11/28/07

AEROFLEX WEINSCHEL

Model 1404N
Precision Coaxial Termination

dc to 18.0 GHz
1 Watt

Lab Standard N Connectors

RoHS

Features

- **Precision Connector** - Interface dimensions per MIL-STD-348 Test connector
- **Rugged Construction** - Numerically controlled machining is used to produce high quality uniform parts with controlled concentricity and surface finishes. The result is excellent SWR repeatability.

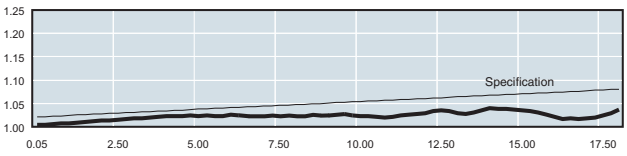
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

POWER RATING: 1.0 watt **average** to 25 °C ambient temperature, derated linearly to 0.1 watts @ 125°C. 1 kilowatt **peak** maximum (5 µsec pulse width; 0.05 % duty cycle).

MAXIMUM SWR:	
Model	SWR
F1404N	≤ 1.04 + 0.0023f (GHz)
M1404N	≤ 1.02 + 0.0033f (GHz)



Typical M1404 SWR Performance

TEMPERATURE RANGE: -55°C to +85°C

TEST DATA: SWR and other test data can be provided at additional cost.

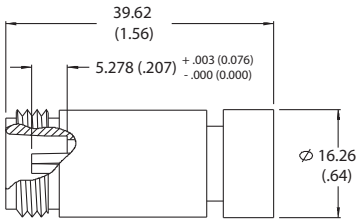
CONNECTOR: Type N connector - mates nondestructively with MIL-C-39012 connector. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

CONSTRUCTION: Gold plated brass body; stainless steel connector; gold plated beryllium copper contacts.

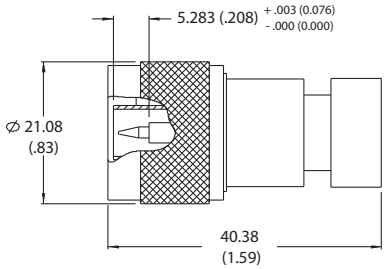
WEIGHT: Net, 110 g (4 oz)

PHYSICAL DIMENSIONS:

MODEL F1404N:



MODEL M1404N:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Models 1406A & 1408
Subminiature Coaxial Termination

dc to 18.0 GHz
2 Watts

Ruggedized SMA Connector

RoHS

Features

Models 1406A & 1408 are general purpose subminiature terminations that operate in the frequency range of dc to 18 GHz but are usable to 26.5 GHz.

- **Low SWR** - Model 1406A has low VSWR across its operating range (typical SWR is less than specified). The Model 1408 has ultra-low SWR to 18 GHz (usable to 26.5 GHz).
- **Subminiature Size and Lightweight** - All models are approximately 0.5 inches long, and weigh less than 3 grams with male connector and 1.5 grams with female connector.
- **Rugged Construction.**

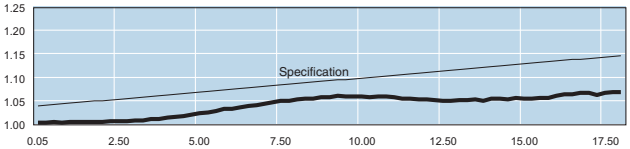
Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

POWER RATING: 2 Watts average @ 25 C ambient temperature derated linearly to 0.2 watt @ 125 °C. 500 watts peak (5 µsec pulse width; 0.2% duty cycle).

MAXIMUM SWR:	
Model	SWR
1406A	1.05 + 0.009f (GHz)
1408	1.04 + 0.006f (GHz)



Typical M1408 SWR Performance

TEMPERATURE RANGE: -54°C to +105°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

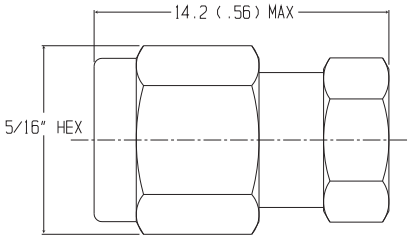
CONNECTOR: SMA connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

CONSTRUCTION: Gold plated beryllium copper contacts with passivated stainless steel.

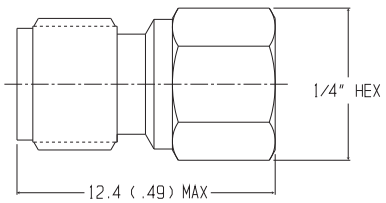
WEIGHT: Male Connector: 2.8 g (0.1 oz)
Female Connector: 1.4 g (0.05 oz)

PHYSICAL DIMENSIONS:

M1406 / M1408:



F1406 / F1408:



NOTE:

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2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 9/15/09

Model 1465
Precision Coaxial Termination

dc to 32.0 GHz
2 Watt

3.5mm Connector

Features

- **High Performance - Precision Lab Grade**
- **Subminiature Size and Lightweight -** All models are approximately 0.5 inches long, and weigh less than 3 grams with male connector
- **Low SWR Design Option**
- **Rugged Construction**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 32.0 GHz

POWER RATING: 2.0 watt **average** @ 25°C ambient temperature, derated linearly to 0.2 watts @ 100°C. 500 watts **peak** maximum (5 µsec pulse width; 0.2% duty cycle).

MAXIMUM SWR:		
Frequency Range (GHz)	F1465 M1465	F1465A M1465A
dc - 18	1.08	1.06
18 - 26.5	1.10	1.08
26.5 - 32	1.15	1.10

OPERATING TEMPERATURE: -50°C to +100°C

STORAGE TEMPERATURE: -50°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

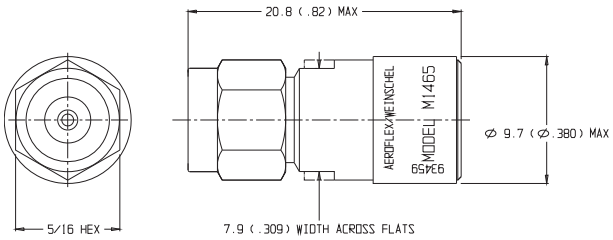
CONNECTOR: Male or Female 3.5mm connector - mate nondestructively with SMA, SMK, 2.92mm, and other 3.5mm connectors. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

PIN RECESSION: 0.003 maximun (male and female connectors

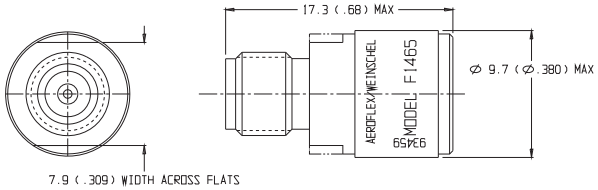
WEIGHT: 6.0 g (0.17 oz) maximum

PHYSICAL DIMENSIONS:

Model M1465/M1465A:



Model F1465/F1465A:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 3/10/09

Model 1459
Precision Coaxial Termination

dc to 40.0 GHz
2 Watts

Ruggedized 2.92mm Connector

RoHS

Features

- **High Performance - Precision Lab Grade**
- **Subminiature Size and Lightweight -** All models are approximately 0.5 inches long, and weigh less than 3 grams with male connector
- **Low SWR Design Option**
- **Rugged Construction**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

POWER RATING: 2.0 watt **average** @ 25°C ambient temperature, derated linearly to 0.2 watts @ 100°C. 500 watts **peak** maximum (5 µsec pulse width; 0.2% duty cycle).

MAXIMUM SWR:

Frequency Range (GHz)	F1459 M1459	F1459A	M1459A
dc - 18	1.15	1.10	1.10
18 - 40	1.25	1.18	1.15

TEMPERATURE RANGE: -50°C to +100°C

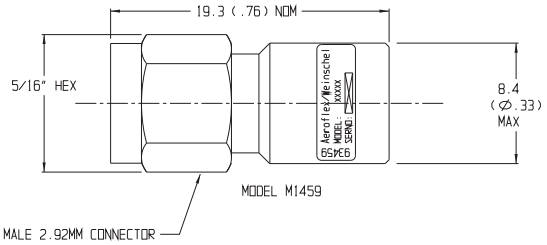
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Ruggedized 2.92mm connector compatible with SMA, 3.5mm and SMK connector. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

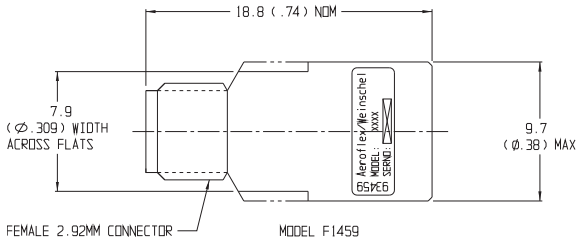
WEIGHT: 6.0 g (0.17 oz) maximum

PHYSICAL DIMENSIONS:

Model M1459/M1459A:

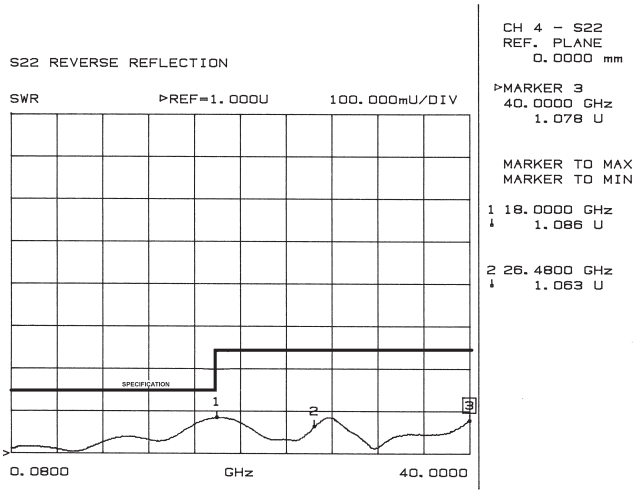


Model F1459/F1459A:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.



Typical M1459 SWR Performance

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Revision Date: 3/10/09

Model 1460
Precision Coaxial Termination

dc to 50.0 GHz
2 Watt

Ruggedized 2.4mm Connector

☑ RoHS

Features

- **High Performance - Precision Lab Grade**
- **Subminiature Size and Lightweight -** All models are approximately 0.5 inches long, and weigh less than 3 grams with male connector
- **Low SWR Design Option**
- **Rugged Construction**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 50.0 GHz

POWER RATING: 2.0 watt **average** @ 25°C ambient temperature, derated linearly to 0.2 watts @ 100°C. 500 watts **peak** maximum (5 µsec pulse width; 0.2% duty cycle).

MAXIMUM SWR:		
Frequency Range (GHz)	F1460 M1460	M1460A F1460A
dc - 20	1.10	1.10
20 - 50	1.22	1.15

TEMPERATURE RANGE: -50°C to +100°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

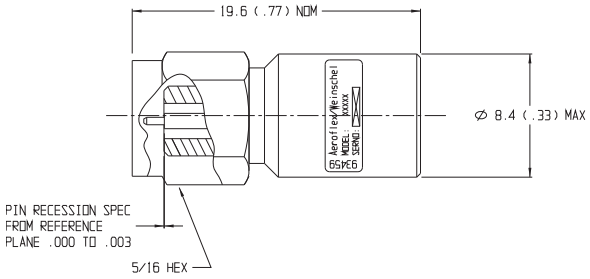
CONNECTOR: 2.4mm connector mates nondestructively with other 2.4mm connectors. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

TEST DATA SUPPLIED: SWR Sweep data provided between 120 MHz and 50 GHz.

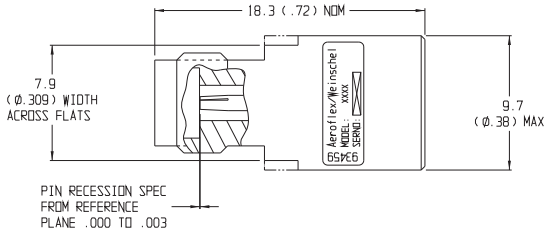
WEIGHT: 6.0 g (0.16 oz) maximum

PHYSICAL DIMENSIONS:

Model M1460/M1460A:



Model F1460/F1460A:



NOTE:

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2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1424 dc to 12.4 GHz
Medium Power Coaxial Termination 5 Watt

Type N Connector

Features

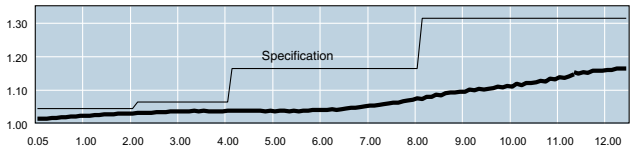
- **Quality Connectors -** Choice of male or female N connector that mate nondestructively with connector manufactured in accordance with MIL-C-39012.
- **Rugged Construction.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 12.4 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 2	1.03
2 - 4	1.05
4 - 8	1.15
8 - 12.4	1.30



Typical 1424-3 SWR Performance

POWER RATING: 5 watts **average** @ 25°C ambient temperature, derated linearly to 0 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 0.05 % duty cycle)

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: Test data supplied at dc resistance and SWR at 2.0, 4.0, 8.0, and 12.0 GHz. Other test data can be provided at additional cost.

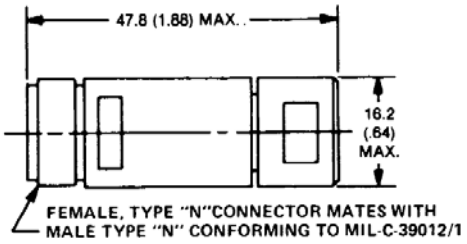
CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

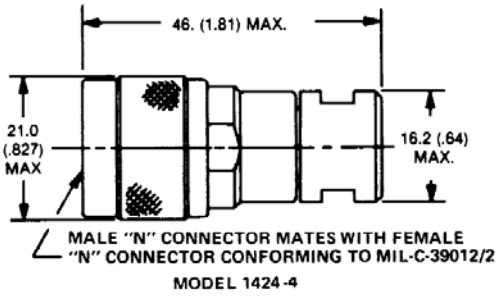
CONSTRUCTION: Stainless steel connector; gold plated beryllium copper contacts

WEIGHT: Net 60 g (2 oz)

PHYSICAL DIMENSIONS:



MODEL 1424-3



MODEL 1424-4

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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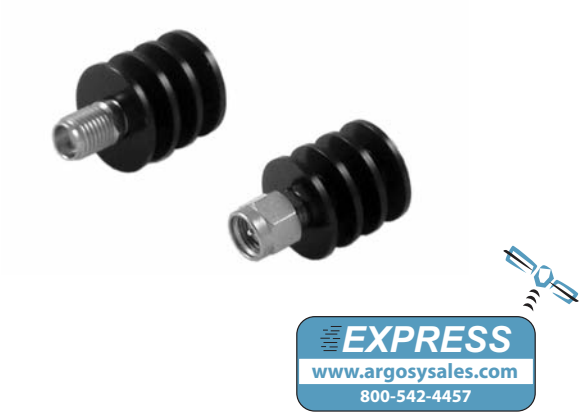
Revision Date: 3/10/09

Model 1443A
Medium Power Coaxial Termination

dc to 18.0 GHz
5 Watts

RoHS

SMA, Subminiature Design



Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision Injection Molded Connector.**
- **Low SWR.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 18	1.15

POWER RATING: 5 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** to 25°C ambient temperature, derated linearly to 0.5 watts @ 125°C. 500 watts **peak** (5 µsec pulse width; 0.5% duty cycle).

TEMPERATURE RANGE: -55°C to +100°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: SMA connector per MIL-STD-348 interface dimensions - mate nondestructively with SMK, 3.5mm, 2.92mm and SMA connectors per MIL-C-39012 .

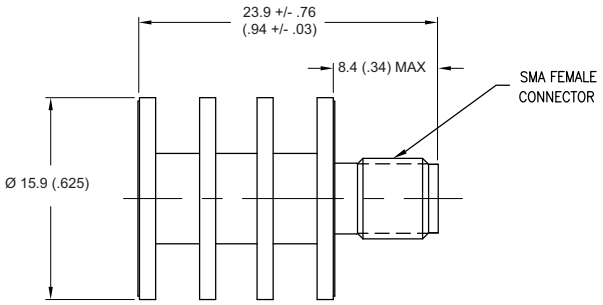
Choice of male (-2) or female (-1) connector.

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

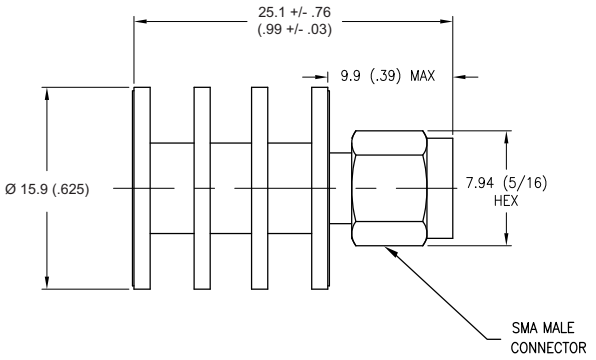
WEIGHT: 10 g (0.35 oz)

PHYSICAL DIMENSIONS:

Model 1443A-1:



Model 1443A-2:



NOTE:

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2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

Model 1445A
Medium Power Coaxial Termination

dc to 40.0 GHz
5 Watts

2.92mm Connector

Features

- **Compact Construction -** Lowest size/power ratio.
- **Precision Injection Molded Connector.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 18	1.20
18 - 40	1.35

POWER RATING: 5 watts **average (mounted horizontally)** to 25°C ambient temperature, derated linearly to 0.5 watts @ 125°C. 200 watts **peak** (5 µsec pulse width; 1.25% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

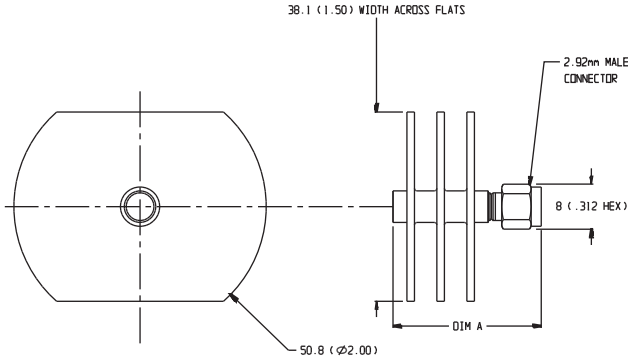
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: 2.92mm connector mate nondestructively with SMA per MIL-C-39012, SMK, 3.5mm and other 2.92mm connector. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Black, finned aluminum body, gold plated beryllium copper contacts.

WEIGHT: 200 g (7 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1445A-1	33.8 (1.33)	2.92mm female
1445A-2	37.8 (1.49)	2.92mm male

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 3/10/09

Model 1419
Medium Power Coaxial Termination

dc to 18.0 GHz
10 Watts

Ruggedized SMA Connector

Features

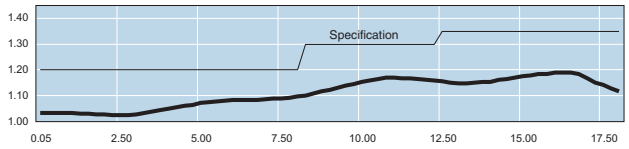
- **Miniature Size and Lightweight -** All models are approximately 1.6 inches long, and weigh less than 14 grams with male connector.
- **Quality connector with special high temperature support beads.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 8	1.20
8 - 12.4	1.30
12.4 - 18	1.35



Typical M1419 SWR Performance

POWER RATING: 10 watts **average (mounted horizontally)** @ 25°C ambient temperature, derated linearly to 0 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.05% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

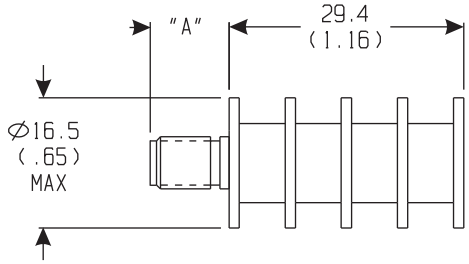
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: SMA connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 14 g (0.49 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
M1419	11.2 (0.44)	SMA male
F1419	9.4 (0.37)	SMA female

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1453
Medium Power Coaxial Termination

dc to 8.5 GHz
10 Watts

Type N Connector

RoHS

Features

- **Optimized for Wireless OEM and Test Applications.**
- **Designed to meet environmental requirements of MIL-D-39030.**
- **Quality Injection Molded Connector.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15
4 - 8.5	1.25

POWER RATING: 10 watts **average (mounted horizontally)** @ 25°C ambient temperature, derated linearly to 1 watt @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.05% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

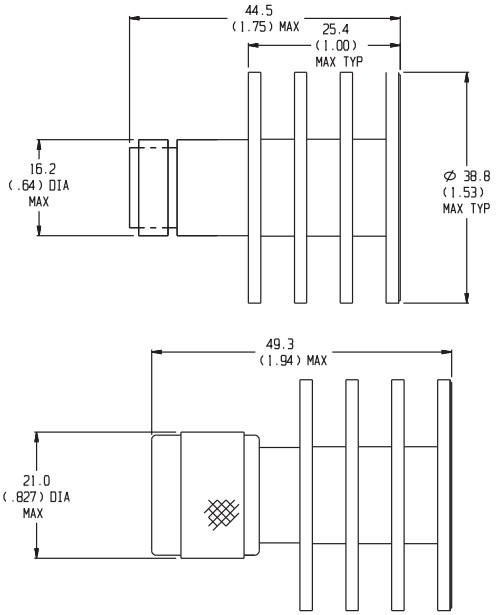
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 85 g (3 oz)

PHYSICAL DIMENSIONS:



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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1425
Medium Power Coaxial Termination

dc to 12.4 GHz
10 Watts

Type N Connector

RoHS

Features

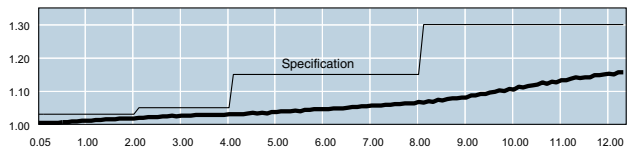
- **Quality Connectors -** Choice of male or female N connector that mate nondestructively with connector manufactured in accordance with MIL-C-39012.
- **Rugged Construction.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 12.4 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 2	1.03
2 - 4	1.05
4 - 8	1.15
8 - 12.4	1.30



Typical 1425-4 SWR Performance

POWER RATING: 10 watts **average (mounted horizontally)** @ 25°C ambient temperature, derated linearly to 0 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.05% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

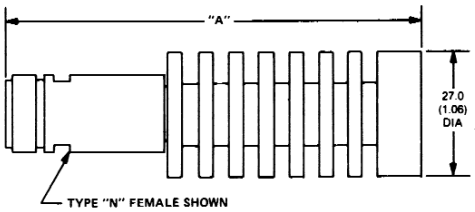
CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts

WEIGHT: Net 110 g (4 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1425-4	84.58 (3.33)	N, male
1425-3	86.36 (3.40)	N, female

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1418
Medium Power Coaxial Termination

dc to 18.0 GHz
10 Watts

Type N Connector

RoHS

Features

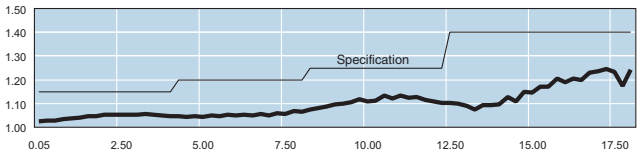
- **Optimized for Wireless OEM and Test Applications.**
- **Designed to meet environmental requirements of MIL-D-39030.**
- **Quality Injection Molded Connector.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15
4 - 8	1.20
8 - 12.4	1.25
12.4 - 18	1.40



Typical M1418 SWR Performance

POWER RATING: 10 watts **average (mounted horizontally)** @ 25°C ambient temperature, derated linearly to 0 watt @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 0.05% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

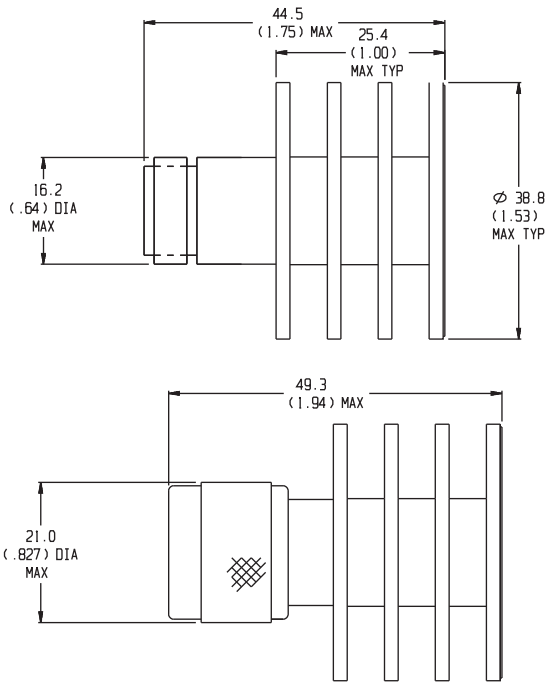
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male or female connector. When ordering, prefix model number with M for male and F for female.

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 90 g (3 oz)

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

Model 1452
Medium Power Coaxial Termination

dc to 4.0 GHz
25 Watts

RoHS

Convection Cooled

Features

- **Optimized for Wireless OEM and Test Applications.**
- **Designed to meet environmental requirements of MIL-D-39030.**
- **Quality connector with special high temperature support beads.**
- **5 Kilowatts Peak Power.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM SWR*:	
Frequency (GHz)	SWR
dc - 2	1.10
2 - 4	1.20

POWER RATING: 25 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 0.25% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

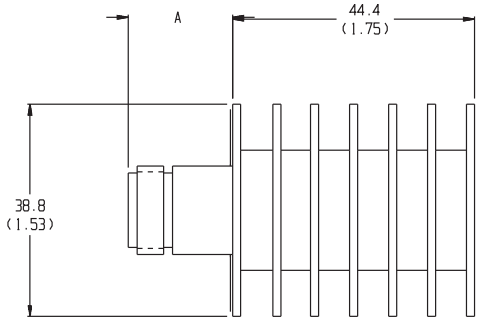
CONNECTOR: Type N or 2.92mm connectors mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 150 g (5.2 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1452-1	12.7 (0.50)	2.92mm female
1452-2	14.0 (0.55)	2.92mm male
1452-3	15.0 (0.59)	N female
1452-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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AEROFLEX WEINSCHEL

Model 1427
Medium Power Coaxial Termination

dc to 10.0 GHz
25 Watts

Convection Cooled

☑ RoHS

Features

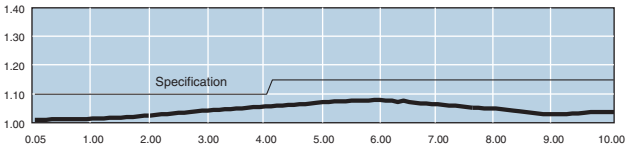
- **Designed to meet environmental requirements of MIL-D-39030.**
- **Quality connector with special high temperature support beads.**
- **Low Intermodulation Option**
- **5 Kilowatts Peak Power**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 10.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.10
4 - 8	1.15
8 - 10	1.30



Typical M1427 SWR Performance

POWER RATING: 25 watts **average (mounted horizontally)** @ 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 0.25% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

INTERMODULATION (Model 1427-X-LIM Only): IM3 (Reflected) = -100 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +41 dBm each.

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

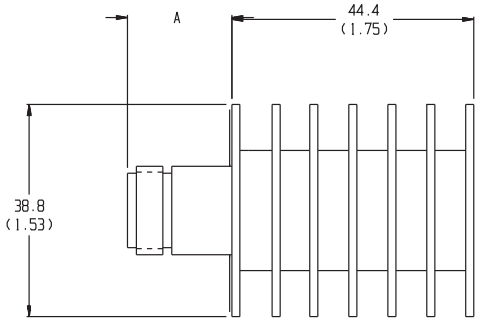
CONNECTOR: Type N or 2.92mm connectors mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 150 g (5.2 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1427-1	12.7 (0.50)	2.92mm female
1427-2	14.0 (0.55)	2.92mm male
1427-3	15.0 (0.59)	N female
1427-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1427 - X - LIM

- 1427: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option. Option not available through Express.

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Revision Date: 3/10/09

Model 1429
Medium Power Coaxial Termination

dc to 18.0 GHz
25 Watts

Convection Cooled

Features

- **Designed to meet environmental requirements of MIL-D-39030.**
- **Rugged injection molded connector.**
- **Low Intermodulation Option.**
- **1 Kilowatt Peak Power**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 18	1.20

POWER RATING: 25 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 2.5 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 1.25% duty cycle).

INTERMODULATION (Model 1429-X-LIM Only): IM3 (Reflected) = -90 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +41 dBm each.

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

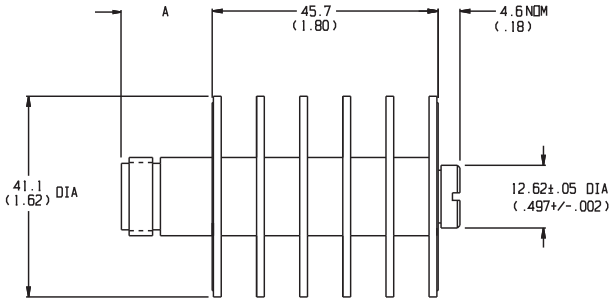
CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

3.5mm connector mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connector. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contact or stainless steel male contact.

WEIGHT: 100 g (3.5 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1429-1	13.2 (0.52)	3.5mm female
1429-2	14.0 (0.55)	3.5mm male
1429-3	18.3 (0.72)	N female
1429-4	23.1 (0.91)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1429 - X - LIM

- 1429: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1444 dc to 26.5 GHz
Medium Power Coaxial Termination 25 Watts

Convection Cooled

Features

- **Designed to meet environmental requirements of MIL-D-39030.**
- **Precision Connectors.**
- **Flat Response.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 26.5	1.25

POWER RATING: 25 watts average **(mounted horizontally) average** @ 25°C ambient temperature, derated linearly to 2.5 watt @ 125°C. 500 watts **peak** (5 µsec pulse width; 2.5% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

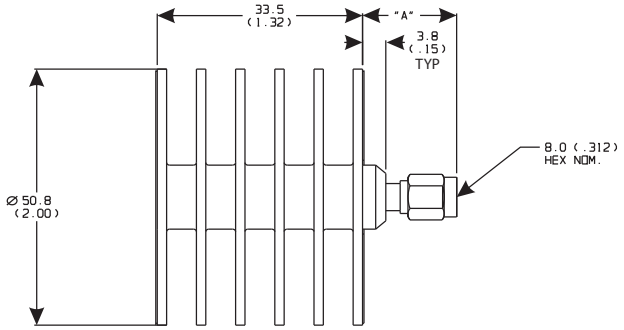
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: 3.5mm connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm, and other 3.5mm connectors. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: 100 g (5.2 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1444-1	15.0 (0.59)	3.5mm female
1444-2	16.0 (0.63)	3.5mm male

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 3/10/09

Model 1441
Medium Power Coaxial Termination

dc to 4.0 GHz
50 Watts

RoHS

Conduction Cooled

Features

- **Compact Construction -** Lowest size/power ratio.
- **Rugged Construction -** Quality connector with special high temperature support bead.
- **Ideal for Wireless Applications.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15

POWER RATING: 50 watts **average**, 5 kilowatts **peak** (5 µsec pulse width; 0.5% duty cycle) with case temperature held within **100°C maximum** with appropriate conductive heatsink.

TEMPERATURE RANGE: -55°C to 100°C case.

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

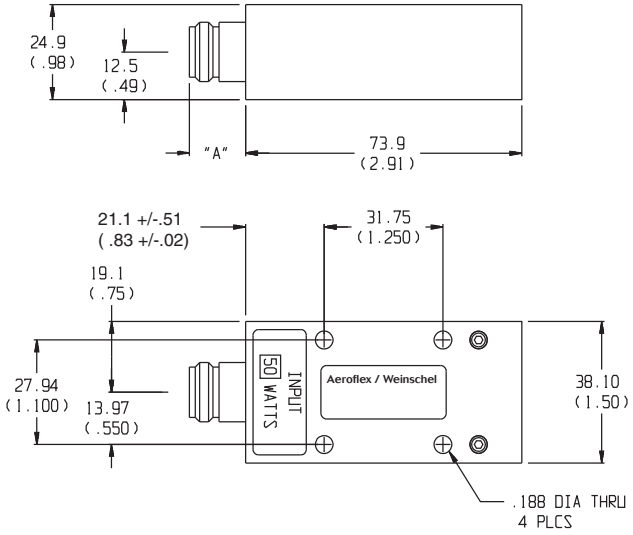
CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mates nondestructively with MIL-C-39012 connector. Choice of male (-4) or female (-3) connector.

CONSTRUCTION: Aluminum alloy body, stainless steel connector; gold plated beryllium copper contacts.

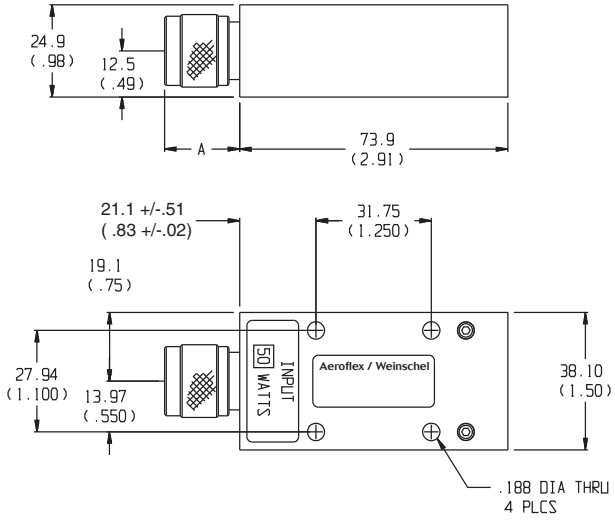
WEIGHT: Net 170g (6 oz.) maximum

PHYSICAL DIMENSIONS:

Model 1441-3:



Model 1441-4



Model #	DIM A	Connector Type
1441-3	15.0 (0.59)	N female
1441-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1426
Medium Power Coaxial Termination

dc to 8.5 GHz
50 Watts

☑ RoHS

Convection Cooled

Features

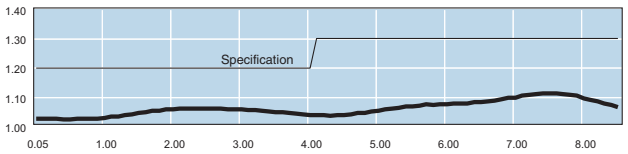
- **Rugged Construction -** Quality connector with special high temperature support bead.
- **Low Intermodulation Option**
- **5 Kilowatts Peak Power**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.20
4 - 8.5	1.30



Typical 1426-4 SWR Performance

POWER RATING: 50 watts **average (mounted horizontally)** to 25°C ambient temperature, derated linearly to 0 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 0.05% duty cycle).

INTERMODULATION (Model 1426-X-LIM Only): IM3 (Reflected) = -100 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +41 dBm each.

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

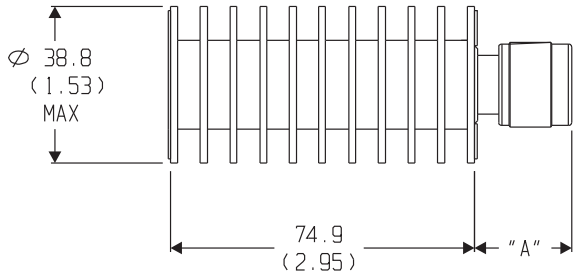
CONNECTOR: Type N or 2.92mm connectors mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contacts and stainless steel male contacts.

WEIGHT: Net 280 g (10 oz.)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1426-1	12.7 (0.50)	2.92mm female
1426-2	14.0 (0.55)	2.92mm male
1426-3	15.0 (0.59)	N female
1426-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1426 - X - LIM

- 1426: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option. Option not available through Express.

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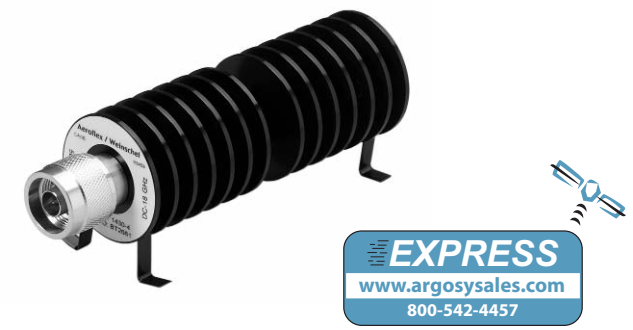
Revision Date: 3/10/09

Model 1430
Medium Power Coaxial Termination

dc to 18.0 GHz
50 Watts

Convection Cooled

RoHS



Features

- **Designed to meet environmental requirements of MIL-D-39030.**
- **Rugged injection molded connector.**
- **1 Kilowatt Peak Power**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8	1.15
8 - 18	1.30

POWER RATING: 50 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 5 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 2.5% duty cycle).

INTERMODULATION (Model 1430-X-LIM Only): IM3 (Reflected) = -90 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +43 dBm each.

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

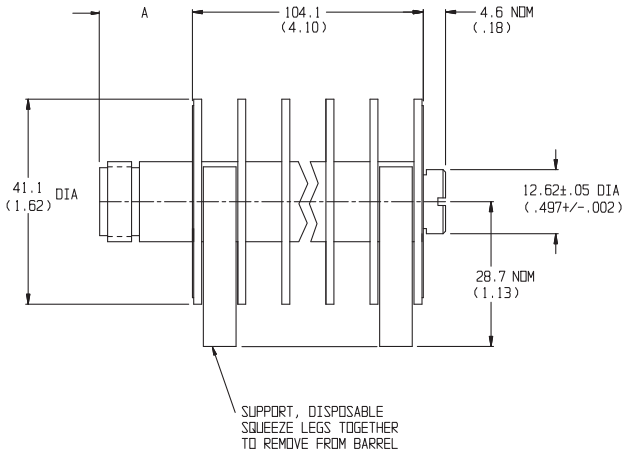
CONNECTOR: Type N connector - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

3.5mm connector mate nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connector. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contact or stainless steel male contact.

WEIGHT: 175 g (6 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1430-1	13.2 (0.52)	3.5mm female
1430-2	14.0 (0.55)	3.5mm male
1430-3	18.3 (0.72)	N female
1430-4	23.1 (0.91)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1430 - X - LIM

- 1430: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Models 1458 dc to 22.0 GHz
Medium Power Coaxial Termination 50 Watts

Convection Cooled, 3.5mm Connectors

Features

- **Compact Construction -** Lowest size/power ratio.
- **Rugged Construction -** Quality connector with special high temperature support bead.
- **Ideal for Space & Airborne Applications**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 22.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 22.0	1.30

POWER RATING: 50 watts **average**, 1 kilowatts **peak** (5 µsec pulse width; 0.5% duty cycle) with case temperature held within **90°C maximum** with appropriate conductive heatsink.

TEMPERATURE RANGE: -55°C to 90°C case.

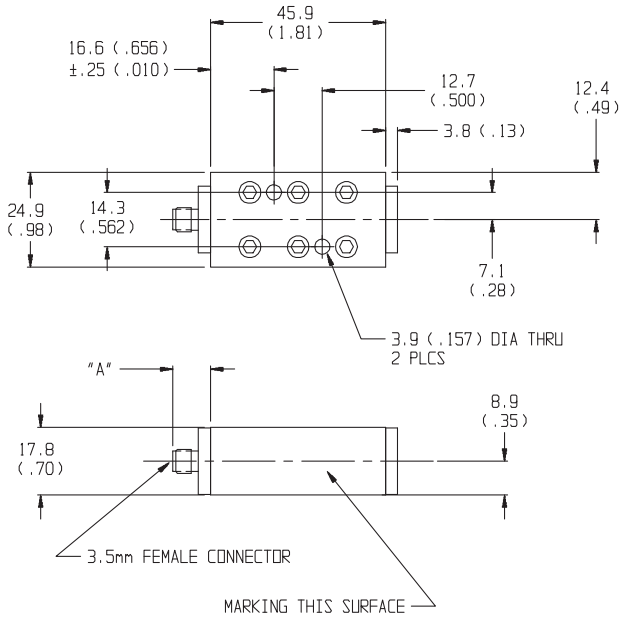
TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: 3.5mm connectors - mate nondestructively with SMA per MIL-C-39012, 2.92mm, and other 3.5mm connectors. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Aluminum alloy body, stainless steel connector; gold plated beryllium copper contacts.

WEIGHT: Net 56 g (1.9 oz) maximum

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1458-1	9.9±0.5 (0.35±0.02)	3.5mm female
1458-2	13.4±0.5 (0.53±0.02)	3.5mm male

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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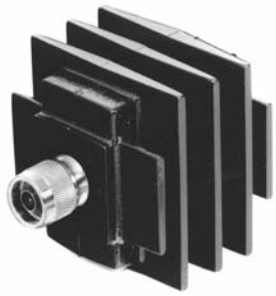
Revision Date: 3/10/09

Model 1440
High Power Coaxial Termination

dc to 4.0 GHz
100 Watts

RoHS

Convection Cooled



Features

- **Compact Construction -** Lowest size/power ratio.
- **Low SWR**
- **Rugged Construction -** Quality connector with special high temperature support bead.
- **Ideal for Wireless Applications.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

PHYSICAL DIMENSIONS:

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.15

POWER RATING: 100 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** to 25°C ambient temperature, derated linearly to 10 watts @ 125°C. 10 kilowatts **peak** (5 µsec pulse width; 0.5 % duty cycle).

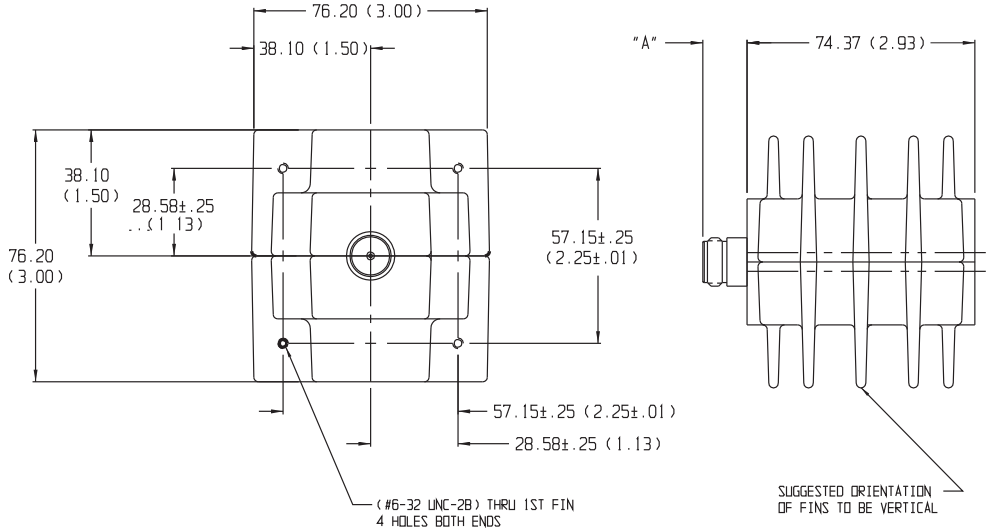
TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper center contacts.

WEIGHT: 500 g (18 oz)



Model #	DIM A	Connector Type
1440-3	15.0 (0.59)	N female
1440-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1442
High Power Coaxial Termination

dc to 8.5 GHz
100 Watts

RoHS

Convection Cooled

Features

- **Compact Construction -** Lowest size/power ratio.
- **Rugged Construction -** Quality connector with special high temperature support bead.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 4	1.20
4 - 8.5	1.30

POWER RATING (mounted horizontally with fins vertical): 100 watts **average** to 35°C ambient temperature, derated linearly to 10 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 1.0% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

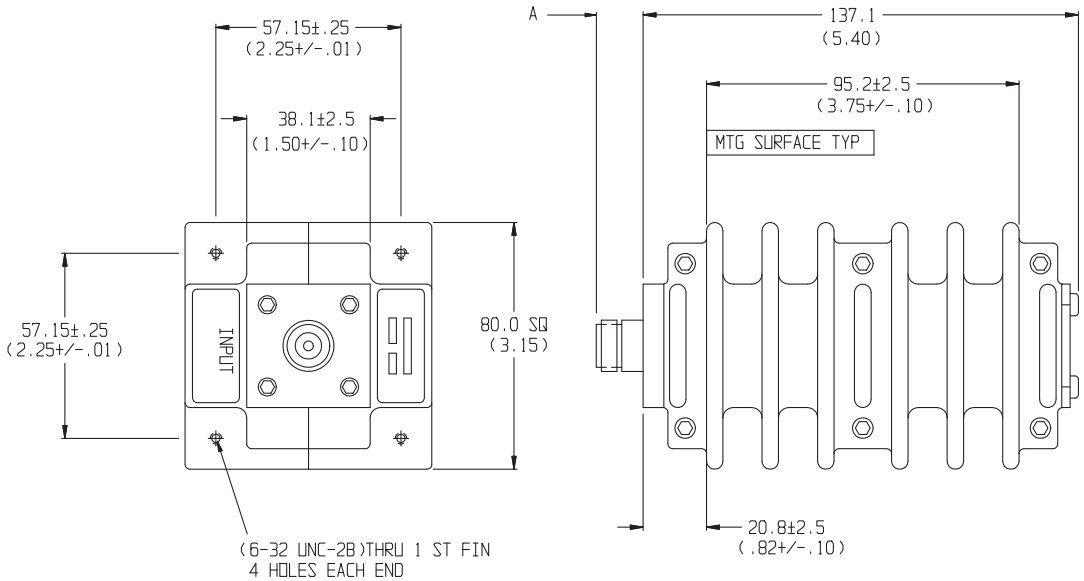
TEST DATA: SWR testing performed across the frequency range. Test data available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contact or stainless steel male contact.

WEIGHT: 1,130 g (2 lbs, 8 oz)

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

Model #	DIM A	Connector Type
1442-3	15.0 (0.59)	N female
1442-4	22.9 (0.90)	N male

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Revision Date: 3/10/09

Model 1431
High Power Coaxial Termination

dc to 18.0 GHz
100 Watts

RoHS

Convection Cooled

Features

- **Designed to meet environmental requirements of MIL-D-39030.**
- **Rugged injection molded connector.**
- **1 Kilowatt Peak Power**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 8	1.20
8 - 18	1.30

POWER RATING: 100 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 10 watts @ 125°C. 1 kilowatt **peak** (5 µsec pulse width; 5% duty cycle).

INTERMODULATION (Model 1431-X-LIM Only): IM3 (Reflected) = -90 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +43 dBm each.

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

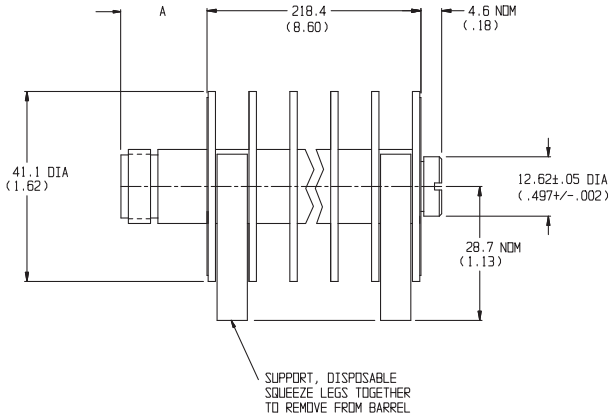
CONNECTOR: Type N connector mates nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

3.5mm connector mates nondestructively with SMA per MIL-C-39012, 2.92mm and other 3.5mm connector. Choice of male (-2) or female connector (-1).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper contact or stainless steel male contact.

WEIGHT: 320 g (11 oz)

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1431-1	13.2 (0.52)	3.5mm female
1431-2	14.0 (0.55)	3.5mm male
1431-3	18.3 (0.72)	N female
1431-4	23.1 (0.91)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

MODEL NUMBER DESCRIPTION:

Example:

1431 - X - LIM

- 1431: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1428 dc to 1.5 GHz
Model 1435 dc to 5.0 GHz
High Power Coaxial Termination 150 Watts

RoHS

Convection Cooled

Features

- **Low SWR** - Maximum SWR remains low through full frequency and power range.
- **Rugged Construction** - Quality connector with special high temperature support beads.

Specifications

NOMINAL IMPEDANCE: 50 Ω

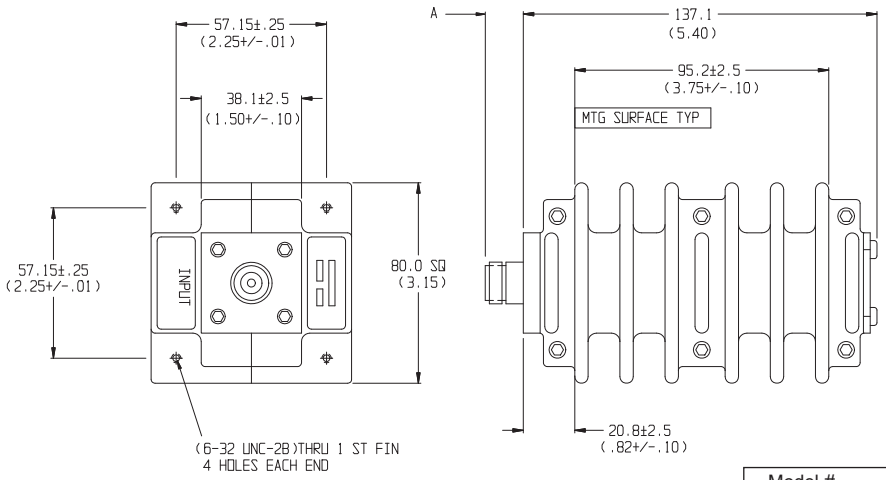
FREQUENCY RANGE: Model 1428: dc to 1.5 GHz
Model 1435: dc to 5.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 2	1.10
2 - 5	1.15

INTERMODULATION (Model 1435-X-LIM Only): IM3 (Reflected) = -100 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +43 dBm each.

PHYSICAL DIMENSIONS:



POWER RATING: 150 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 15 watts @ 125°C. 10 kilowatts **peak** (5 µsec pulse width; 0.75% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

Model 1428: Add M for male or F for female
Model 1435: Add -4 for male or -3 for female

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contact or stainless steel male contact.

WEIGHT: 1,130 g (2 lbs, 8 oz)

MODEL NUMBER DESCRIPTION:

Example:

1435 - X - LIM

- 1435: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

Model #	DIM A	Connector Type
F1428, 1435-3	15.0 (0.59)	N female
M1428, 1435-4	22.9 (0.90)	N male

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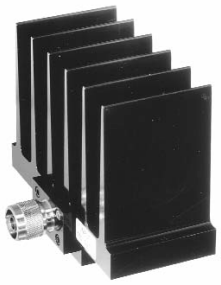
Revision Date: 3/10/09

Model 1439
High Power Coaxial Termination

dc to 2.5 GHz
150 Watts

Convection Cooled



Features

- **Compact Construction -** Lowest size/power ratio.
- **Flexible Mounting Position -** The units may be mounted in horizontal (fins up) or vertical position.
- **Rugged Construction -** Quality connector with special high temperature support bead.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 2.5 GHz

PHYSICAL DIMENSIONS:

MAXIMUM SWR*:	
Frequency (GHz)	SWR
dc - 2.5	1.20

POWER RATING: 150 watts a**verage (mounted horizontally or vertically assuming unobstructed air flow and natural convection around unit),** 10 kilowatts **peak** (5 µsec pulse width; 0.75% duty cycle). Case temperature must be held to **100°C maximum.**

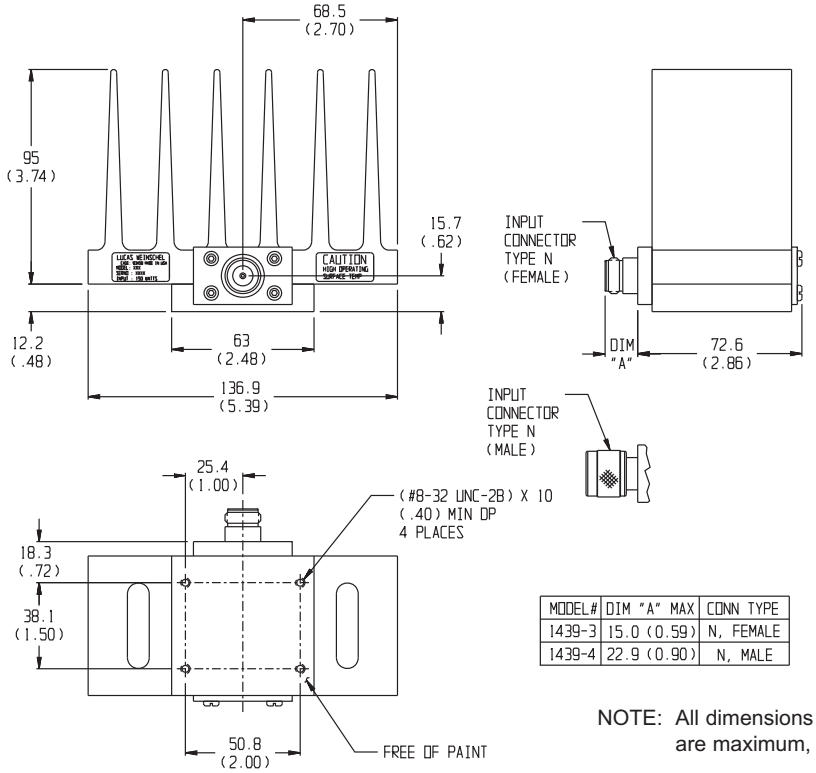
TEMPERATURE RANGE: -55°C to 100°C **case**

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contact or stainless steel male contact.

WEIGHT: 850 g (1 lb, 14 oz)



MODEL#	DIM "A" MAX	CONN TYPE
1439-3	15.0 (0.59)	N, FEMALE
1439-4	22.9 (0.90)	N, MALE

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 3/10/09

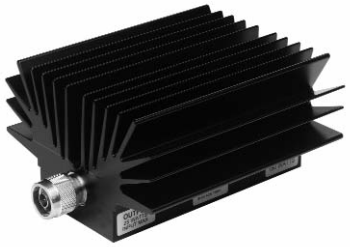
AEROFLEX WEINSCHEL

Model 1432
High Power Coaxial Termination

dc to 8.5 GHz
150 Watts

☑ RoHS

Convection Cooled



Features

- **Flexible Mounting Position -** The units may be mounted in horizontal (fins up) or vertical position.
- **Rugged Construction** - Quality connector with special high temperature support bead.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 8.5 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 4	1.20
4 - 8.5	1.30

INTERMODULATION (Model 1432-X-LIM Only): IM3 (Reflected) = -100 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +43 dBm each.

POWER RATING: 150 watts **average (mounted horizontally or vertically assuming unobstructed air flow and natural convection around unit)** to 25°C ambient temperature, derated linearly to 15 watts @ 125°C. 5 kilowatts **peak** (5 µsec pulse width; 1.5% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female (-3) connector.

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contacts and stainless steel male contacts.

WEIGHT: 1,450g (3 lbs., 3 oz.)

MODEL NUMBER DESCRIPTION:

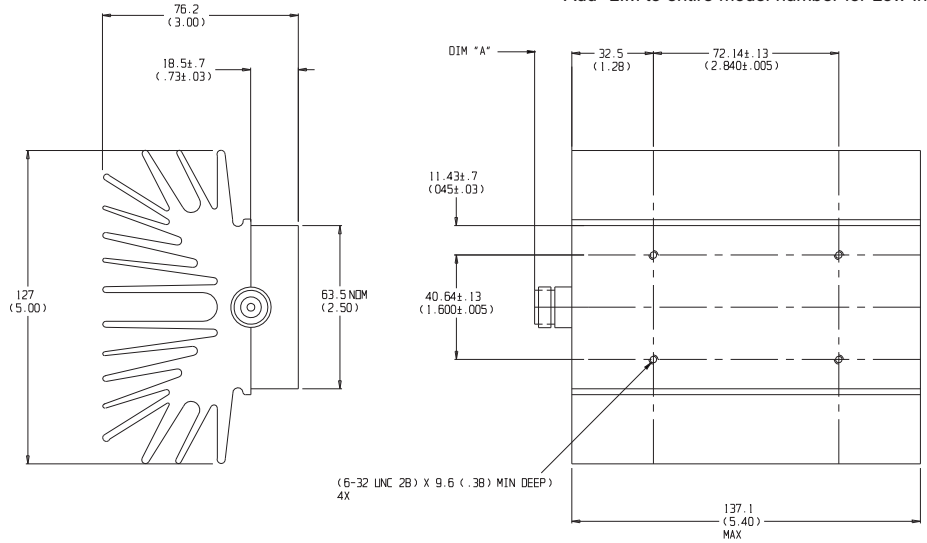
Example:

1432 - X - LIM

- 1432: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

Model #	DIM A	Connector Type
1432-3	15.0 (0.59)	N female
1432-4	22.9 (0.90)	N male

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1433
High Power Coaxial Termination

dc to 5.0 GHz
250 Watts

☑ RoHS

Convection Cooled

Features

- **Compact Construction -** Lowest size/power ratio.
- **Low SWR** - Maximum SWR remains low through full frequency and power range.
- **Operates down to dc.**
- **Rugged Construction** - Quality connector with special high temperature support beads.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 5.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 2	1.10
2 - 5	1.15

INTERMODULATION (Model 1433-X-LIM Only): IM3 (Reflected) = -100 dBc with two input signals @ 869 MHz and 891 MHz with an average power of +43 dBm each.

POWER RATING: 250 watts **average (mounted horizontally assuming unobstructed air flow and natural convection around unit)** @ 25°C ambient temperature, derated linearly to 25 watts @ 125°C. 10 kilowatts **peak** (5 µsec pulse width; 2.5% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

CONNECTOR: Type N connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector. Choice of male (-4) or female connector (-3).

CONSTRUCTION: Black, finned aluminum body, stainless steel connector; gold plated beryllium copper female contact or stainless steel male contact.

WEIGHT: Net 1,530 g (3 lbs., 6 oz.) maximum

MODEL NUMBER DESCRIPTION:

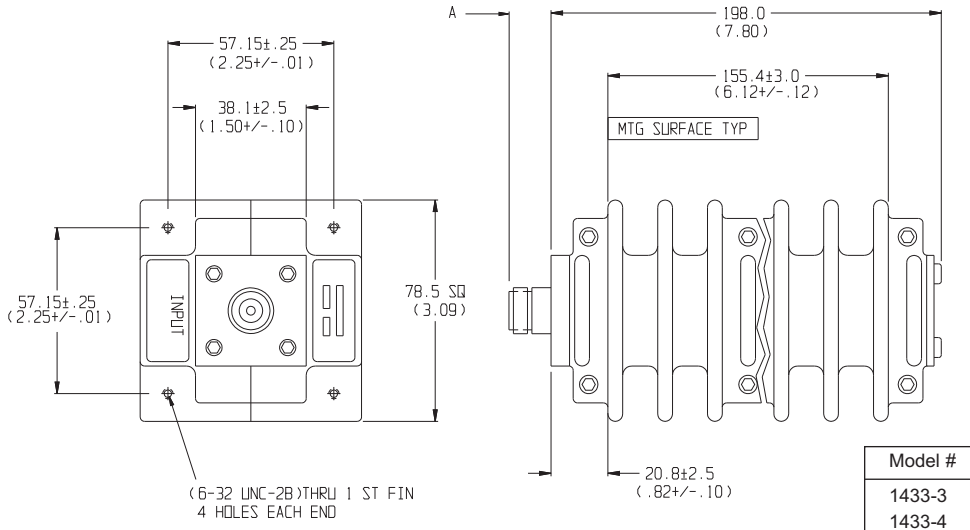
Example:

1433 - X - LIM

- 1433: Basic Model Number
- X: Connector Option
- LIM: IM Option*

* Add -LIM to entire model number for Low Intermodulation option.

PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
1433-3	15.0 (0.59)	N female
1433-4	22.9 (0.90)	N male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1456
High Power Coaxial Termination

dc to 3.0 GHz
1,000 Watts

Convection Cooled

RoHS

Features

- **Quality Type N connectors with special high temperature support beads.**
- **Designed to meet environmental requirements of MIL-D-39030.**
- **Low Intermodulation Distortion Design**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 3.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 1.5	1.15
1.5 - 3.0	1.25

POWER RATING: 1,000 watts **average (assuming unobstructed air flow and natural convection around unit)** to 25°C ambient temperature, derated linearly to 100 watts @ 125°C. 10 kilowatt **peak** (5 µsec pulse width; 5% duty cycle).

TEMPERATURE RANGE: -55°C to +125°C with Power derating applied.

TEST DATA: SWR Testing performed across the frequency band. Test data is available at additional cost.

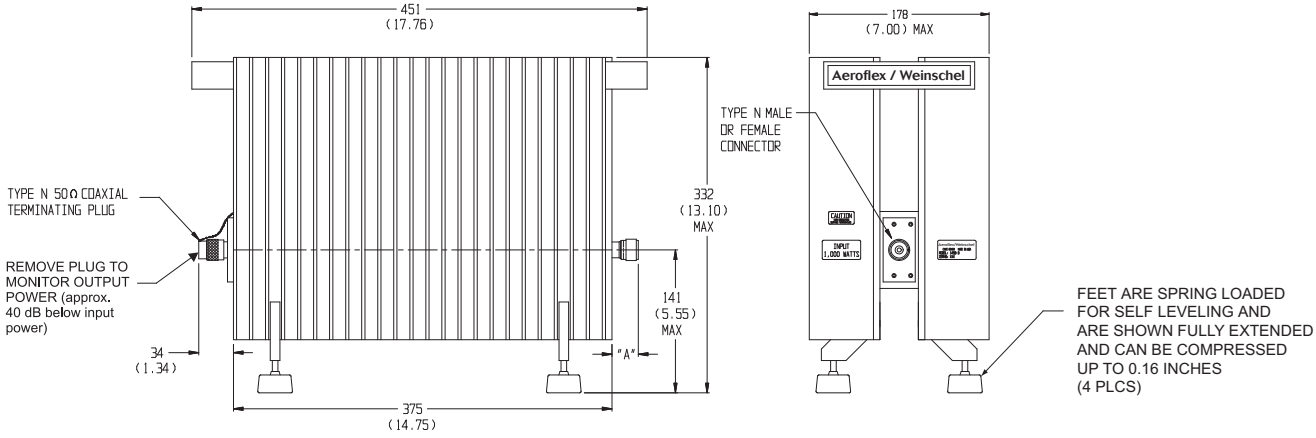
CONNECTOR: Type N connectors - mate nondestructively with MIL-C-39012 connector.

Connector Options	Type/Description
3	Type N, Female
4	Type N, Male

CONSTRUCTION: Black, finned aluminum body, stainless steel or silver plated brass connectors with gold plated beryllium copper or silver plated contacts.

WEIGHT: Net 12.10 kg (34 lbs) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

Model #	DIM A	Connector Type
1456-1	30.7 (1.21)	7/16 female
1456-2	32.3 (1.27)	7/16 male
1456-3	15.0 (0.59)	N female
1456-4	22.9 (0.90)	N male

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Revision Date: 3/10/09

Mechanical Phase Shifters

AEROFLEX
A passion for performance.

- DC to 20 GHz; Low Loss; Linear
- **Self Locking -** Internal mechanism eliminates the need for a locking nut. Ideal for phase trimming in densely packaged systems with minimum accessibility.
- **EDGE LINE** designs for ultra fine resolution to 22 GHz
- **COAXIAL** designs for broadband low-loss operation to 18 GHz
- **STRIPLINE** designs for lower cost applications to 12 GHz

General Information

In this section of the catalog, each Phase Shifter is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the Phase Shifter(s) that fits your needs. The page number for each phase shifter data sheet is given in the quick reference guide.

Aeroflex / Weinschel offers a variety of Mechanical Phase Shifter designs that are ideally suited for delay line applications in optical and RF Networks. These designs provide linear adjustable phase shift in a very small in-line coaxial packages with long mechanical cycle life. Models can also be easily adapted to motorized control configurations.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current products and stocking quantities.

AEROFLEX
WEINSCHEL

Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Mechanical Phase Shifters

Phase Shifters...dc to 20 GHz

Model Number	Frequency Range (GHz)	Connector Type	Incremental Phase Shift (Minimum)	Insertion Phase (Typical)	Average Power (Watts)	Maximum Insertion Loss (dB)	Maximum SWR	Page No.	
☆ 917	dc to 20.0	2.92mm	225° @ 20 GHz, 100° at 9 GHz.	890° @ 10 GHz	200	0.8	1.50	200	
980-1	dc to 3.0	SMA	140° @ 3.0 GHz	560° @ 3.0 GHz	10	0.7-1.2*	1.30	199	
☆ 980-2	dc to 3.0	SMA	165° @ 1.5 GHz 330° @ 3.0 GHz	780° @ 3.0 GHz	10	1.0-1.7*	1.35		
☆ 980-3	dc to 7.0	SMA	85° @ 3.0 GHz 170° @ 7.0 GHz	700° @ 3.0 GHz	10	0.5	1.30		
☆ 980-4	dc to 12.4	SMA	290° @ 12.0 GHz	1200° @ 12.0 GHz	10	1.0	1.45		
980K-1	dc to 3.0	SMA	140° @ 3.0 GHz	560° @ 3.0 GHz	10	0.7-1.2*	1.30	199	
☆ 980K-2	dc to 3.0	SMA	340° @ 3.0 GHz	780° @ 3.0 GHz	10	1.0-2.0*	1.35		
980K-3	dc to 7.0	SMA	85° @ 3.0 GHz 170° @ 7.0 GHz	700° @ 3.0 GHz	10	0.5	1.30		
980K-4	dc to 12.4	SMA	290° @ 12.0 GHz	1200° @ 12.0 GHz	10	1.0	1.45		
☆ 981	dc to 18.0	3.5mm	60° /GHz	- - -	50	0.5+0.35 f * f (GHz)	1.80	202	

* VARIES WITH FREQUENCY.

☆ *EXPRESS* Shipment available via **www.argosysales.com** or 800-542-4457.
Note: Other models may also be available from Express delivery.

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Revision Date: 3/10/09

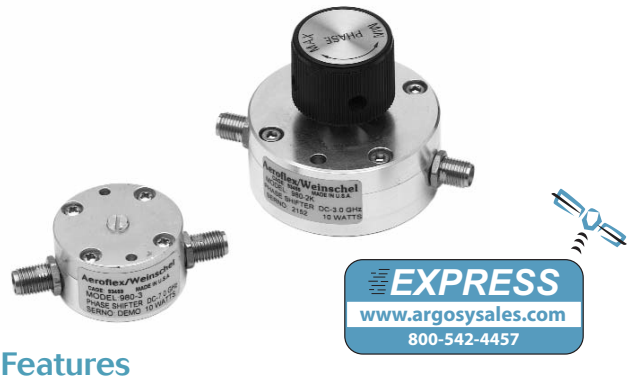
AEROFLEX WEINSCHEL

Model 980 Coaxial Phase Shifters

dc to 3.0/7.0/12.0 GHz 10 Watts

☑ RoHS

Ruggedized SMA Connector



Features

- **Self Locking -** Internal mechanism eliminates the need for a locking nut. Ideal for phase trimming in densely packaged systems with minimum accessibility.
- **Available *Express* Models -** 980-2, 980-2K 980-3, 980-4
  Other models may be available for Express Delivery.
- **Linear -** Nominally linear phase over the frequency range.
- **Optimized for Wireless OEM Applications.**
- **New Models with Adjustment Knobs** (See Models 980-1K through 980-4K).

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE:

Model 980-1 & 980-1K:	dc to 3.0 GHz
Model 980-2 & 980-2K:	dc to 3.0 GHz
Model 980-3 & 980-3K:	dc to 7.0 GHz
Model 980-4 & 980-4K:	dc to 12.0 GHz

INCREMENTAL PHASE SHIFT:

Model 980-1 & 980-1K:	140° minimum @ 3.0 GHz
Model 980-2 & 980-2K:	160° minimum @ 1.5 GHz 330° minimum @ 3.0 GHz
Model 980-3 & 980-3K:	85° minimum @ 3.5 GHz 170° minimum @ 7.0 GHz
Model 980-4 & 980-4K:	290° minimum @ 12.0 GHz

MAXIMUM INSERTION LOSS (dB):

	Frequency Range (GHz)			
Model No.	1.5	3.0	7.0	12.0
980-1 & -1K	0.70 dB	1.20 dB	- - -	- - -
980-2 & -2K	1.50 dB	2.00 dB	- - -	- - -
980-3 & -3K	0.50 dB	0.50 dB	0.50 dB	- - -
980-4 & -4K	1.00 dB	1.00 dB	1.00 dB	1.00 dB

INSERTION PHASE:

Model 980-1 & 980-1K:	560° (Typical) @ 3.0 GHz
Model 980-2 & 980-2K:	780° (Typical) @ 3.0 GHz
Model 980-3 & 980-3K:	700° (Typical) @ 7.0 GHz
Model 980-4 & 980-4K:	1200° (Typical) @ 12.0 GHz

PHASE VS FREQUENCY: Nominally linear response

MAXIMUM SWR:

Frequency	Model No.			
Range (GHz)	908-1/1K	980-2/2K	980-3/3K	980-4/4K
dc - 3	1.30	1.35	1.30	1.30
3 - 7	- - -	- - -	1.30	1.30
7 -12	- - -	- - -	- - -	1.60

POWER RATING: 10 watts average

TEMPERATURE RANGE:

Operating:	-50°C to 85°C
Storage:	-50°C to 125°C

CONNECTOR: SMA female connector per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connector.

WEIGHT:

Models 980-1 & 980-2:	50 g (1.80 oz)
Models 980-1K & 980-2K:	60 g (2.14 oz)
Model 980-3 & 980-4:	25 g (0.88 oz)
Model 980-3K & 980-4K:	35 g (1.24 oz)

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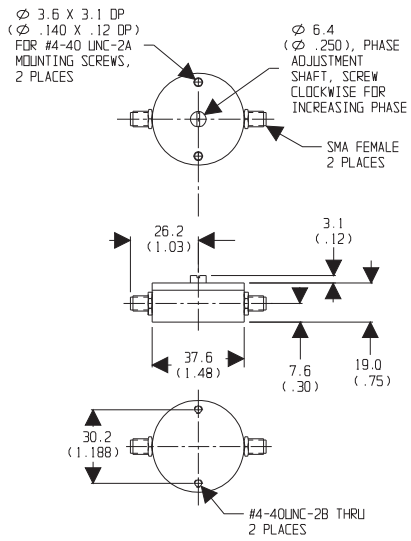
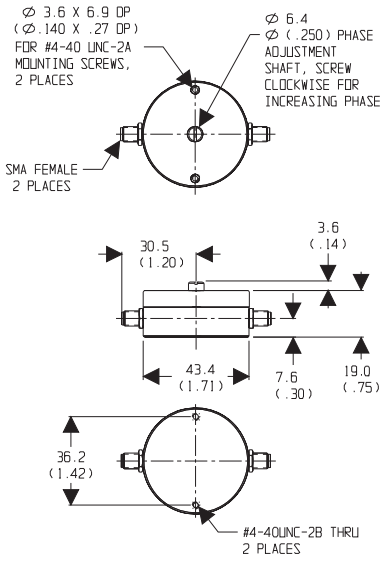
Revision Date: 3/10/09

PHYSICAL DIMENSIONS:



MODEL 980-1



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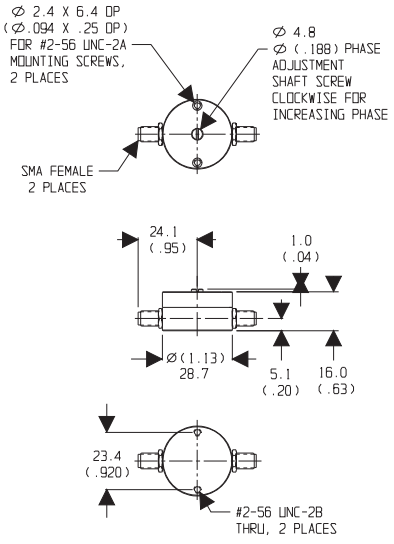
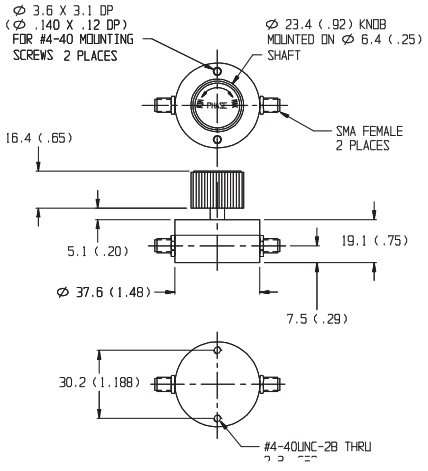
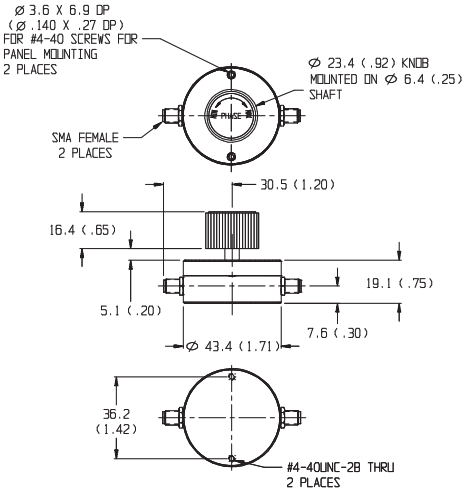


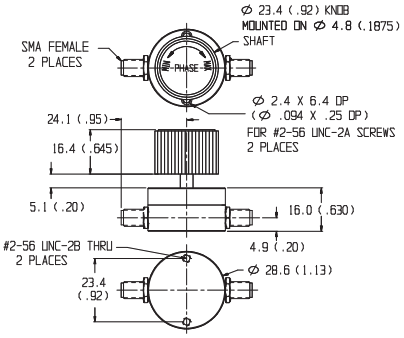
MODELS 980-3 & 980-4



MODEL 980-1K



MODEL 980-2K



MODEL 980-3K & 980-4K

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

Mechanical Phase Shifters

AEROFLEX WEINSCHEL

Model 917
Miniature In-Line Phase Shifter

dc to 20.0 GHz
200 Watts

Ruggedized 2.92mm Connector

Features

- **Self Locking -** Internal mechanism eliminates the need for a locking nut. Ideal for phase trimming in densely packaged systems with minimum accessibility.
- **Linear -** Provides a linear adjustable phase shift to 20 GHz in a very small in-line coaxial package.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 20.0 GHz

INCREMENTAL PHASE SHIFT: Adjustable to 225° @ 20 GHz; 100° at 9 GHz.

RESOLUTION: 0.5 ° per turn per GHz, typical (Adjustment shaft has 20 turns for full range).

INSERTION PHASE: 890° @ 10 GHz (Typical)

PHASE VS FREQUENCY: Nominally linear response

INSERTION LOSS: 0.8 dB maximum (0.5 dB typical @ 20 GHz)

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 20	1.5

POWER RATING: 200 watts average

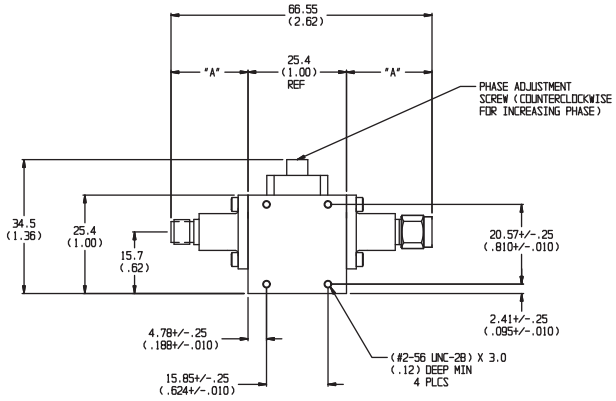
TEMPERATURE RANGE: -55°C to 125°C.

CONNECTOR: 2.92mm connector compatible with SMA, 3.5mm, SMK and other 2.92mm connectors. Available connector options are:

Connector Options	Type/Description
1	2.92mm, Female
2	2.92mm, Male

WEIGHT: 45 g (1.6 oz)

PHYSICAL DIMENSIONS:



CONN TYPE	DIM A
Female	19.81 (0.78)
Male	21.34 (0.84)

NOTE: All dimensions are given in mm (inches) and are nominal ±0.5 (0.02), unless otherwise specified.

MODEL NUMBER DESCRIPTION:

Example:

917 - XX

Basic Model Number

Connector Options*
1st digit is J1 side
2nd digit is J2 side

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Revision Date: 3/10/09

Model 981
Coaxial Phase Shifter

dc to 18.0 GHz
50 Watts

3.5mm Connectors

Features

- **Broadband Frequency Coverage:** Operates from dc to 18 GHz, usable to 20 GHz
- **Ideally suited for delay line applications in optical and RF Networks.**
- **Easily adapts to motorized control configurations.**
- **Designed for long mechanical cycle life.**

Specifications

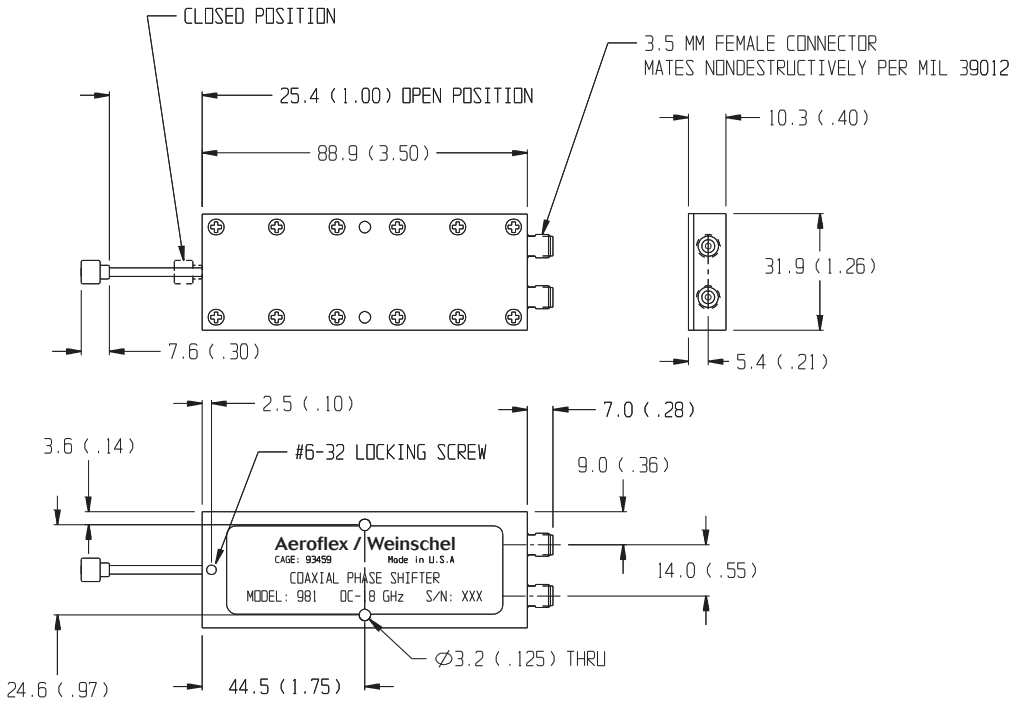
NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 18.0 GHz
INCREMENTAL PHASE SHIFT (Minimum): 60° /GHz
INSERTION LOSS (dB): 0.5 + 0.035 f(GHz)

MAXIMUM SWR:

Frequency Range (GHz)	SWR
dc - 10	1.6
10 - 18	1.8

POWER RATING: 50 watts average, 1 kW peak
TEMPERATURE RANGE: -50°C to 100°C.
CONNECTOR: 3.5mm female connectors compatible with 3.5mm, SMA, SMK and other 2.92mm connectors.
WEIGHT: 80 g (2.84 oz)

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum unless otherwise specified.

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Revision Date: 3/10/09

Power Splitters & Dividers

AEROFLEX
A passion for performance.

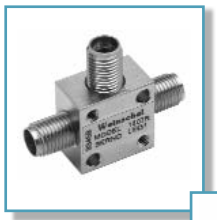
- Broadband Frequency Range - dc to 40 GHz
- Widest Selection of connector types & Frequency
- ***Express*** shipment available on select models.
- 4-Way Designs Available
- High Quality Construction & Connectors
- Stable - Low temperature and power coefficients ensure operating stability.
- Custom Designs Available on Request - Just contact us with your special requirement...
  - Broadband High Power
  - Low SWR\Return Loss
  - Unique Packaging

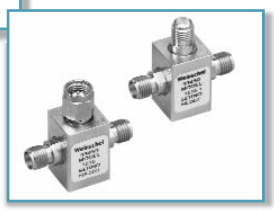
General Information

In this section of the catalog, each Resistive Power Splitter/Divider & Directional Coupler is outlined utilizing individual data sheets containing product features, specifications and outline drawings. These data sheets are preceded by a quick reference guide to help you select the product(s) that fits your needs. The page number for each product data sheet is given in the quick reference guide.

Aeroflex / Weinschel offers a comprehensive product line of Power Dividers, and Power Splitters. Many of these standard products were designed for particularly demanding broadband requirements, SWR, and high power system applications. As with the development of all Aeroflex / Weinschel products, high performance at competitive prices is of paramount importance.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current products and stocking quantities.





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Power Splitters & Dividers

Resistive Power Splitters...dc-40.0 GHz

Model Number	Frequency Range (GHz)	Connector Type	Maximum SWR INPUT	Maximum SWR OUTPUT	Maximum Insertion Loss (dB)	Amplitude Tracking (dB MAX)	Phase Tracking (±°)	Average Input Power (W)	Page No.	
☆ 1507R	dc-4.0	2.92mm (f) all	1.15	1.25	6.5	<0.20	<4.0	1	205	
☆ 1579	dc-26.5	3.5mm (f) al	1.50	1.45	8.5	0.40	5.0	0.5	207	
☆ 1593	dc-26.5	3.5mm (f) al	1.25	1.35	8.5	0.25	4.0	0.5	209	
☆ 1534	dc-40.0	2.92mm (f) all	160	- - -	10.5	0.50	4.0	1.0	210	
☆ 1870A	dc-18.0	N (f) all	1.15	1.15	7.5	0.20	2.0	1	208	

Resistive Power Dividers...dc-40.0 GHz, 2-Way & 4-Way

Model Number	Frequency Range (GHz)	Connector Type	Maximum SWR INPUT	Maximum SWR OUTPUT	Maximum Insertion Loss (dB)	Amplitude Tracking (dB MAX)	Phase Tracking (±°)	Average Input Power (W)	Page No.	
☆ 1506A	dc-18.0	N(m) IN (f) OUT	1.35	1.35	7.5	0.50	2.0	1	213	
1515 ☆ 1515-1	dc-18.0	SMA (m) IN (f) OUT SMA (f) all	1.35	1.35	7.5	0.50	5.0	1	212	
☆ 1549R	dc-4.0	2.92mm (f) all	1.25	1.25	6	<0.20	<4.0	1	211	
☆ 1550A (4-way)	dc-3.0	SMA (f) all	1.25	1.25	13.5	0.50	10.0	1	216	
1575	dc-40.0	2.92mm (f) all	1.70	1.70	8.5	<0.25-0.50*	2.0-5.0*	1	215	
☆ 1580 1580-1	dc-26.5	3.5mm (m) IN (f) OUT 3.5mm (f) all	1.70	1.70	8.5	1.00	8.0**	1	214	
☆ 1594 (4-way)	dc-18.0	3.5mm (f) all	1.30	1.30	14.5	2.5	50.0	2	216	

(f) denotes female & (m) denotes male.

* Varies with Frequency.

** Maximum between any two output ports

☆ *EXPRESS* Shipment available via www.argosysales.com or 800-542-4457.
Note: Other models may also be available from Express delivery.

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Revision Date: 4/8/09

Frequently Asked Questions about Power Splitters & Dividers. . .

What Types of power splitters and dividers does Weinschel offer?

Weinschel offers a variety of broadband (dc-40 GHz) resistive power splitters and dividers with Type N, SMA, 3.5mm, 2.92mm connector options. Power Dividers are available in 2 and 4 way configurations.

How does a resistive power splitter work?

Our resistive power splitters are intended for applications in which one of the two outputs are included in a leveling loop or used as a reference in a ratio measurement system, for the purpose of providing an output signal whose source impedance is essentially matched to 50 ohms. A basic design consists of three ports with a resistor on each of the two output ports, and is a unidirectional device.

What are some applications for a resistive power splitter?

Resistive power splitters provide exceptional amplitude tracking and a very low equivalent output SWR over very broad frequency ranges. They are used in applications in which one of the two outputs is included in a leveling loop or as a reference in a ratio systems such as:

- A dual channel insertion loss measuring system where the resistive power splitter provides reference and a signal channel.
- A precision power source where a power meter of known characteristics is used, either by ratio or leveling to provide a calibrated output.
- Provide a sampled output used for leveling a signal source - for instance in single channel attenuation measurements.

What applications use resistive power dividers?

- Broadband independent signal sampling - used in systems to simultaneously measure two different characteristics of one signal such as frequency and power.
- Distribution of a low power signals to two or more antennas.
- Laboratory measurements where a reference signal exactly tracking the reference signal is required.
- Resistive power dividers can be used as power combiners because they are bidirectional.

When do I use a power splitter or divider?

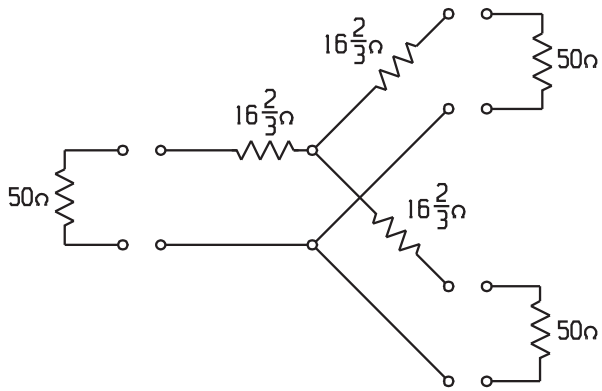
In simple terms many are confused as to the difference between power splitters and power dividers. Here is some basic information that we hope will help.

Power splitters are only used in a ratio systems or leveling loop.

- Power splitters can never be used to combined power. They are unidirectional.
- A basic power splitter has two resistors and three ports. Power dividers should not be used in ratio and leveling loop application because a mismatch condition of nominally 3:1 would exist.
- Power dividers can be used as power combiners because they are bi-directional. Power dividers can be used in a system to simultaneously measure t w o different characteristics of one signal such as frequency and attenuation, power splitters can not.
- A basic power divider has three resistors and three ports. A simple description of the circuit shows that any one of the three ports has 50 ohm input impedance when the others are terminated in 50 ohms. The insertion loss between any two ports is 6 dB.

What is a Resistive Power Divider?

An equivalent circuit of the resistive divider is shown below. A simple analysis of this circuit will demonstrate that any one of the three ports has a 50 ohm input impedance when the other two are terminated in 50 ohms, and that the insertion loss between any two ports is 6 dB. A microwave network of this type consists of a symmetrical resistive film deposited on a ceramic substrate having three conducting contacts, each connected to the center conductor of a coaxial connector. Resistive dividers provide well-matched signals of essentially equal magnitude and phase over a very broad band as opposed to the reactive and hybrid types which employ frequency limitive techniques. The resistive divider is intended for applications where the output signals are used independently, such as the simultaneous monitoring of power and frequency.



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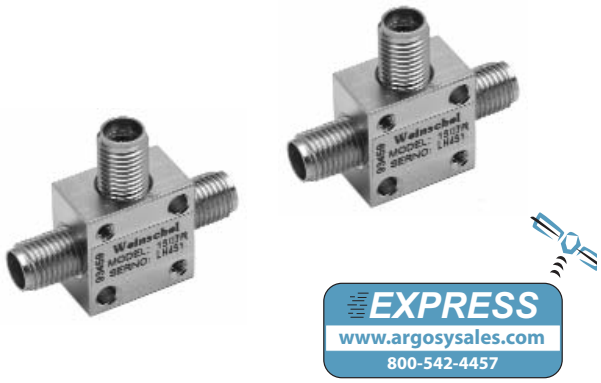
Model 1507R Broadband Resistive Power Splitter (Matching)

dc to 4.0 GHz 1 Watt

Low Cost, 2.92mm Connectors



Features

These resistive power splitters are intended for RF and wireless applications in which one of the two outputs is included in a leveling loop or is used as a reference in a ratio system, for the purpose of providing an output signal whose source impedance is essentially matched to 50Ω. Some examples are:

- A dual channel insertion loss measuring system (ratio).
- A parallel IF substitution insertion loss measuring system (ratio or ALC loop).
- A precision power source (ratio or ALC loop).

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 4.0 GHz

INSERTION LOSS: 6 dB nominal, 6.5 dB maximum (Between input and either output)

MAXIMUM INPUT POWER: 1.0 watt CW (Input connector only)

AMPLITUDE & PHASE TRACKING (Maximum):

Frequency (GHz)	Tracking	
	Amplitude	Phase
dc - 4.0	<0.2 dB	<4°

MAXIMUM SWR:

Frequency (GHz)	Output*	Input
dc -4	1.15	1.25

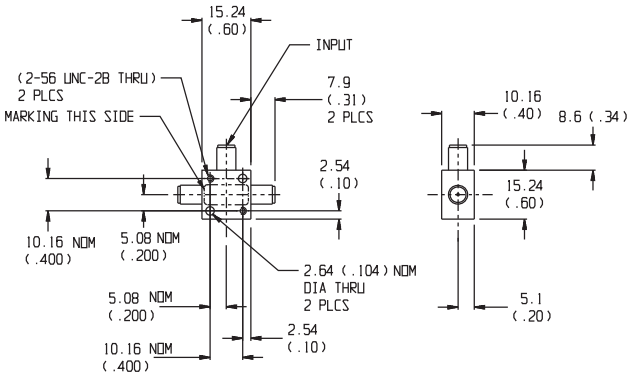
*Equivalent output SWR when used in a leveling or ratio system.

TEMPERATURE RANGE: -55 °C to +125 °C

CONNECTORS: Female 2.92 mm (SMA compatible) connectors all ports--mate nondestructively with other SMA, 2.92mm and 3.5mm connectors.

WEIGHT: 25 g (0.9 oz) maximum

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 4/3/09

AEROFLEX WEINSCHEL

Model 1579
Broadband Resistive Power Splitter (Matching)

dc to 26.5 GHz
0.5 Watts

3.5mm Connectors

RoHS

Features

These resistive power splitters are intended for RF and wireless applications in which one of the two outputs is included in a leveling loop or is used as a reference in a ratio system, for the purpose of providing an output signal whose source impedance is essentially matched to 50Ω. Some examples are:

- A dual channel insertion loss measuring system (ratio).
- A parallel IF substitution insertion loss measuring system (ratio or ALC loop).
- A precision power source (ratio or ALC loop).

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

INSERTION LOSS: 6 dB nominal, 8.5 dB maximum (Between input and either output)

MAXIMUM INPUT POWER: 0.5 watts CW (Input Connector only)

OUTPUT TRACKING (Between Ports):

Frequency (GHz)	Tracking (maximum dB)
dc - 4	0.15
4 - 8	0.20
8 -18	0.30
18 - 26.5	0.40

MAXIMUM INPUT SWR:

Frequency (GHz)	Maximum SWR
dc - 26.5	1.50

PHASE TRACKING: ±5° nominal between output ports

EQUIVALENT OUTPUT SWR (Port 2 & 3):

Frequency (GHz)	Maximum SWR
dc - 18	1.25
18 - 26.5	1.45

*When used in a leveling or ratio system.

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

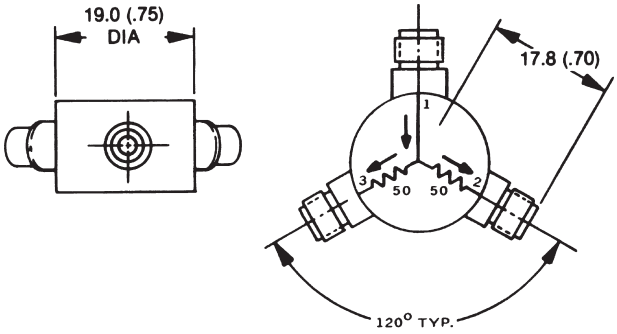
TEST DATA: Insertion Loss, SWR, and Tracking measurements performed across the frequency band. Test data available at additional cost.

CONNECTORS: Female 3.5mm connectors all ports--mate nondestructively with SMA, 2.92mm and other 3.5mm connectors.

CONSTRUCTION: Gold plated brass body; stainless steel connectors; gold plated beryllium copper contacts.

WEIGHT: 30 g (1 oz) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 4/8/09

Model 1870A Broadband Resistive Power Splitter (Matching)

dc to 18.0 GHz 1 Watt

RoHS

Type N Connectors

Features

These resistive power splitters are intended for RF and wireless applications in which one of the two outputs is included in a leveling loop or is used as a reference in a ratio system, for the purpose of providing an output signal whose source impedance is essentially matched to 50Ω. Some examples are:

- A dual channel insertion loss measuring system (ratio).
- A parallel IF substitution insertion loss measuring system (ratio or ALC loop).
- A precision power source (ratio or ALC loop).

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

INSERTION LOSS: 6 dB nominal, 7.5 dB maximum (Between Input and either output).

MAXIMUM INPUT POWER: 1 watt average, 1 kilowatt peak (Input connector only)

OUTPUT TRACKING (Between Ports):

Frequency (GHz)	Tracking (maximum dB)
dc - 8	0.15
8 -18	0.20

PHASE TRACKING: ±2° nominal between output ports

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: <0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +85°C

CONSTRUCTION: Nickel plated brass body; stainless steel connectors; gold plated beryllium copper contacts.

MAXIMUM INPUT SWR:

Frequency (GHz)	Maximum SWR
dc - 18	1.30

EQUIVALENT OUTPUT SWR (Port 2 & 3):

Frequency (GHz)	Maximum SWR
dc - 2	1.05
2 - 4	1.07
4 - 8	1.10
8 - 18	1.15

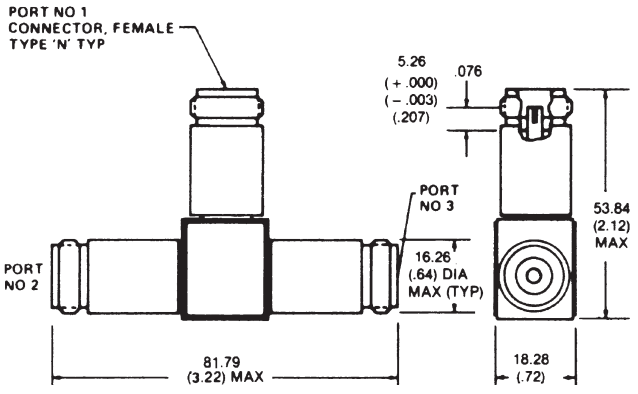
* When used in a leveling or ratio system.

TEST DATA: Insertion Loss, SWR, and Tracking measurements performed across the frequency band. Test data available at additional cost.

CONNECTORS: Type N female connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

WEIGHT: Net 170 g (6 oz)

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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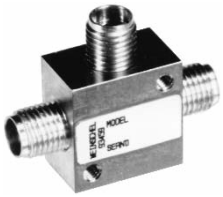
AEROFLEX WEINSCHEL

Model 1593 Broadband Resistive Power Splitter (Matching)

dc to 26.5 GHz 1 Watt

Subminiature, 3.5mm Connectors



Features

These resistive power splitters are intended for RF and wireless applications in which one of the two outputs is included in a leveling loop or is used as a reference in a ratio system, for the purpose of providing an output signal whose source impedance is essentially matched to 50Ω. Some examples are:

- A dual channel insertion loss measuring system (ratio).
- A parallel IF substitution insertion loss measuring system (ratio or ALC loop).
- A precision power source (ratio or ALC loop).

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

INSERTION LOSS: 6 dB nominal, 8.5 dB maximum (Between input and either output)

MAXIMUM INPUT POWER: 1.0 watts CW (Input Connector only)

AMPLITUDE & PHASE TRACKING (Maximum):

Frequency (GHz)	Tracking	
	Amplitude	Phase
dc - 26.5	<0.25 dB	<4°

MAXIMUM INPUT SWR:

Frequency (GHz)	Maximum SWR
dc - 26.5	1.25

EQUIVALENT OUTPUT SWR (Port 2 & 3):

Frequency (GHz)	Maximum SWR
dc - 18	1.25
18 - 26.5	1.35

*When used in a leveling or ration system.

TEMPERATURE RANGE:

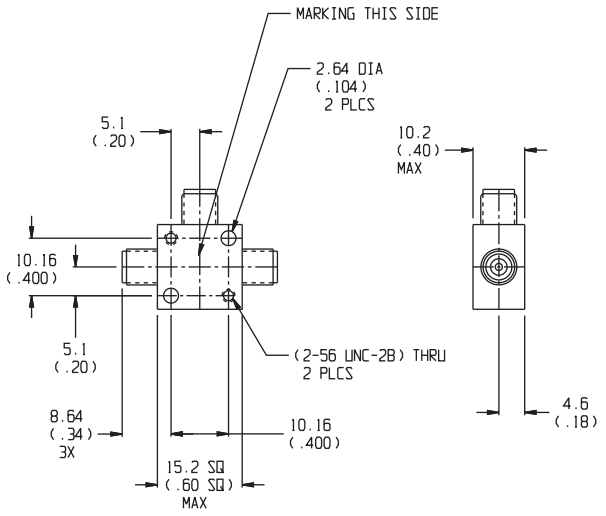
Operating: -55°C to +85°C
Storage: -55°C to +125°

TEST DATA: Insertion Loss, SWR, and Tracking measurements performed across the frequency band. Test data available at additional cost.

CONNECTORS: Female 3.5mm connectors all ports --mate nondestructively with SMA, 2.92mm and other 3.5mm connectors.

WEIGHT: 25 g (0.9 oz) maximum

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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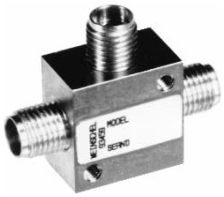
Revision Date: 4/3/09

Model 1534 dc to 40.0 GHz
Broadband Resistive Power Splitter 1 Watt
(Matching)

Subminiature, 2.92mm Connectors



Features

These resistive power splitters are intended for RF and wireless applications in which one of the two outputs is included in a leveling loop or is used as a reference in a ratio system, for the purpose of providing an output signal whose source impedance is essentially matched to 50Ω. Some examples are:

- A dual-channel insertion loss measuring system where the resistive power splitter provides a reference and a signal channel for ratio meter.
- A parallel IF substitution insertion loss measuring system where the resistive power splitter provides a sampled output for leveling the signal source.
- A precision power source where a power meter of known characteristics is used, either by ratio or leveling to provide a calibrated output.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

INSERTION LOSS: 6 dB nominal, 8.0 dB maximum to 26.5, 10.5 dB to 40 GHz (Between input and either output)

MAXIMUM INPUT POWER: 1.0 watt CW (Input Connector only)

AMPLITUDE & PHASE RACKING (Maximum):

Frequency (GHz)	Tracking	
	Amplitude	Phase
dc - 18	<0.20 dB	<2°
18 - 26.5	<0.30 dB	<2°
26.5 - 40	<0.50 dB	<4°

MAXIMUM INPUT SWR:

Frequency (GHz)	Maximum SWR
dc - 18	1.25
18 - 26.5	1.40
26.5 - 40	1.60

EQUIVALENT OUTPUT SWR (Port 2 & 3):

Frequency (GHz)	Maximum SWR
dc - 26.5	1.35
26.5 - 40	- - -

*When used in a leveling or ration system.

TEMPERATURE RANGE:

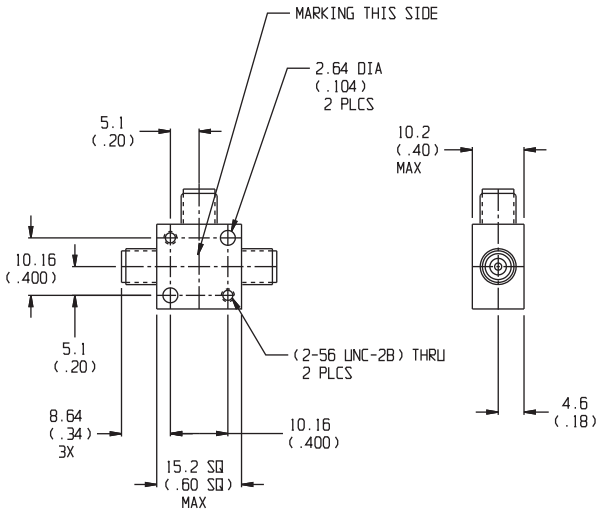
Operating: -55°C to +85°C
Storage: -55°C to +125°C

TEST DATA: Insertion Loss, SWR, and Tracking measurements performed across the frequency band. Test data available at additional cost.

CONNECTORS: Female 2.92mm connectors all ports--mate nondestructively with SMA, 2.92mm and other 2.92mm and 3.5mm connectors.

WEIGHT: 25 g (0.9 oz) maximum

PHYSICAL DIMENSIONS:



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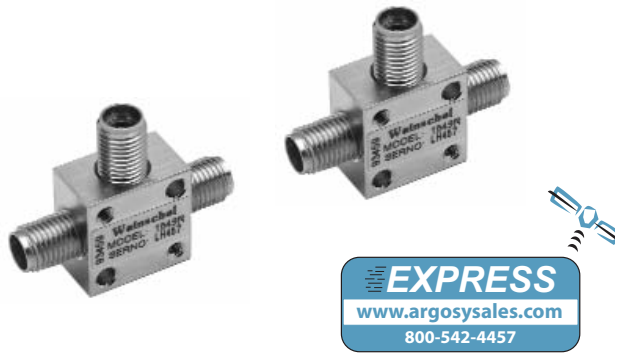
Revision Date: 4/3/09

AEROFLEX WEINSCHEL

Model 1549R
Broadband Resistive Power Divider

dc to 4.0 GHz
1 Watt

Low Cost, SMA Connectors



Features

- **Excellent Tracking Between Ports.**
- **Miniature Size and Light Weight.**
- **Wireless Applications** - Ideal for use in the wireless communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 4.0 GHz
INSERTION LOSS: 6 dB nominal, 6.5 dB maximum (Between input and either output)
MAXIMUM INPUT POWER: 1.0 watt CW (input connector only)
NUMBER OF PORTS: 3, Interchangeable for Input and Output.

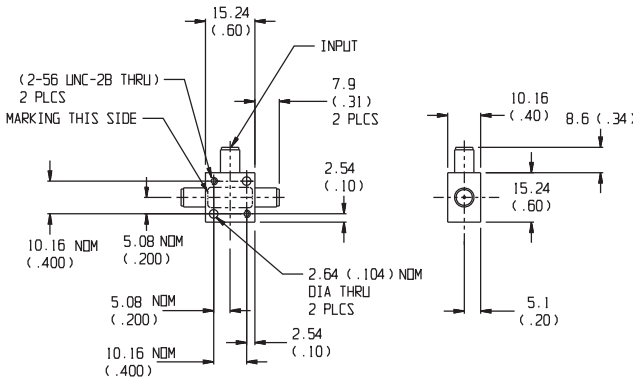
AMPLITUDE & PHASE TRACKING (Maximum):

Frequency (GHz)	Tracking	
	Amplitude	Phase
dc - 4.0	<0.2 dB	<4°

MAXIMUM SWR:

Frequency (GHz)	Output	Input
dc - 4	1.25	1.25

TEMPERATURE RANGE: -55 °C to +125 °C
CONNECTORS: Female SMA connectors all ports--mate nondestructively with other SMA, 2.92mm and 3.5mm connectors.
WEIGHT: 25 g (0.9 oz) maximum
PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 4/3/09

Model 1515 & 1515-1 Broadband Resistive Power Divider

dc to 18.0 GHz 1 Watt

SMA Connectors

RoHS

Features

- **Miniature Size & Lightweight -** High power capability and high ambient temperature operation.
- **Close Tracking & Low Frequency Sensitivity -** Output power symmetry is excellent across the frequency range. Division is 6 dB from matched ports.
- **Test data Data -** Insertion loss test data data supplied.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

INSERTION LOSS (between input & either output arm): 6 dB nominal, -0.2 dB, +1.2 to 10 GHz, 1.5 to 18 GHz

MAXIMUM INPUT POWER: 1 watt CW, 1 kilowatt peak (5 µsec pulse width, 0.05% duty cycle)

NUMBER OF PORTS: 3, interchangeable for input and output

PHASE TRACKING: 5° maximum between ports (J2 & J3) with input connector (J1).

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

CONSTRUCTION: Nickel plated brass body; stainless steel connectors; gold plated beryllium copper contacts.

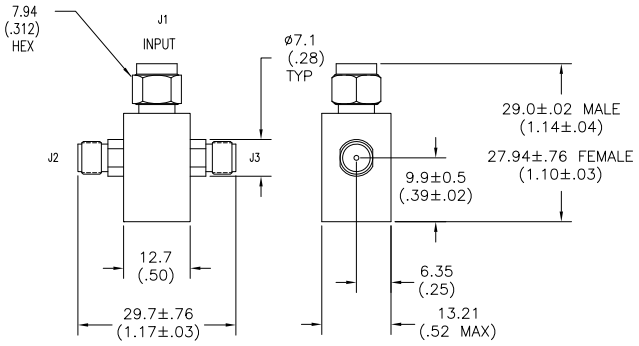
TEST DATA: Insertion loss data supplied at 50 MHz, 12.0, and 18.0 GHz. Other test data can be provided at additional cost.

CONNECTORS: Model 1515: Male SMA connector port 1 and Female SMA connectors ports 2 and 3.

Model 1515-1: SMA Female connectors all ports--all SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

WEIGHT: Net 30 g (1 oz)

PHYSICAL DIMENSIONS:



Model No.	Input Connector	Output Connector
1515	SMA Male	SMA Female
1515-1	SMA Female	SMA Female

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

AMPLITUDE TRACKING-J2 & J3 (Maximum):

Frequency (GHz)	Tracking
dc - 4	0.2 dB
4 - 10	0.4 dB
10 - 18	0.5 dB

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 10	1.25
10 - 18	1.35

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Revision Date: 4/8/09

AEROFLEX WEINSCHEL

Model 1506A
Broadband Resistive Power Divider

dc to 18.0 GHz
1 Watt

Type N Connectors

Features

- **Accurate Division and Low Frequency Sensitivity** - The symmetry of output power between the two arms is excellent across the frequency range.
- **High Stability** - Low temperature and power coefficients ensure attenuation stability.
- **Test data Data** - Each divider is calibrated at four frequencies, and the data is supplied on a permanently attached test data plate.
- **Matched Ports** - Symmetrical 6 dB division permits any port to be used as input.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM INPUT POWER: 1 watt CW, 1 kilowatt peak (5 µsec pulse width, 0.05 % duty cycle)

INSERTION LOSS (between input & one output arm): 6 dB nominal, -0.2, +1.2 dB maximum to 10.0 GHz; +1.5 dB maximum to 18.0 GHz.

NUMBER OF PORTS: 3, interchangeable for input and output

PHASE TRACKING: 5° maximum between ports (J2 & J3) with input connector (J1).

AMPLITUDE TRACKING (Maximum):

Frequency (GHz)	Tracking
dc - 4	0.2 dB
4 - 10	0.4 dB
10 - 18	0.5 dB

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 10	1.25
10 - 18	1.35

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

TEMPERATURE RANGE: -55°C to +125°C

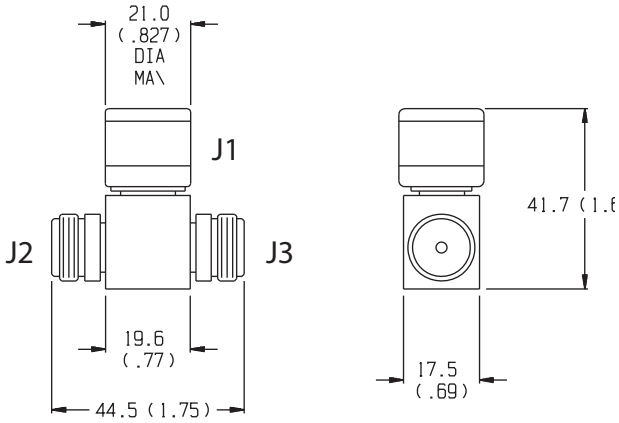
CONSTRUCTION: Nickel plated brass body; stainless steel connectors; gold plated beryllium copper contacts.

TEST DATA: Insertion loss data supplied at 50 MHz, 6.0, 12.0, and 18.0 GHz on nameplate only. No paper data supplied. Other test data can be provided at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

WEIGHT: Net 140 g (5 oz)

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 4/3/09

AEROFLEX WEINSCHEL

Models 1580 & 1580-1 Broadband Resistive Power Dividers

dc to 26.5 GHz 1 Watt

3.5mm Connectors

RoHS

Features

- **Miniature Size & Lightweight -** High power capability and high ambient temperature operation.
- **Close Tracking & Low Frequency Sensitivity -** Output power symmetry is excellent across the frequency range. Division is 6 dB from matched ports.
- **Test data Data -** Insertion loss test data data supplied.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM INPUT POWER: 1 watt CW, 500 watt pulse

INSERTION LOSS (between input & one output arm): 6 dB nominal, 7.5 maximum to 18 GHz and 8.5 maximum to 26.5 GHz.

NUMBER OF PORTS: 3, interchangeable for input and output

PHASE TRACKING: 8° maximum between any two output ports

AMPLITUDE TRACKING (Maximum):

Frequency (GHz)	Tracking
dc - 18	0.50 dB
18 -22	0.75 dB
22 - 26.5	1.00 dB

POWER COEFFICIENT: < 0.005 dB/dB/watt

TEMPERATURE COEFFICIENT: < 0.0004 dB/dB/°C

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 12.4	1.25
12.4 - 18	1.35
18 -22	1.50
22 - 26.5	1.70

TEMPERATURE RANGE: -55°C to +125°C

CONSTRUCTION: Gold plated brass body; stainless steel connectors; gold plated beryllium copper contacts.

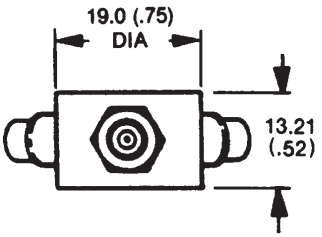
TEST DATA: Insertion loss data supplied at 50 MHz, 12.0, 18.0 and 26.5 GHz. Other test data can be provided at additional cost.

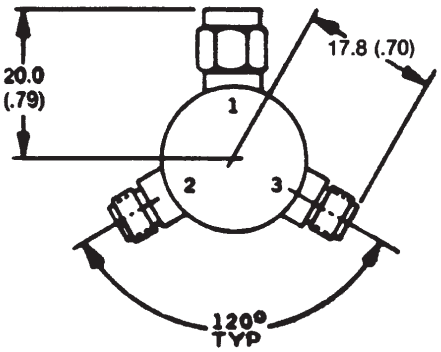
CONNECTORS:

Model 1580: Male 3.5mm connector port 1 and Female 3.5mm connectors ports 2 and 3--all mate nondestructively with SMA, 2.92mm and other 3.5mm connectors.

Model 1580-1: Female 3.5mm connectors all ports--mate nondestructively with SMA, 2.92mm and other 3.5mm connectors.

PHYSICAL DIMENSIONS:





NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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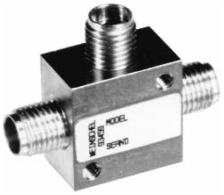
Revision Date: 4/8/09

Model 1575 dc to 40.0 GHz
Broadband Resistive Power Divider 1.0 Watt

Subminiature, 2.92mm Connectors



Features

This three resistor Power Divider is designed for applications where an RF and Microwave signal must be accurately divided or combined.

- **Miniature Size and Lightweight** - High power capability and high ambient temperature operation.
- **Close Tracking and Low Frequency Sensitivity** - Output power symmetry is excellent across the frequency range. Division is 6 dB from matched ports.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 40.0 GHz

INSERTION LOSS (Between input and either output):
6 dB nominal, 8.5 dB maximum

MAXIMUM INPUT POWER: 1.0 watts CW, 1 kilowatt peak, 5 µsec pulse width

NUMBER OF PORTS: 3, interchangeable for input and output

AMPLITUDE & PHASE TRACKING (Maximum):

Frequency (GHz)	Tracking	
	Amplitude	Phase
dc - 19	<0.25 dB	2°
19 - 40	<0.50 dB	5°

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 19	1.40
19 - 40	1.70

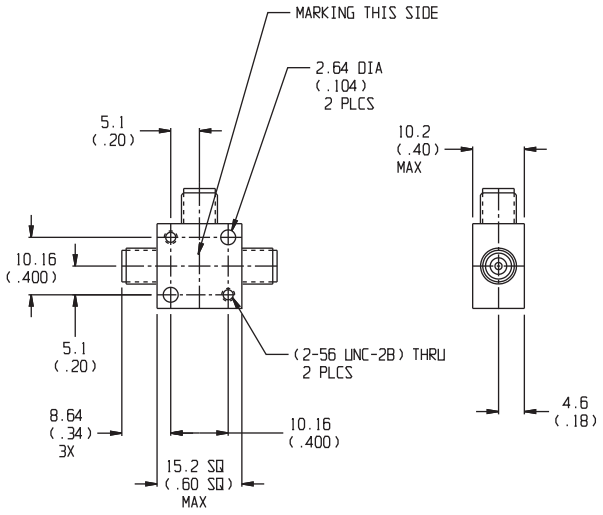
TEMPERATURE RANGE: -55°C to +85°C

TEST DATA: Insertion Loss, SWR, and Tracking measurements performed across the frequency band. Test data available at additional cost.

CONNECTORS: Female 2.92mm connectors all ports--mate nondestructively with SMA, 2.92mm and other 2.92mm and 3.5mm connectors.

WEIGHT: 25 g (0.9 oz) maximum

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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Revision Date: 4/8/09

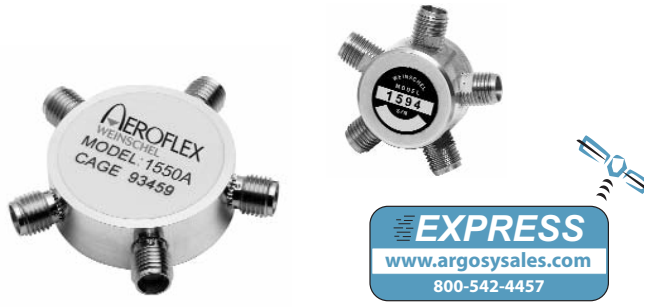
AEROFLEX WEINSCHEL

Model 1550A
Model 1594
4-WAY Resistive Power Dividers

dc to 3.0 GHz/1 Watt
dc to18.0 GHz/2 Watts

Subminiature, SMA/3.5mm Connectors

RoHS



Features

- **Broadband Performance.**
- **Excellent Tracking Between Ports.**
- **Miniature Size and Light Weight.**
- **Wireless Applications** - Model 1550A is specifically designed for use in the wireless communications bands.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 1550A: dc to 3.0 GHz (usable to 5 GHz)
1594: dc to 18.0 GHz

INSERTION LOSS*:
Model 1550A: 12 dB nominal, 13.5 dB maximum
Model 1594: 12 dB nominal, 14.5 dB maximum
* input port to any output port with all other terminated.

MAXIMUM INPUT POWER: 1550A: 1 watt CW
1594: 2 watts CW

AMPLITUDE & PHASE TRACKING (Maximum):

Model No.	Frequency (GHz)	Tracking* Amplitude	Phase
1550A	dc - 3	±0.5 dB	±10°
1594	dc - 12 12 - 18	<2.0 dB <2.5 dB	<30° <50°

Between output ports.

NUMBER OF PORTS: 1 input and 4 outputs

TEMPERATURE RANGE: -55°C to +100°C

CONNECTORS: Model 1550A: SMA female connectors all ports--mate nondestructively with other SMA, 2.92mm and 3.5mm connectors.

Model 1594: 3.5mm female connectors all ports--mate non-destructively with other SMA, 2.92mm and 3.5mm connectors.

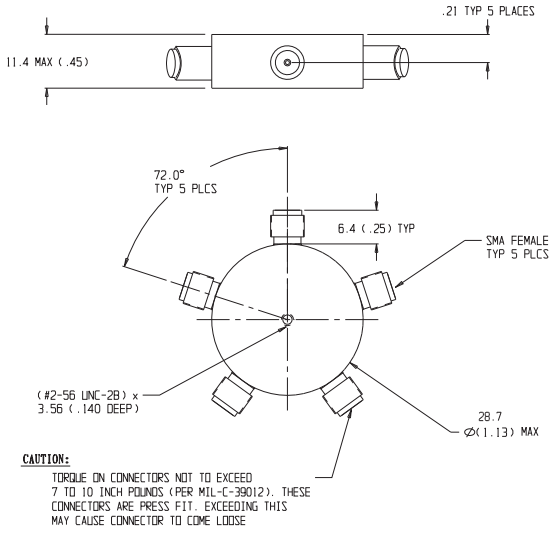
MAXIMUM SWR:

Model No.	SWR
1550A	1.25
1594	1.30

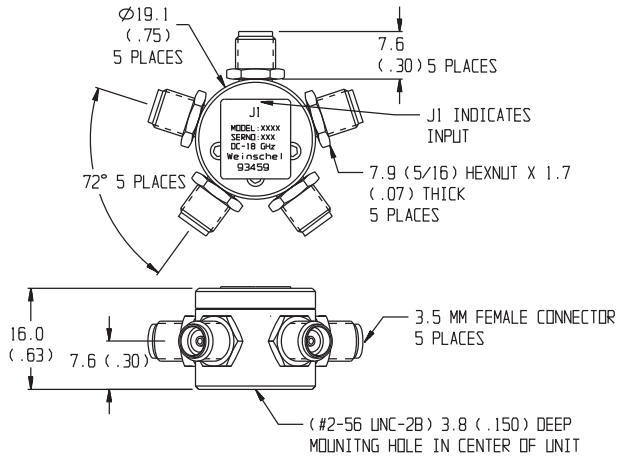
WEIGHT: 1550A: 28 g (1.0 oz) maximum
1594: 30 g (1.05 oz) maximum

PHYSICAL DIMENSIONS:

Model 1550A:



Model 1594:



NOTE:
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2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 4/3/09

Models 7008, 7034, 7035, 7035R & 7041 Planar Blind-Mate® Connectors, dc to 40.0 GHz

AEROFLEX
A passion for performance.

Threadless Connector System / Space Saving / Long Life

Features

- **Threadless Connector Mating -** This blind-mate connector series provides threadless connector mating which is useful when mating an array of connectors on one RF module to another array within seconds.
- **Space Saving -** These connectors can simplify RF connections in the most inaccessible regions and high package density systems where conventional threaded connector mating is extremely difficult.
- **Long Life** - 1,000,000 typical matings. Excellent for ATE applications. Non-piloting spring loaded contact areas provided extremely long life and repeatability.
- **Connector Options -** Choose from many standard Connector options such as SMA per MIL-C-39012, 2.92mm (SMK), 2.4mm and SMB.
- **Broad Frequency Range** - Aeroflex / Weinschel offers a wide selection of frequency ranges from dc to 40 GHz including most wireless bands.
- **Blind-Mate Fixed Attenuator, Termination & dc Block Designs -** Blind-mates can be configured on other coaxial products such as Fixed Attenuators, terminations and even dc blocks.
- **Ideal for mass-mount and receiver interface subsystems** where hundreds of high frequency connections need to be made simultaneously.
- **New Front & Rear Locking Models** - New designs offer front or rear mounting options.
- **Optimized Designs for RF & Wireless Applications**

Description

Planar Blind-mates connectors are typically used as a pair or set which is comprised of two connector subassemblies that have a common mating interface. Generally, a pair contains one floating blind-mate Interface with spring loaded inner/outer contacts and the other is a fixed blind-mate interface with fixed inner/outer contacts (Figure 1).

The Planar Blind-mate series provides threadless connector mating which is useful when mating an array of connectors on one RF module to another array within seconds. Each connector pair will tolerate typically 0.02 inches per pair radial and axial offset misalignment and still meet all of its electrical specifications.

Most Aeroflex / Weinschel Planar Blind-mates designs conveniently mount on any panel using a standard panel D-hole or most any standardized hole pattern. Extra heavy construction for long life even with mistreatment makes these blind-mate products suitable for panel use.

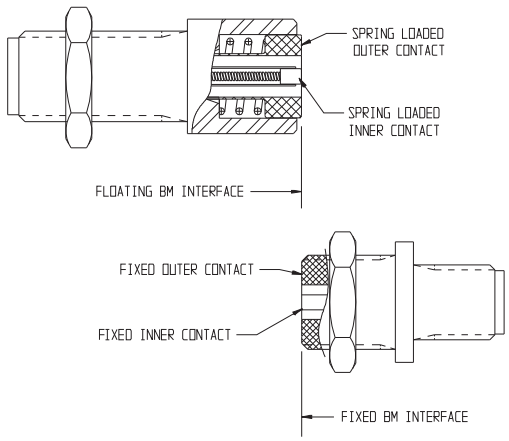

Figure 1. Common Blind-Mate Mating Interface

U.S. Patent Number 6,409,550

EXPRESS Shipment available via 800-542-4457 or **www.argosysales.com**. Check with distributor for current product stocking quantities.

AEROFLEX
WEINSCHEL

Revision Date: 3/10/09

Blind-Mate Connectors...dc-40.0 GHz

Model Number	Connector Type	Frequency Range (GHz)	SWR (Maximum)	Loss (Maximum dB)	Page No.	
☆ 7008	Pressurized SMA Female	dc - 40.0	1.30-1.65*	0.3-1.5*	220	
☆ 7034	2.92mm Female, Rear Lock, Floating	dc - 40.0	1.35-1.55*	0.85	221	
☆ 7034-1	2.92mm Female, Rear Lock, Fixed	dc - 40.0	1.35-1.55*	0.85		
☆ 7035	2.92mm Female, Front Locking Hex Nut, Floating	dc - 40.0	1.35-1.55*	0.85	222	
☆ 7035-1	2.92mm Female, Front Locking Hex Nut, Fixed	dc - 40.0	1.35-1.55*	0.85		
7035R	2.92mm Female, Front Locking, Floating, Round Nut	dc - 40.0	1.35-1.55*	0.85		
7035R-1	2.92mm Female, Front Locking, Fixed, Round Nut	dc - 40.0	1.35-1.55*	0.85		
7041	2.92mm Female, Rear Locking, Fixed, Round Nut, Lower Cost	dc - 18.0	1.20-1.40*	0.60	223	

☆ *EXPRESS* Shipment available via **www.argosysales.com** or 800-542-4457.
Note: Other models may also be available from Express delivery.

* VARIES WITH FREQUENCY.

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Revision Date: 3/10/09

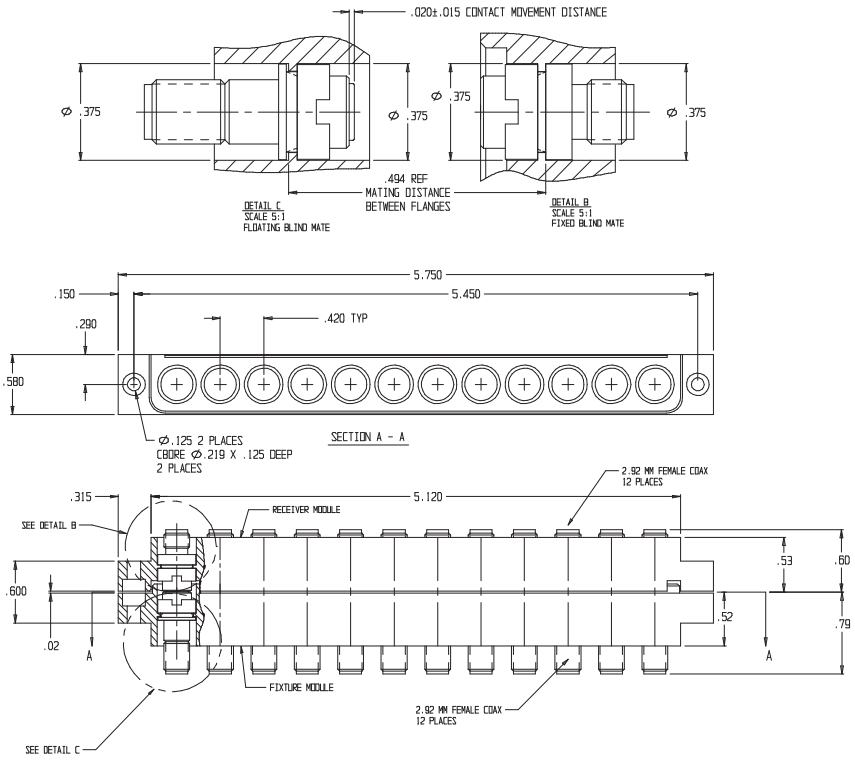
Applications

Ideal applications for these high quality/high frequency connectors range from mass-mount and receiver interface subsystems that house hundreds of high frequency connectors to single connector configurations. In either case these connectors allow threadless connector mating which is very useful when mating an array of connectors on one RF module to another array or connector within seconds.

Figure 2 shows a typical application where each connector half contains 7035R series connectors. These connectors contain spring loaded inner/outer contacts which allows for extremely long contact life as well as 0.02 per pair maximum radial and axial offset misalignment while still meeting all the specified electrical specifications.

Aeroflex / Weinschel offers a variety of standard models which are designed to fit or be configured into a wide range of applications:

- **Pressurized Designs -** Model 7008 (page 220) is equipped with a flange arrangement designed to withstand 1000 PSI of hydrostatic pressure. This model can be mated with another 7008 or any 7034 or 7035 series Planar Blind-mate. See page 218 for mating applications.
- **Rear Locking** - Models 7034 & 7034-1 (page 221) are beneficial in applications where there is easy access to the front of the connector for holding while the cable and connector is added or removed. Rotation is also prevented if the connector front is inserted in a slot which could allow for easier cable and connector assembly installation.
- **Front Locking** - Models 7035, 7035-1, 7035R, 7035R-1 (page 222) & 7041 (New..page 223) are beneficial in applications where the cable and connector will be inserted as an assembly into a panel or connector module from the rear.
- **Custom Configurations** - Other types of Planar Blind-mate connectors such as SMA, SMB, 3.5mm, flange, microstrip/pc board mount launch, test probes, frequency specific, arrays or interface subsystems can be designed for your particular application. Refer to page 222-224 for other examples.



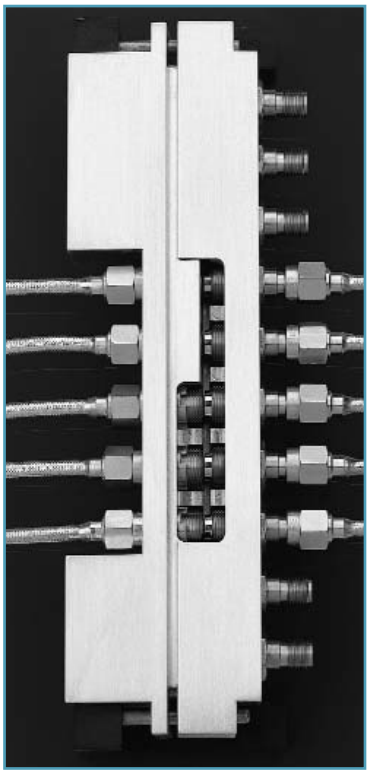


Figure 2. Typical Application

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Revision Date: 3/10/09

Model 7008
Pressurized Planar Blindmate® Connector

dc to 40.0 GHz

RoHS

Specifications

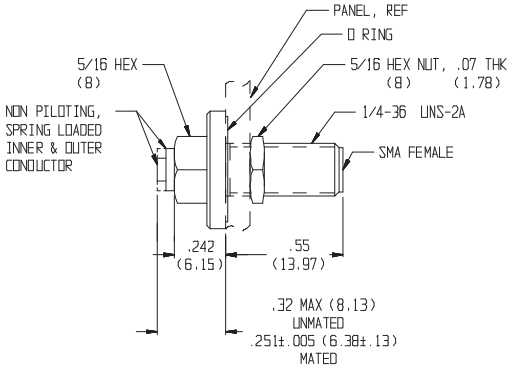
NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 40.0 GHz
POWER RATING: 50 Watts CW, 500 Watts peak

INSERTION LOSS (dB) & SWR*:

Frequency (GHz)	SWR typical	SWR maximum	Loss typical	Loss maximum
dc - 18	1.20	1.30	0.2	0.3
18 - 26.5	1.30	1.40	0.6	0.8
26.5 - 40	1.45	1.65	1.0	1.5

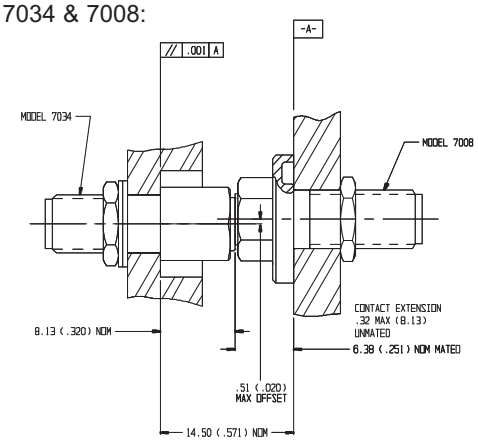
*Specifications are for mated pair (Mated pair can be any combination of Model 7008 and 7035).

HYDROSTATIC PRESSURE: 1000 PSI
STATIC PRESSURE: 50 PSI
TEMPERATURE RANGE: -50°C to +125°C
CONNECTORS: Stainless Steel SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.
WEIGHT: 2 oz (56.7 g) maximum
PHYSICAL DIMENSIONS:

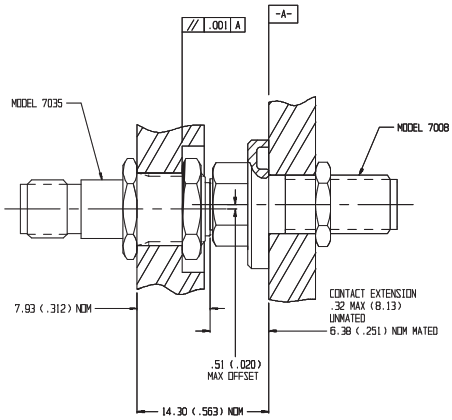


Applications

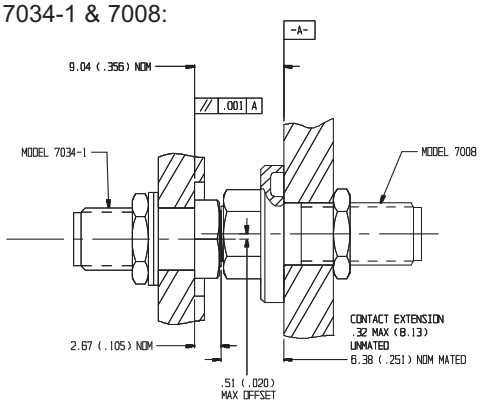
Model 7034 & 7008:



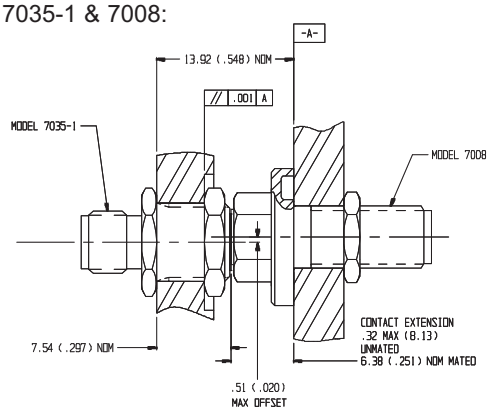
Model 7035 & 7008:



Model 7034-1 & 7008:



Model 7035-1 & 7008:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Models 7034 & 7034-1 dc to 40.0 GHz
Rear Locking Planar Blindmate® Connectors

RoHS

Specifications

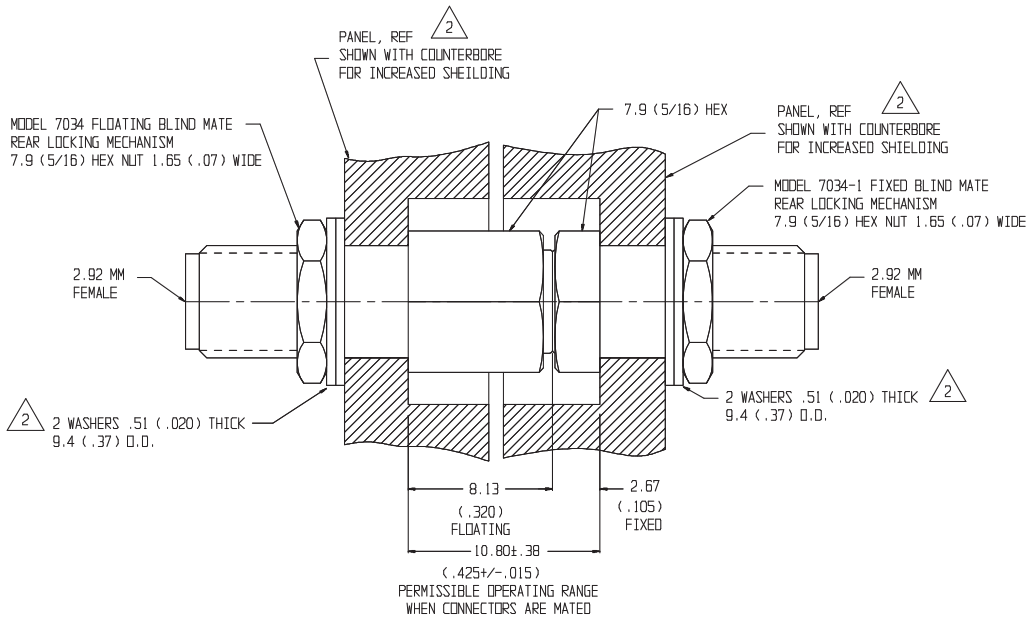
NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 40.0 GHz
INSERTION LOSS REPEATABILITY: ±0.1 dB typical
MECHANICAL LIFE: 25,000 matings minimum

INSERTION LOSS (dB) & SWR:

Frequency (GHz)	Loss (maximum)	SWR (maximum)
dc - 18	0.85	1.35
18 - 40	0.85	1.55

RADIAL OFFSET ALLOWED: ±0.02 inches per pair
TEMPERATURE RANGE: -50°C to +100°C
CONNECTORS: Stainless Steel 2.92mm connector with gold plated contacts - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.
WEIGHT: 2 oz, (56.7 g) maximum

PHYSICAL DIMENSIONS:



NOTES:
1. All dimensions are given in mm (inches) and are nominal, unless otherwise specified.
2. Maximum panel thickness for Model 7034 is 4.9 (0.195). For panels less than 4.2 (0.165) installation requires appropriate washer.
3. Unit available with RoHS compliant materials, specify when ordering.

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AEROFLEX WEINSCHEL

Connector Systems

Models 7035, 7035-1, 7035R & 7035R-1 dc to 40.0 GHz Front Locking Planar Blindmate® Connectors

☑ RoHS

Specifications

NOMINAL IMPEDANCE: 50 Ω
FREQUENCY RANGE: dc to 40.0 GHz
INSERTION LOSS REPEATABILITY: ±0.1 dB typical
MECHANICAL LIFE: 25,000 matings minimum

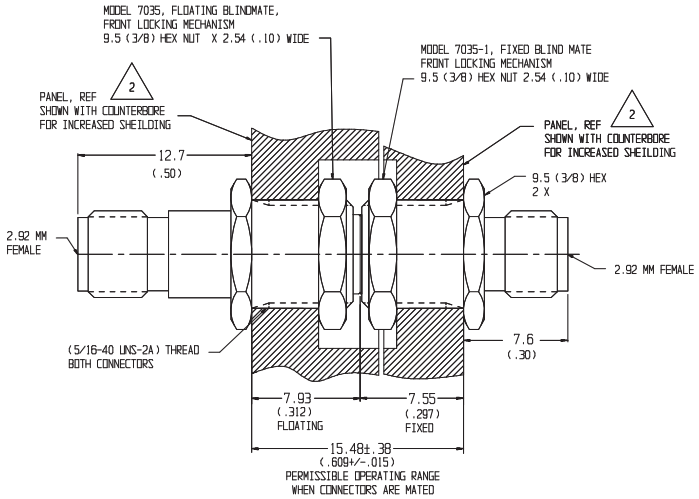
INSERTION LOSS (dB) & SWR:

Frequency (GHz)	Loss (maximum)	SWR (maximum)
dc - 18	0.85	1.35
18 - 40	0.85	1.55

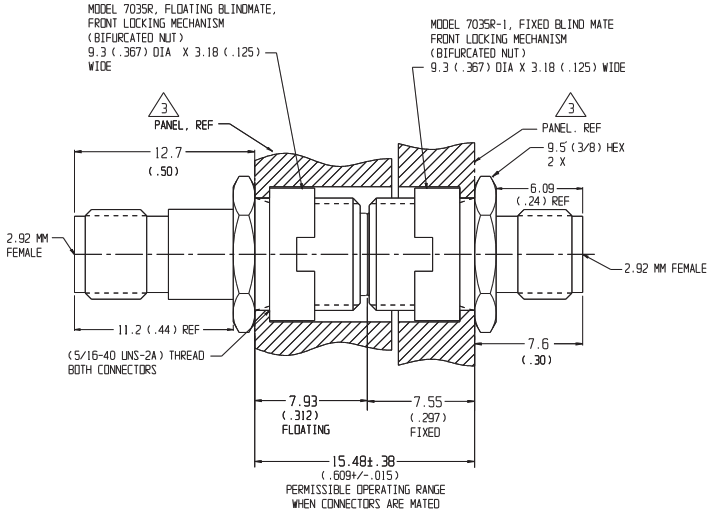
RADIAL OFFSET ALLOWED: ±0.02 inches per pair
TEMPERATURE RANGE: -50°C to +100°C
CONNECTORS: Stainless Steel 2.92mm connector with gold plated contacts - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.
WEIGHT: 2 oz (56.7 g) maximum

PHYSICAL DIMENSIONS:

Models7035 & 7035-1:



Models 7035R & 7035R-1:



NOTES:
1. All dimensions are given in mm (inches) and are nominal, unless otherwise specified.
2. Maximum panel thickness for Model 7035 is 4.9 (0.195).
3. Panel flange thickness of 1.0 (0.03) shown for 7035R. Connector Mating shown with counterbore for increased shielding effectiveness.
4. Unit available with RoHS compliant materials, specify when ordering

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Models 7041 dc to 18.0 GHz
Rear Locking Planar Blindmate® Connector

Lower Cost Design

Specifications

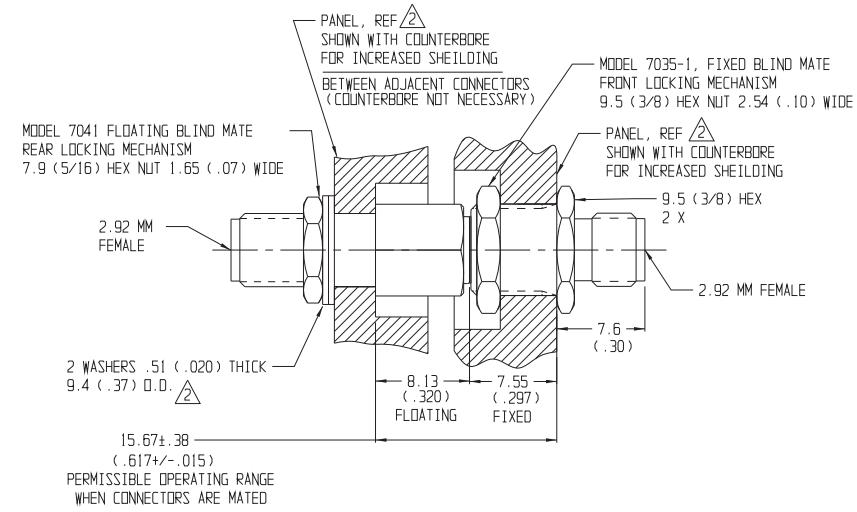
NOMINAL IMPEDANCE: 50 Ω nominal
FREQUENCY RANGE: dc to 18.0 GHz

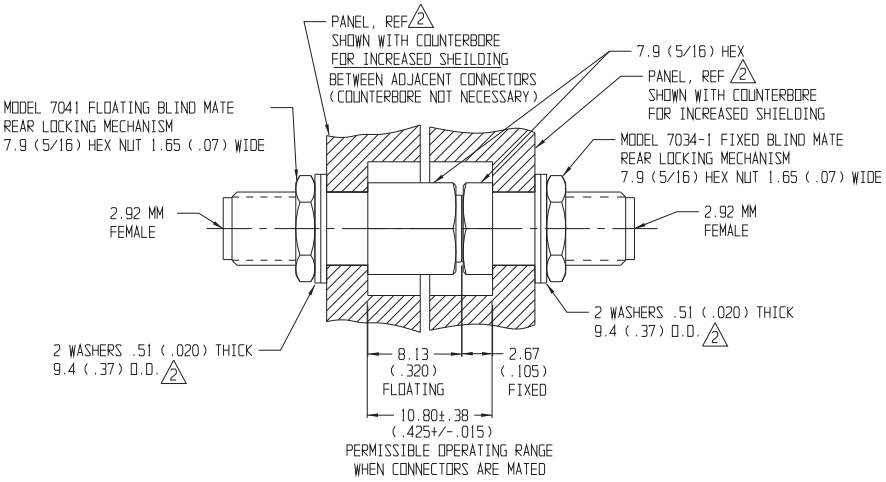
INSERTION LOSS (dB) & SWR:

Frequency (GHz)	Loss (maximum)	SWR (maximum)
dc - 6	0.40	1.20
6 - 18	0.60	1.40

INSERTION LOSS
REPEATABILITY: ±0.1 dB typical
MECHANICAL LIFE: 25,000 matings minimum
RADIAL OFFSET ALLOWED: ±0.02 inches per pair
TEMPERATURE RANGE: -50°C to +100°C
CONNECTORS: Stainless Steel 2.92mm connector with gold plated contacts - mate nondestructively with SMA connectors per MIL-C-39012, 3.5mm, SMK, and other 2.92mm connectors.
WEIGHT: 2 oz, (56.7 g) maximum

PHYSICAL DIMENSIONS:





NOTES:
1. All dimensions are given in mm (inches) and are nominal, unless otherwise specified.
2. Maximum panel thickness for Model 7041 is 4.9 (0.195). Panel flange thickness less than 4.2 (0.165). Installation requires appropriate washer.
3. * when mating surface have been maintained and kept clean.

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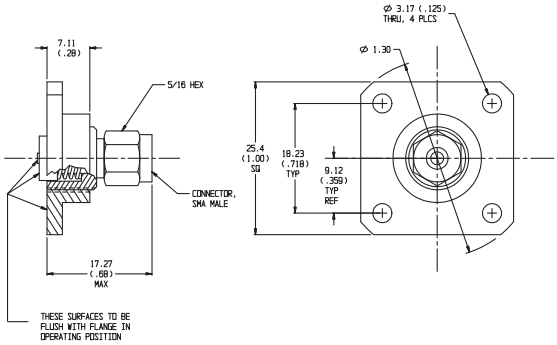
Custom Examples

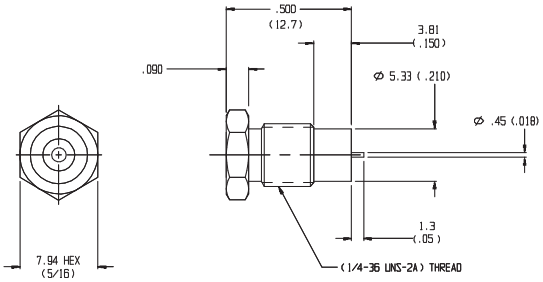
The following examples illustrate some typical Blind-mate designs that can be either modified or used as a basis for creating a specific blind-mate connector or system for your application:

Example 1:



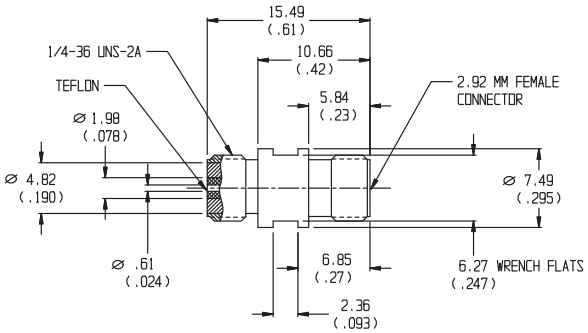
This example shows a blind-mate to SMA flange connector which includes a standard 4 hole mounting pattern and SMA connectors per MIL-C-39012 connectors. These connectors can be optimized to a specific frequency range and/or your defined specifications.

Example 2:



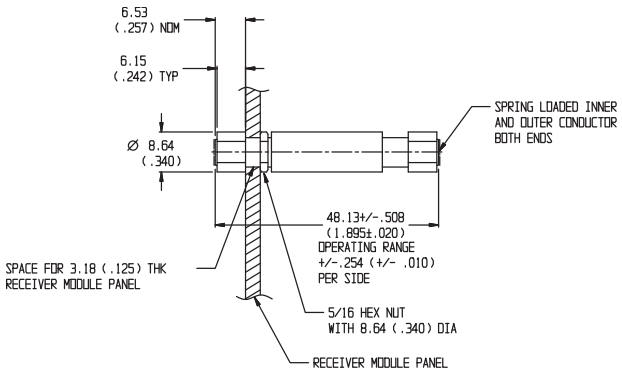
Example 2 illustrates a blind-mate to a microstrip launch design that features a non-piloting (fixed), spring loaded inner connector. Specifications include dc to 4 GHz frequency operation, maximum insertion loss of 0.5 dB and maximum SWR of 1.25.

Example 3:



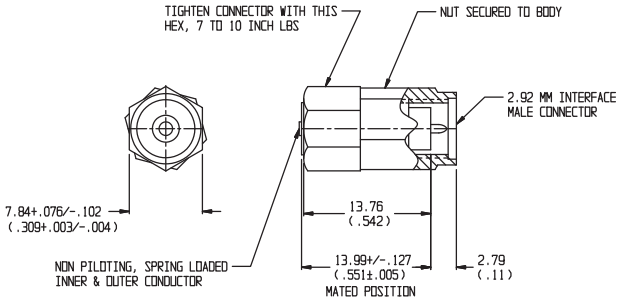
Example 3 illustrates a blind-mate to 2.92mm test probe design that features wrench flats, dc to 18 GHz frequency operation, maximum insertion loss of 6 dB and maximum SWR of 1.25. This was specifically designed to interface with standard SMA, 3.5mm, and 2.92mm Bulkhead connectors.

Example 4:



This example illustrates shows a 6 dB blind-mate attenuator design that consists of two floating receivers with a compression spring and spring loaded contacts (inner and outer conductors). Designs can also be supplied with stationary fixed surface connectors. Specifications for this unit include dc-32 GHz operation, 1.35 maximum SWR, and a radial alignment ±0.02 offset.

Example 5:



This example illustrates a blind-mate to 2.92mm connector design that features a non-piloting, spring loaded inner and outer connector. Specifications included dc to 40 GHz frequency operation, static pressure of 50 PSI, temperature range of -50°C to +125°C maximum insertion loss of 0.3 to 1.5 and maximum SWR of 1.30-1.70.

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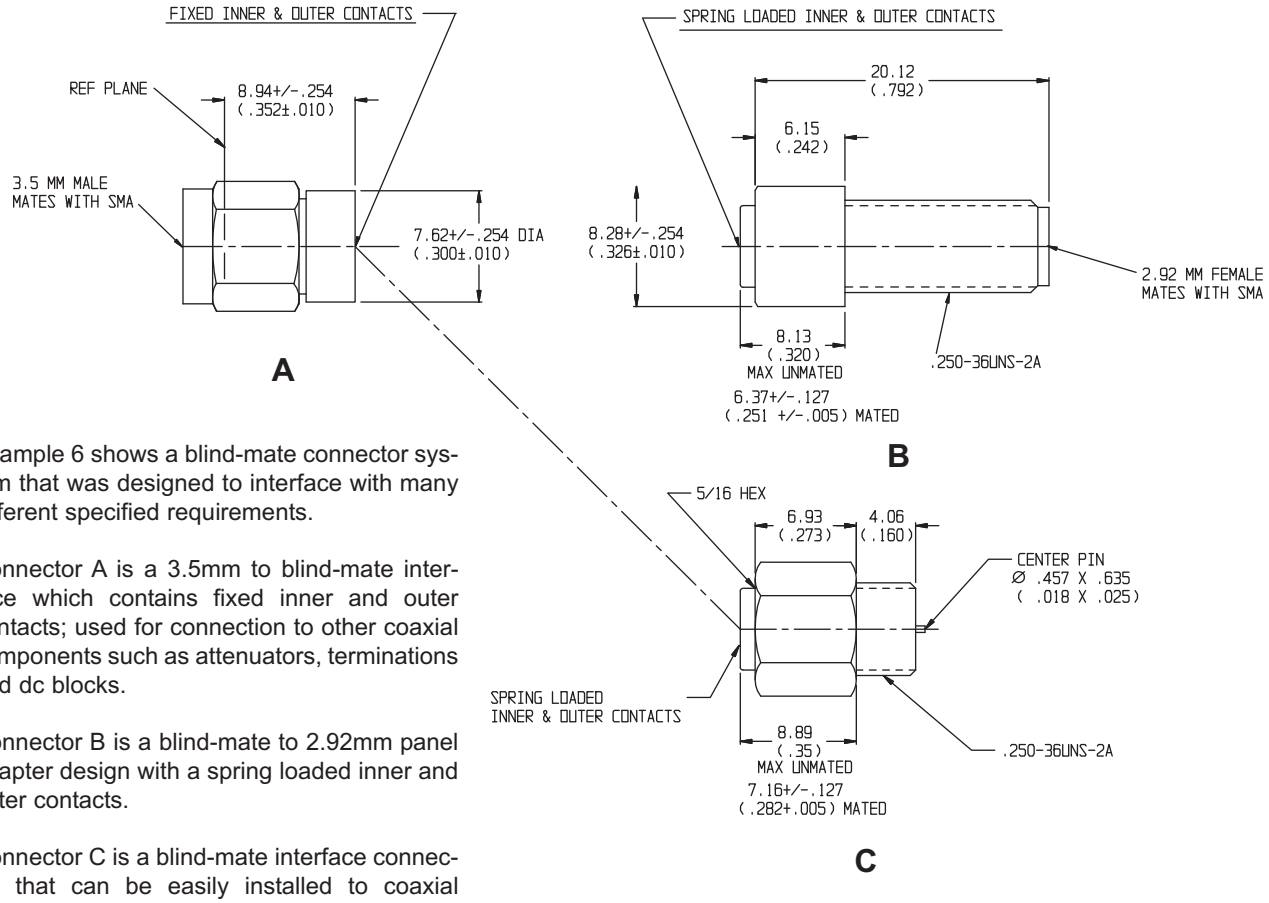
Example 6:



Example 6 shows a blind-mate connector system that was designed to interface with many different specified requirements.

Connector A is a 3.5mm to blind-mate interface which contains fixed inner and outer contacts; used for connection to other coaxial components such as attenuators, terminations and dc blocks.

Connector B is a blind-mate to 2.92mm panel adapter design with a spring loaded inner and outer contacts.

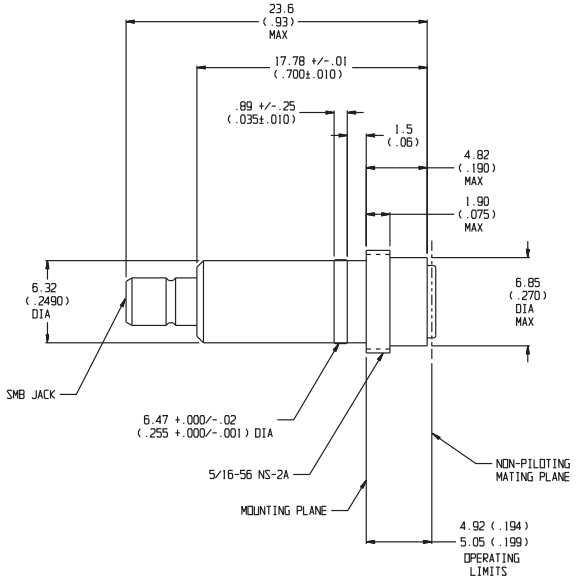
Connector C is a blind-mate interface connector that can be easily installed to coaxial cables or printed circuit board assemblies.

Example 7:

This example illustrates a low cost blind-mate to SMB configuration specifically designed and optimized for RF & wireless applications. These connectors offer not only all the features of the Planar Blind-mate interface but the SMB connector provides an additional quick disconnect for cable assemblies.

Specifications for this connector include dc to 2.0 GHz operation, 50 Ω nominal impedance, insertion loss of 0.35 dB, SWR of 1.15-1.30, radial/axial misalignment of ±0.020" OFFSET (blind-mate side)**, operating temperature of** +10°C to +40°C, dielectric withstanding voltage of 1000 Vac and a insulation resistance of **1000 MΩ nominal.**

These stainless steel connectors contain non-piloting contacts that provides long life (1,000,000 matings) and offers a repeatability of ±0.05 dB typical.



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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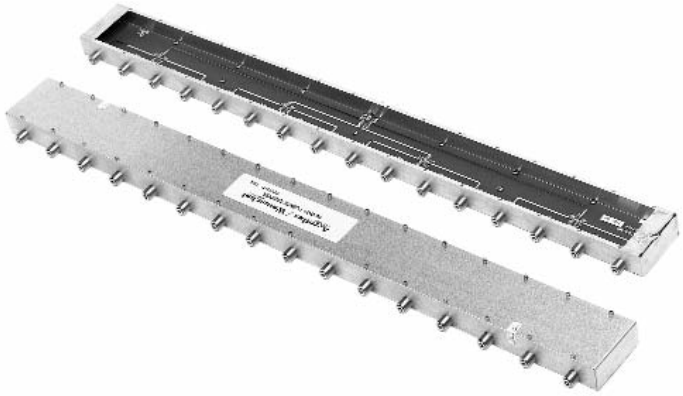
Example 8: 16 Way Power Divider - High Density Packaging Environment

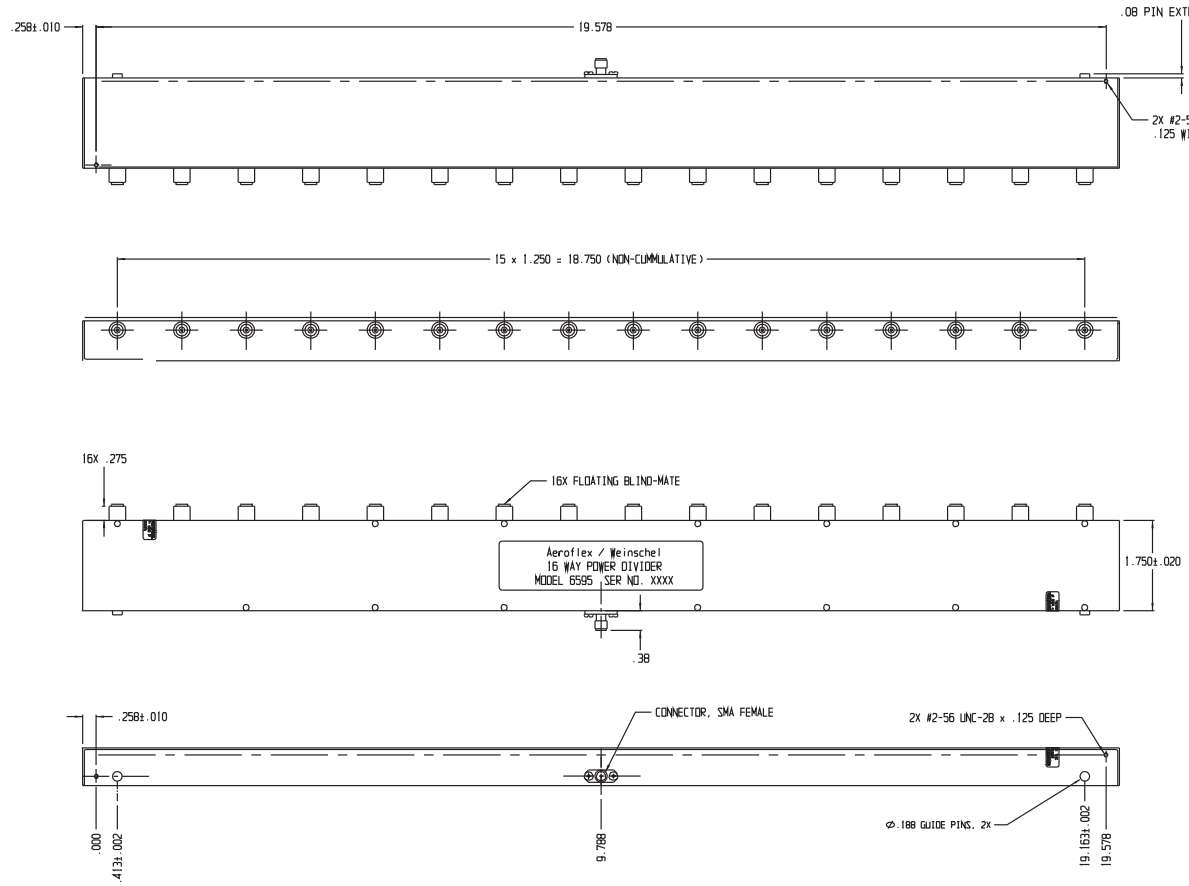
This example shows how a series of blind-mate connectors are used in a 16 Way Power Divider module that is used in a high density packaging environment.



Specifications

Frequency Range:	30 MHz - 3 GHz
Impedance:	50 ohms nominal
Isolation:	23.5 minimum
RF Input Power:	1 Watt maximum (any port)
Operating Temperature Range:	0 to 60 °C

PHYSICAL DIMENSIONS:



NOTES: All dimensions are given in inches and are nominal, unless otherwise specified.

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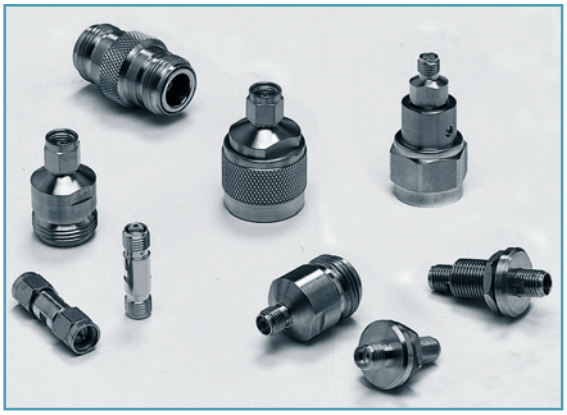
Coaxial Adapters

AEROFLEX
A passion for performance.



- High Repeatability & Low SWR
- Rugged Injection Molded Connectors.
- Bulkhead Mounting - Model 1568 conveniently mounts on any panel using a standard D-hole.
- In-Series & Between Series Configurations - Type N or SMA
- Precision Connectors & Rugged Construction

General Information

In this section of the catalog, each product is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the product(s) that fits your needs. The page number for each product data sheet is given in the quick reference guide.

The superior performance Aeroflex / Weinschel components enjoy is due to our connector design capabilities. Utilizing proprietary design techniques, we offer connectorized devices that are mechanically robust, stable over environmental extremes, and highly reliable. Aeroflex / Weinschel offers a comprehensive line of between-series adapters, blind-mate connectors, and our patented PLANAR CROWN® Connector System.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current products and stocking quantities.

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Precision Adapters...dc-26.5 GHz

MODEL NUMBER	CONNECTOR TYPE	FREQUENCY RANGE	SWR (MAXIMUM)	INSERTION LOSS	REPEATABILITY	Page No.	
☆ F1513 ☆ M1513	N female - N female N male - N male	dc - 18	1.10-1.15*	<0.25	0.020 dB	236	
☆ 1548-13 1548-14 1548-23 ☆ 1548-24	SMA female - N female SMA female - N male SMA male - N female SMA male - N male	dc - 18	1.10	0.43 (maximum) per mated pair	Type N: 0.006-0.010* SMA: 0.010-0.020*	238	
☆ 1568 ☆ 1568-1	SMA (female-female) bulkhead (add -1 to model number for stainless steel)	dc - 26.5	1.15-1.20*	<0.30 - <0.50*	0.010-0.020*	234	
☆ 1587 ☆ 1588 ☆ 1589	SMA female - SMA female SMA male - SMA female SMA male - SMA male	dc - 26.5	1.15-1.20*	<0.30 - <0.50*	0.010-0.020*	235	
☆ 7002-13 ☆ 7002-14 ☆ 7002-23 ☆ 7002-24	SMA female to N female SMA female to N male SMA male to N female SMA male to N male	dc - 18	1.12	<0.40 - <0.50*	0.010-0.020*	237	

☆ *EXPRESS* Shipment available via **www.argosysales.com** or 800-542-4457.
Note: Other models may also be available from Express delivery.

* VARIES WITH FREQUENCY

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AEROFLEX WEINSCHEL

Frequently Asked Questions about Adapters Precision Connector Systems...

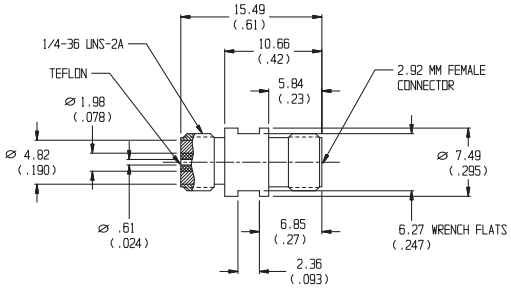
What types of adapters and/or connectors does Aeroflex / Weinschel offer?

Aeroflex / Weinschel offers a wide variety of precision SMA, 2.92mm, Type N, 3.5mm, 2.4mm and male, female, and sexless combinations of adapters from which to choose. Also, Aeroflex / Weinschel manufactures a wide range of Blind-mate Connectors and our own PLANAR CROWN® Connector System. All Aeroflex / Weinschel components are designed and manufactured to obtain low SWR and excellent repeatability over the longest possible operational life. Other features of Aeroflex / Weinschel Adapters and Connectors include:

1. High Repeatability.
2. Quality Connectors - SMA, Type N, 3.5mm, 2.92mm, and 2.4mm.
3. Bulkhead Mounting Available
4. Broad Frequency Range - dc to 40 GHz.

What are Blind-mate Connectors and where would I use them?

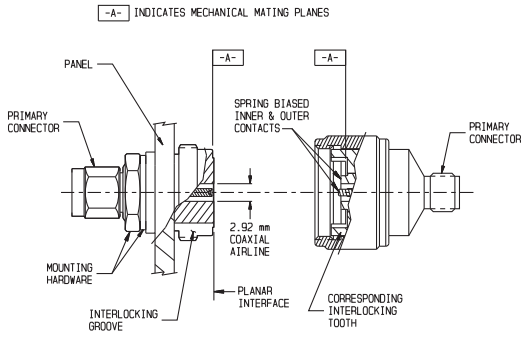
Aeroflex / Weinschel Blind-mate connector series provides threadless connector mating which is useful when mating an array of connectors on one RF module to another array within seconds. Each connector pair will tolerate a radial and axial offset of 0.02 inch and still meet all of its electrical specifications. These connectors simplify RF connections in the most inaccessible regions and high package density systems where conventional threaded connector mating is extremely difficult.



What is difference between Aeroflex / Weinschel precision SMA/ 2.92mm connectors and other SMA connectors?

Typical commercial SMA connectors may have a useful SWR to 18 or 26 GHz; however, most absorb energy between 22 and 25 GHz due to TEM mode conversion. A mated pair could have between 0.5 dB to 2.0 dB insertion loss. A mated pair of Aeroflex / Weinschel Precision Miniature connectors (2.92mm), which mate with SMA type connectors, have a VSWR of less than 1.25 and an insertion loss of less than 0.5 dB to 26 GHz. The new 2.92mm expands this range to 40 GHz.

What is the advantages of using Aeroflex / Weinschel PLANAR CROWN® connectors?.



The Aeroflex / Weinschel PLANAR CROWN® Universal Connector System incorporates design and application features that eliminate the mechanical, electrical and economical drawbacks of standard bulkhead connectors, connector savers, cable connectors and adapters. In one standard design, it has resolved connector related problems faced by users and manufacturers of instruments, cables and components, how to quickly and inexpensive to change connector series or replace damaged front panel connectors on instruments. This system features an operating frequency range of dc to 40 GHz; ability to maintain calibration integrity when changing connector types; and compatibility with all Type N, TNC, GPC-7, SMA, 2.92mm, and 2.4mm connectors used throughout the microwave industry.

What is a Ruggedized SMA Connector?

All Aeroflex / Weinschel SMA connectors labeled as ruggedized have a dielectric insulator at the interface of the connector to provide additional support for the center conductor during connects and disconnects and to keep out foreign material. This provides an important benefit--improved axial alignment of the center contact. This substantially reduces finger breakage of the female contact. Longevity of the Aeroflex / Weinschel SMA connector is enhanced because of the increased shoulder-wall thickness of the male connector shell. Typically, a standard SMA male connector shell has a 0.0065 inch wide shoulder. Compare that to 0.018 inch for the Aeroflex / Weinschel SMA series. The shoulder of most SMA male connectors gradually collapses from use. This causes the center contact to exceed the maximum height tolerance and eventually destroys the mating female contact. This will not happen with a Aeroflex / Weinschel SMA connector.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1568 & 1568-1 dc to 26.5 GHz
Precision Coaxial Panel Adapters

Ruggedized SMA Connectors (female to female)

☑ RoHS

Features

- **High Repeatability.**
- **Rugged Injection Molded Connectors.**
- **Bulkhead Mounting** - Conveniently mounts on any panel using a D-hole shown below. Extra heavy construction for long life even with mistreatment makes this adapter suitable for instrument and subsystem front panel applications.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR
dc - 18	1.15
18 - 26.5	1.20

INSERTION LOSS & REPEATABILITY (dB):

Frequency (GHz)	Ins Loss	Repeatability
dc - 12.4	< 0.30	0.01
12.4 - 18	< 0.40	0.02
18.0 to 26.5	< 0.50	0.02

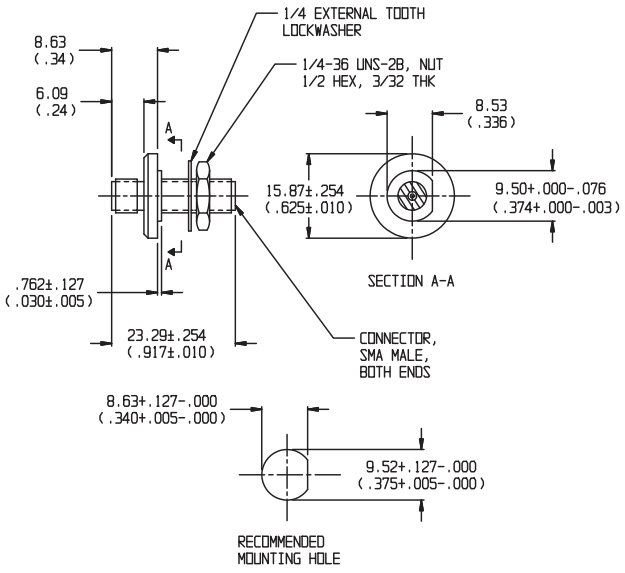
TEMPERATURE RANGE: -55°C to +100°C

CONSTRUCTION: Inner and outer conductors: heat treated beryllium copper, gold plated. Mounting hardware provided (Hex nut and lockwasher) Add -1 to model number for the optional stainless steel body.

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

WEIGHT: 56.7 g (2 oz) maximum

PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

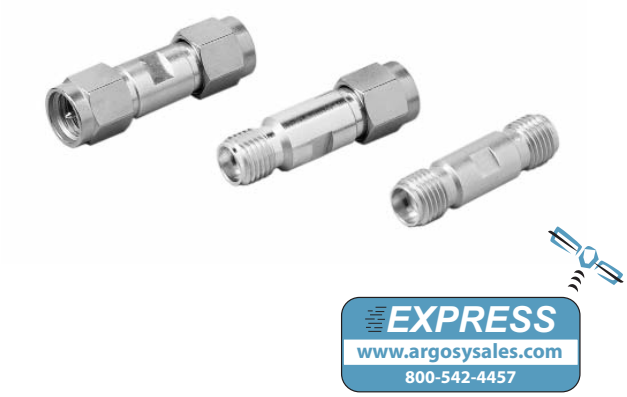
AEROFLEX WEINSCHEL

Models 1587, 1588 & 1589 Precision Coaxial Adapters

dc to 26.5 GHz

Ruggedized SMA to SMA Connectors

RoHS



Features

- **High Repeatability.**
- **Rugged Injection Molded Connectors.**
- **Designed for Measurement System Use** - Auxiliary wrench flats aid in torquing connections without "chain reaction" loosing of multiple component hookups.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 26.5 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 18	1.15
18 - 26.5	1.20

INSERTION LOSS & REPEATABILITY (dB):		
Frequency (GHz)	Ins Loss	Repeatability
dc - 12.4	< 0.30	0.01
12.4 - 18	< 0.40	0.02
18 to 26.5	< 0.50	0.02

TEMPERATURE RANGE: -55°C to +100°C

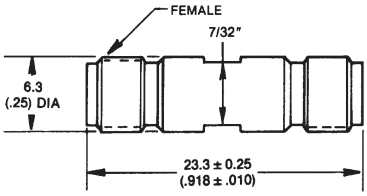
CONSTRUCTION: Inner and outer conductors: heat treated beryllium copper, gold plated.

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

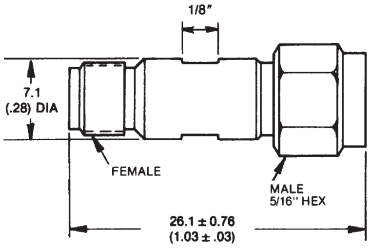
WEIGHT: 56.7 g (2 oz) maximum

PHYSICAL DIMENSIONS:

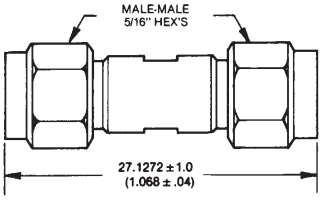
MODEL 1587:



MODEL 1588:



MODEL 1589:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

Model 1513
Precision Coaxial Adapter

dc to 18.0 GHz

Type N to Type N

Features

- **Low SWR.**
- **High Repeatability.**
- **Stainless Steel Construction.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
dc - 10	1.10
10 - 18	1.15

INSERTION LOSS & REPEATABILITY (dB):		
Frequency (GHz)	Maximum Ins Loss	Repeatability (Typical)
dc - 18	< 0.25	0.02

TEMPERATURE RANGE: -55°C to +85°C

CONSTRUCTION: Stainless Steel body, beryllium copper, gold plated contacts.

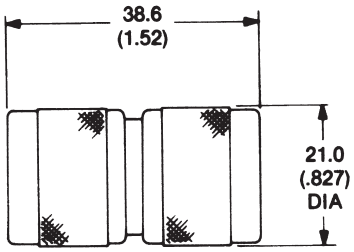
CONNECTORS: Type N per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Select model number as follows:

Model M1513: male to male
Model F1513: female to female

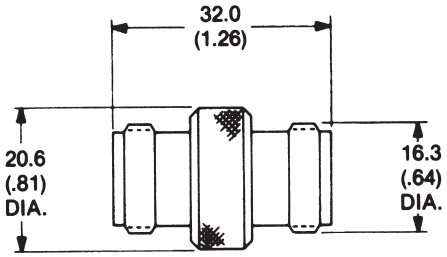
WEIGHT: Model M1513: 50 g (1.7 oz) maximum
Model F1513: 40 g (1.4 oz) maximum

PHYSICAL DIMENSIONS:

MODEL M1513:



MODEL F1513:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

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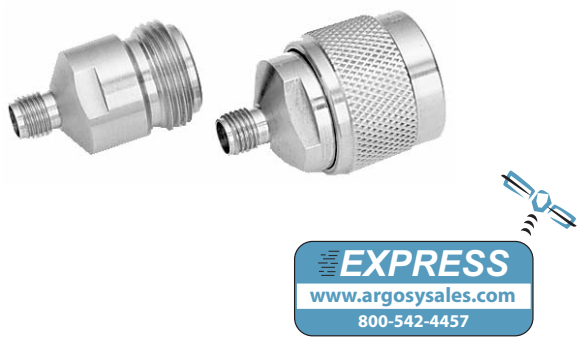
Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 7002 dc to 18.0 GHz
High Performance Coaxial Adapter

Ruggedized SMA to Type N Connectors

RoHS



Features

- **High Repeatability**
- **Rugged Injection Molded Connectors**
- **Stainless Steel Construction**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR (per adapter)
dc - 18	1.12

INSERTION LOSS & REPEATABILITY (dB):

Frequency (GHz)	Ins Loss*	Repeatability*
dc - 12.4	< 0.40	0.01
12.4 - 18	< 0.50	0.02

*Specification based on mated pair terminated in 50 Ω.

ELECTRICAL LENGTH:

Models 7002-14 & 7002-24: 33mm
Models 7002-13 & 7002-23: 20mm

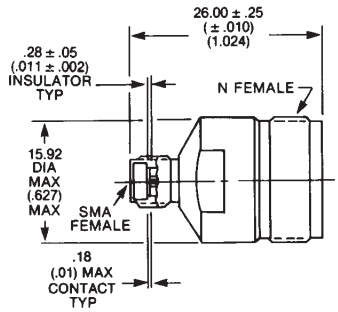
CONSTRUCTION: Gold plated beryllium copper center conductors, injection molded into stainless steel outer bodies.

CONNECTORS: Type N and SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

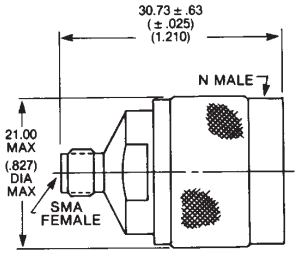
WEIGHT: 30 g (1.1 oz) maximum

PHYSICAL DIMENSIONS:

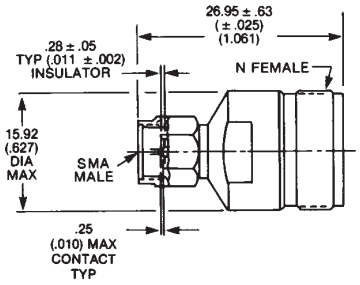
MODEL 7002-13:



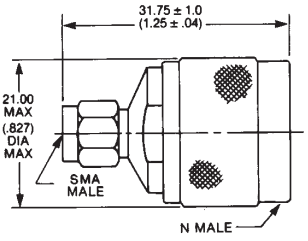
MODEL 7002-14:



MODEL 7002-23:



MODEL 7002-24:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 1548
Precision Coaxial Adapter

dc to 18.0 GHz

SMA to Type N Connectors

☑ RoHS

Features

- **High Repeatability**
- **Rugged Construction**
- **Stainless Steel Construction**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: dc to 18.0 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR*
dc - 18	1.10

INSERTION LOSS (dB):

Frequency (GHz)	Loss (maximum)*
dc - 18	<0.43

REPEATABILITY (dB):

Frequency (GHz)	Type N	SMA
dc - 12.4	< 0.006	0.01
12.4 - 18	< 0.010	0.02

* Specification based on mated pair terminated in 50 Ω.

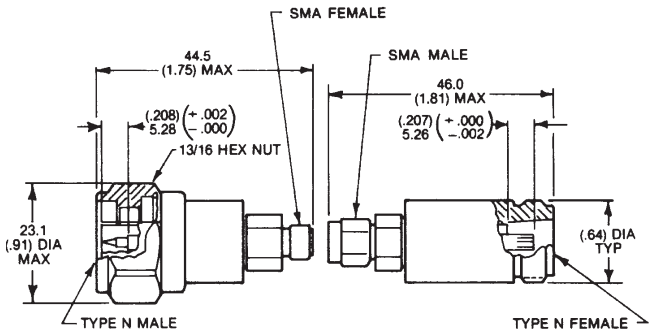
TEMPERATURE RANGE: -55°C to + 85°C

CONSTRUCTION: Stainless steel body and coupling nuts. Gold plated beryllium copper center conductors and SMA bodies, injection molded insulators. Coupling Torque: 14 ± 1 inch pounds for Type N and 8±0.5 inch pounds for SMA.

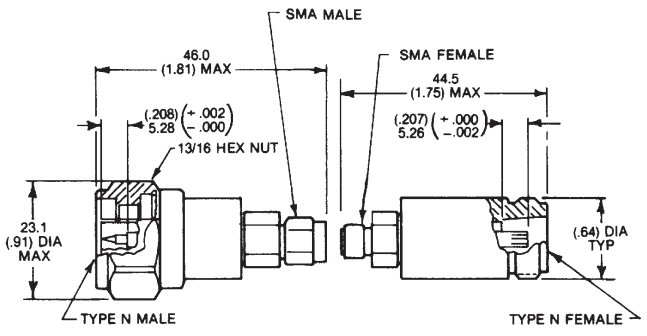
CONNECTORS: Type N and SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors.

WEIGHT: 56.7 g (2 oz) maximum connectors only.

PHYSICAL DIMENSIONS:



MODEL 1548-14 **MODEL 1548-23**



MODEL 1548-24 **MODEL 1548-13**

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

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Revision Date: 3/10/09

DC Blocks

AEROFLEX
A passion for performance.

- Inside & outside versions available.
- ***Express*** shipment available on select models.
- Low SWR - Maximum SWR remains low through full frequency and power range.
- Rugged Construction - Aeroflex / Weinschel semi-precision Type N & SMA stainless steel connectors.
- Broadband Designs to 26 GHz.
- Planar Bulkhead Models with inside DC Block.

General Information

In this section of the catalog, each product is outlined utilizing individual data sheets containing product features, specifications, and outline drawings. These data sheets are preceded by a quick reference guide to help you select the product(s) that fits your needs. The page number for each product data sheet is given in the quick reference guide.

NOTE: ***EXPRESS*** Shipment available via **www.argosysales.com** or 800-542-4457. Check with distributor for current products and stocking quantities.

dc Blocks...dc to 18.0 GHz

Model Number	Type	Connector Type	Frequency Range (GHz)	Insertion Loss Maximum (dB)	SWR (Maximum)	Page No.	
☆ 7003	Inside	N	9 kHz to 18.6	0.9	1.35-1.50*	240	
7006 ☆ 7006-1	Inside	SMA	9 kHz to 26.5 9 kHz to 20	0.8 0.8	1.35-1.70* 1.30-1.50*	241 242	
7010-1	Inside	SMA (f) - Planar Interface	dc - 26.5	0.6-0.9	1.20-1.25	243	
7010-2	Inside	SMA (m) - Planar Interface	dc - 26.5	0.6-0.9	1.20-1.25	243	
☆ 7012	Inside/ Outside	SMA	0.5 to 8.6	0.4	1.25	244	

* VARIES WITH FREQUENCY.

☆ *EXPRESS* Shipment available via **www.argosysales.com** or 800-542-4457.
Note: Other models may also be available from Express delivery.

AEROFLEX
WEINSCHEL

Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 7003
Inside DC Block

9 kHz to 18.0 GHz

Type N Connectors

RoHS

Features

Aeroflex / Weinschel Inside dc Block contains capacitance in-series with the center conductor to prevent the flow of dc current, while permitting RF power to flow without interruption.

- **Low SWR -** Maximum SWR remains low through full frequency and power range.
- **Rugged Construction -** Aeroflex / Weinschel semi-precision Type N stainless steel connectors. Molded captive inner contact/bead assembly provides controlled and stable interface dimensions.
- **Model 7003 useable to 22 GHz.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 9 kHz to 18.6 GHz

MAXIMUM SWR:

Frequency (GHz)	SWR*
9 - 10 kHz	1.50
11 - 20 kHz	1.35
20 kHz - 18	1.35

* Source & load SWR of test system is <1.2.

INSERTION LOSS: 0.9 dB maximum

VOLTAGE RATING: +50 Vdc maximum

POWER RATING: 2 Watts (average), 100 Watts (peak)

TEMPERATURE RANGE: -20 °C to +80 °C (operating)
-20 °C to +100 °C (storage)

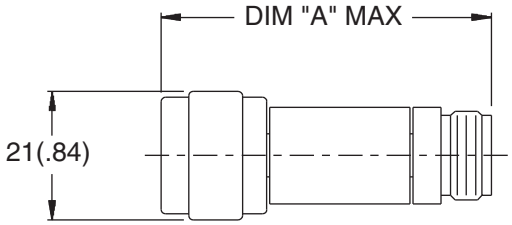
TEST DATA: Test data is available at additional cost.

CONNECTORS: Type N connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Standard unit has one male and one female connector. Add Prefix M for double male and F for double female connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts

WEIGHT: Net: 67 g (2.4 oz)

PHYSICAL DIMENSIONS:

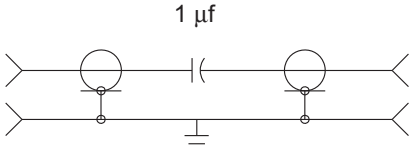


Model #	DIM A	Connector Type
7003	54.61 (2.15)	male-female
F7003	50.80 (2.00)	female-female
M7003	58.67 (2.31)	male-male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

SCHEMATIC DIAGRAM:



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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 7006 Inside DC Block

9 kHz to 26.5 GHz

Rugged SMA Connectors

Features

Aeroflex / Weinschel Inside dc Block contains capacitance in-series with the center conductor to prevent the flow of dc current, while permitting RF power to flow without interruption.

- **Low SWR -** Maximum SWR remains low through full frequency and power range.
- **Rugged Construction -** Aeroflex / Weinschel semi-precision Type N and SMA stainless steel connectors. Molded captive inner contact/bead assembly provides controlled and stable interface dimensions.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 9 kHz to 26.5 GHz

MAXIMUM SWR:

Frequency (GHz)	7006*
9 - 10 kHz	1.45
11 - 20 kHz	1.35
20 kHz - 18	1.35
18 - 26.5	1.70

* Source & load SWR of test system is <1.2.

INSERTION LOSS: 0.8 dB maximum*

VOLTAGE RATING: +50 Vdc maximum

POWER RATING: 2 Watts (average), 100 Watts (peak)

TEMPERATURE RANGE: -20 °C to +80 °C (operating)
-20 °C to +100 °C (storage)

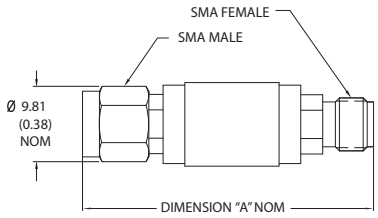
TEST DATA: Test data is available at additional cost.

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Standard unit has one male and one female connector. Add Prefix M for double male and F for double female connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts

WEIGHT: Model 7003: Net: 67 g (2.4 oz)
Model 7006, 7006-1: Net:: 4 g (0.14 oz)

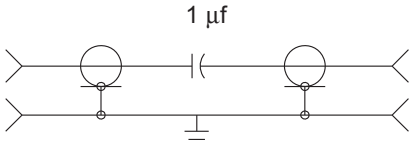
PHYSICAL DIMENSIONS:



Model #	DIM A	Connector Type
7006	36.32 (1.43)	male-female
F7006	33.53 (1.32)	female-female
M7006	35.05 (1.38)	male-male

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

SCHEMATIC DIAGRAM:



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Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 7006-1
Inside DC Block

9 kHz to 20.0 GHz

Rugged SMA Connectors

RoHS

Features

Aeroflex / Weinschel Inside dc Block contains capacitance in-series with the center conductor to prevent the flow of dc current, while permitting RF power to flow without interruption.

- **Low SWR -** Maximum SWR remains low through full frequency and power range.
- **Rugged Construction -** Aeroflex / Weinschel semi-precision SMA stainless steel connectors. Molded captive inner contact/bead assembly provides controlled and stable interface dimensions.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 9 kHz to 20 GHz

MAXIMUM SWR:

Frequency (GHz)	7006-1
9 - 10 kHz	1.50
11 - 20 kHz	1.50
20 kHz - 18	1.30
18 - 20.0	1.20

* Source & load SWR of test system is <1.2.

INSERTION LOSS: 0.8 dB maximum*

VOLTAGE RATING: +50 Vdc maximum

POWER RATING: 2 Watts (average), 100 Watts (peak)

TEMPERATURE RANGE: -20 °C to +80 °C (operating)
-20 °C to +100 °C (storage)

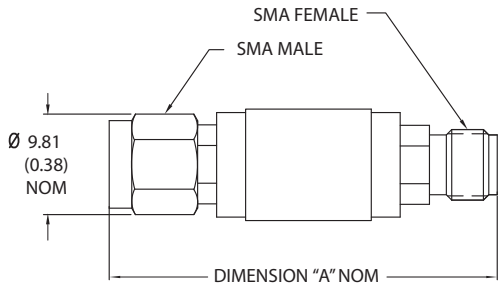
TEST DATA: Test data is available at additional cost.

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Standard unit has one male and one female connector. Add Prefix M for double male and F for double female connectors.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts

WEIGHT: Net:: 4 g (0.14 oz)

PHYSICAL DIMENSIONS:

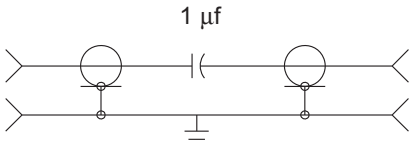


Model #	DIM A	Connector Type
7006-1	37.34 (1.47)	male-female
F7006-1	34.54 (1.36)	female-female
M7006-1	36.07 (1.42)	male-male

NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

SCHEMATIC DIAGRAM:



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Revision Date: 3/10/09

Model 7010 — 10 MHz to 26.5 GHz

PLANAR BULKHEAD with DC Block

2.92mm Connectors to Planar Interface

Features

- **Usable to 40 GHz.**
- **Eliminates the requirement for a separate dc Block to protect instrument front ends.**
- **Offers the user multiple connector options and quick replacement of damaged connectors.**
- **Provides all the features and versatility of the PLANAR CROWN® Connector System.**

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 10 MHz to 26.5 GHz

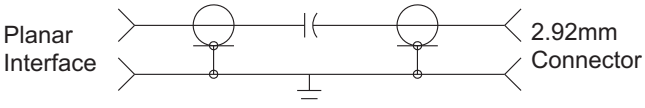
MAXIMUM SWR:	
Frequency (GHz)	SWR
10 MHz - 18	1.20
18 - 26.5	1.25

INSERTION LOSS & REPEATABILITY (dB):	
Frequency (GHz)	Loss
10 MHz - 18	0.6
18 - 26.5	0.9

Note: SWR and Insertion Loss specifications are based on a mated pair of Models 7010-X and 7005A-XX PLANAR CROWN® connector types.

DC BLOCK CAPACITOR RATING: 1,700 pf minimum; + 50 Vdc working voltage

SCHEMATIC DIAGRAM:



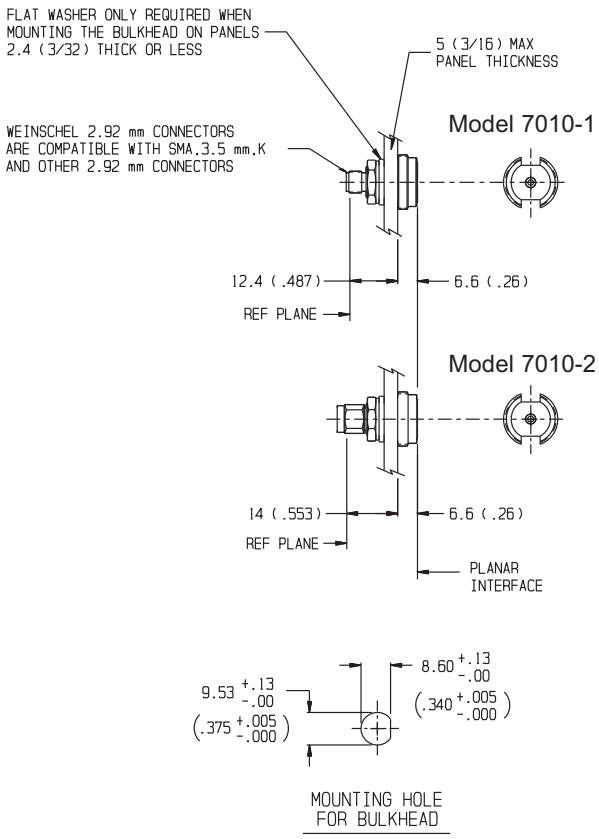
TEMPERATURE RANGE: 0 °C to +60 °C (operating)-40 °C to +70 °C (non-operating)

CONNECTORS: Primary connector is 2.92 mm female or male connector, with a PLANAR INTERFACE on opposite end. Contact Pin Recession of 2.92mm is 0 to 0.076 mm (0 to 0.003 in) for reference plane. Add -1 for female 2.92 mm connector or -2 for 2.92mm male connector

CONSTRUCTION: Passivated Stainless steel body and connectors; gold plated beryllium copper contacts

WEIGHT: Net: 20 g (0.7 oz)

PHYSICAL DIMENSIONS:



NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise specified.

5305 Spectrum Drive, Frederick, MD 21703-7362 • TEL: 301-846-9222, 800-638-2048 • Fax: 301-846-9116
web: www.aeroflex.com/weinschel • email: sales@aeroflex-weinschel.com

Revision Date: 3/10/09

AEROFLEX WEINSCHEL

Model 7012
Inside/Outside DC Block

500 MHz to 8.6 GHz

Rugged SMA Connectors

RoHS

Features

Aeroflex / Weinschel Inside/Outside dc Block contains capacitance in-series with the center conductor to prevent the flow of dc current, while permitting RF power to flow without interruption.

- **Low SWR -** Maximum SWR remains low through full frequency and power range.
- **Rugged Construction -** Aeroflex / Weinschel semi-precision SMA stainless steel connectors.

Specifications

NOMINAL IMPEDANCE: 50 Ω

FREQUENCY RANGE: 500 MHz to 8.6 GHz

MAXIMUM SWR:	
Frequency (GHz)	SWR
500 MHz - 8.6 GHz	1.25

INSERTION LOSS (dB maximum):	
Frequency (GHz)	Loss
500 MHz - 8.6 GHz	0.4

BREAKDOWN VOLTAGE: + 200 Vdc between any of the four connectors

DC RESISTANCE: 20 MΩ minimum between any four connectors

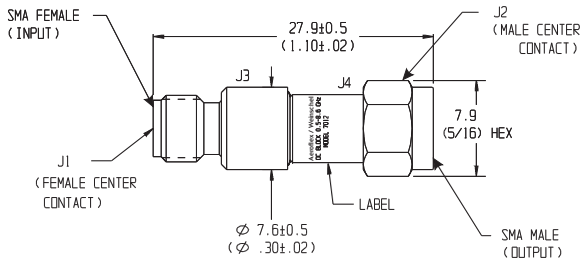
POWER RATING: 10 Watts peak or CW

CONNECTORS: SMA connectors per MIL-STD-348 interface dimensions - mate nondestructively with MIL-C-39012 connectors. Standard unit has one male and one female connector.

CONSTRUCTION: Stainless steel body and connectors; gold plated beryllium copper contacts

WEIGHT: Net: 4.6 g (0.16 oz)

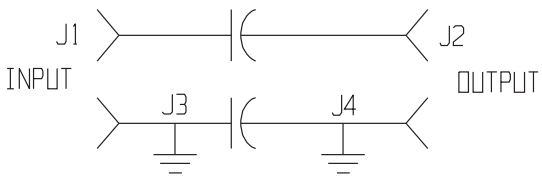
PHYSICAL DIMENSIONS:



NOTE:

1. All dimensions are given in mm (inches) and are maximum, unless otherwise specified.
2. Unit available with RoHS compliant materials, specify when ordering.

SCHEMATIC DIAGRAM:



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