

VARIABLE ATTENUATORS

DC – 40.0 GHz

0.3—5 WATTS

Continuously Variable Attenuators

Model Number	Frequency Range (GHz)	Average Power (W)	Peak Power (kW)	Residual Insertion Loss (dB)	Attenuation Range (dB)	Connectors and Mounting Notes	Page No.
VA-02-30	DC - 2	5	0.5	3	30	N, SMA	134
VA-02-60	DC - 2	5	0.5	5	60	N, SMA	134
VA-02-90	DC - 2	5	0.5	5	90	N, SMA	134
VA-02-100	DC - 2	5	0.5	5	100	N, SMA	134
VA-02-115	DC - 2	5	0.5	5	115	N, SMA	134
VA-04-30	DC - 4	5	0.5	3	30	N, SMA	134
VA-04-60	DC - 4	5	0.5	5	60	N, SMA	134
VA-04-90	DC - 4	5	0.5	5	90	N, SMA	134
WA942-02-15	DC - 1	1	0.5	2	15	SMA	135
953-3	1 - 11	1	1	0.5 - 1	3	N, SMA	136
953-10	2.5 - 11	1	1	0.5 - 1	10	N, SMA	136
953-20	4 - 11	1	1	0.5 - 1	20	N, SMA	136
973-10	1.3 - 11	1	1	0.5 - 1	10	N, SMA	136
973-20	2.5 - 11	1	1	0.5 - 1	20	N, SMA	136
973-40	4 - 11	1	1	0.5 - 1	40	N, SMA	136
953B-3	1 - 18	1	1	0.5 - 1	3	N, SMA	136
953B-10	2.5 - 18	1	1	0.5 - 1	10	N, SMA	136
953B-20	4 - 18	1	1	0.5 - 1	20	N, SMA	136
953K-3	1 - 40	0.5	0.1	0.5 - 1	3	2.92 mm	137
953K-10	3 - 40	0.5	0.1	0.5 - 1	10	2.92 mm	137
953K-20	4 - 40	0.5	0.1	0.5 - 1	20	2.92 mm	137

Programmable Step Attenuators

Model Number	Frequency Range (GHz)	Average Power (W)	Peak Power (dBm)	Attenuation Range (dB)	Connectors and Mounting Notes	Page No.
DA6-30	DC - 6	0.3	+25	30	SMA	138
DA6-60	DC - 6	0.3	+25	60	SMA	138
DA6-90	DC - 6	0.3	+25	90	SMA	138
DA13-30	DC - 13	0.3	+25	30	SMA	139
DA13-60	DC - 13	0.3	+25	60	SMA	139
DA13-90	DC - 13	0.3	+25	90	SMA	139

* Other configurations are available

Custom solutions at “off-the-shelf” prices



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TEL: 877.948.8342 / 301.963.4630 ♦ Fax: 301.963.8640

WEB: <http://www.WeinschelAssociates.com>

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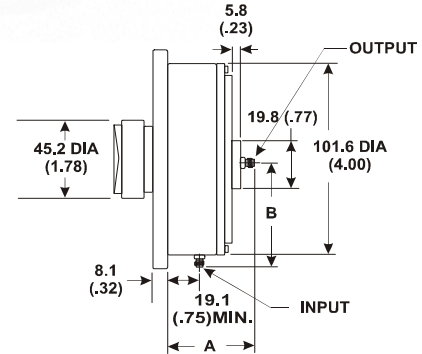
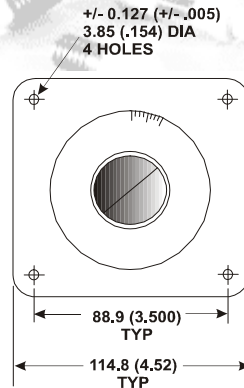
Specification
Subject to change
without notice

VARIABLE ATTENUATOR

MODEL VA-02 & VA-04

DC – 2.0 GHz VA-02
DC – 4.0 GHz VA-04

5 WATTS



Features

Wide Attenuation Range: Variable Attenuation ranges up to 90 dB on 4 GHz Models and 115 dB on 2 GHz Models.

Low Residual Insertion Loss: 3 dB nominal on 30 dB Model and 5 dB nominal on wider range Models

Rugged Construction: Designed and tested to meet the environmental requirements of MIL-DTL-24215.

Long Life: 10,000 cycles standard, 50,000 optional.

Specifications

Nominal Impedance: 50 ohms

Frequency Range: VA-02 DC - 2.0 GHz
VA-04 DC - 4.0 GHz

Residual Insertion Loss: 5 dB, nominal
(3 dB, nominal on 30 dB version)

Attenuation Range:

VA-02 30, 60, 90, 100, or 115 dB
VA-04 30, 60, or 90 dB

VSWR:

FREQ RANGE (GHz)	VSWR, Max
DC - 1.0	1.50
1.0 - 2.0	1.60
2.0 - 3.0	1.70
3.0 - 4.0	1.80

Accuracy:

± 0.25 dB or 0.4% at midband

Dial Calibration:

1 dB increments at midband

Resolution:

VA-02-30	3 to 33 dB	~120°
VA-02-60	5 to 65 dB	~180°
VA-02-100	5 to 105 dB	~270°
VA-02-115	5 to 120 dB	~285°
VA-04-30	3 to 33 dB	~120°
VA-04-60	5 to 65 dB	~180°
VA-04-90	5 to 95 dB	~240°

Power Rating: 5 watts average, 0.5 kW peak, to 40°C ambient temperature, de-rated linearly to 0 watts at 85°C.

Power Coefficient: <0.005 dB/dB/Watt

Phase Shift: 1° / dB x f (GHz) maximum

Temperature Range:

Operating: 0°C to +85°C
Non-Operating: -55°C to +125°C

Temperature Coefficient: <0.001 dB/dB/°C

Connectors: Type N and SMA connectors per MIL-STD-348A, interface dimensions per MIL-PRF-39012.

Connector Option	DIM "A" mm (in.)	DIM "B" mm (in.)
-34	66.0 (2.6)	68.1 (2.68)
-44	66.0 (2.6)	71.9 (2.83)
-33	61.0 (2.4)	68.1 (2.68)
-12	55.6 (2.19)	58.2 (2.29)
-22	55.6 (2.19)	61.5 (2.42)
-11	52.3 (2.06)	58.2 (2.29)



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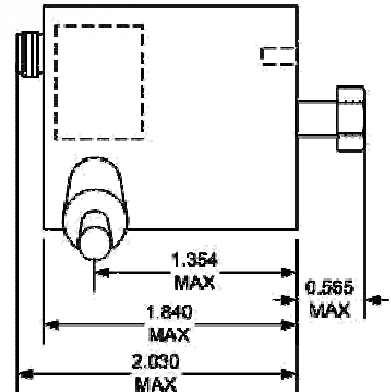
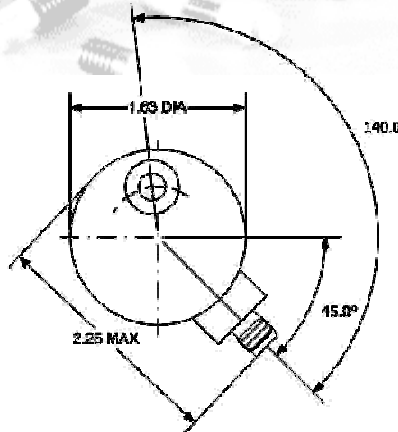
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Specification
Subject to change
without notice

DC – 1.0 GHz

1 WATT



Features

Attenuation Range: 15 dB

Low Residual Insertion Loss: <0.5 dB nominal

Rugged Construction: Designed to meet the environmental requirements of MIL-DTL-24215. Tested for Shipboard environments.

Connectors: SMA Connectors per MIL-PRF-39012 and MIL-STD-348

Excellent Reset-ability: 10:1 Turns Ratio

Panel Mount Configuration

Specifications

Nominal Impedance: 50 ohms

Frequency Range: DC - 1.0 GHz

Attenuation Range: 0 to 15 dB

Insertion Loss: 0.5 dB, nominal

VSWR: 1.5:1, max

Power Rating: 1 watts average, 0.5 kW pk, to 25°C ambient temperature, de-rated linearly to 0.5 watts at 85°C.

Power Coefficient: 0.005 dB/dB/W, max

Temperature:
 Operating: 0°C to +85°C
 Non-Operating: -55°C to +125°C

Temperature Coefficient: 0.001 dB/dB/° C, max

Phase Shift with Change in Attenuation:
 1° / dB x f (GHz) maximum

Connectors: SMA Female connectors per MIL-STD-348A, interface dimensions mate nondestructively with MIL-PRF-39012.

Construction: Aluminum body, stainless steel connectors, gold-plated beryllium copper contacts.

Weight: 0.23 kg (0.5 lb), max

Note: Dimensions are given in inches, unless otherwise specified.



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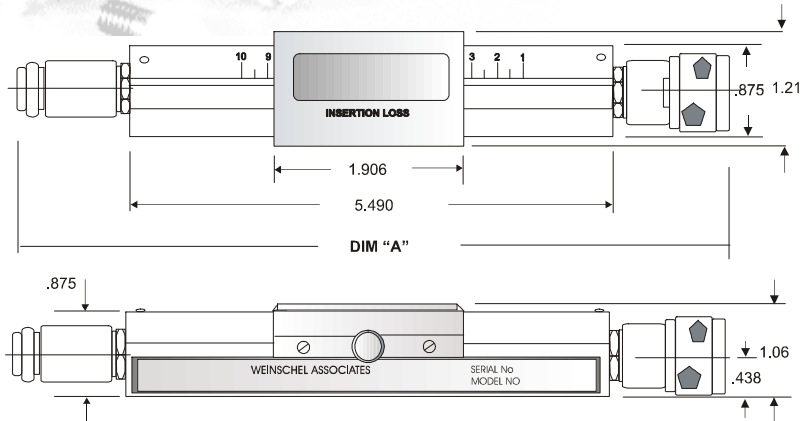
Continuously Variable Attenuator

Model 953
Model 953B
Model 973
1 WATT

DC – 18.0 GHz



953B shown on top



Specifications

Nominal Impedance: 50 ohms

Connectors: 953 (N, SMA), 953B (N, SMA), 973 (N, SMA) Type N/SMA Stainless Steel, M/F per MIL-STD-348A Interface dimensions mate non-destructively with MIL-PRF-39012 connectors.

Frequency Range:

FREQUENCY GHz				
Model	3dB	10dB	20dB	40dB
953	1 – 11	2.5 – 11	4 – 11	--
953B	1 – 18	2.5 – 11	4 – 18	--
973	--	1.3 – 11	2.5 – 11	4 – 11
VSWR GHz				
Model	3dB	10dB	20dB	40dB
953	1,5	1.5	1.5	-
953B	1.6 to 2 1.5 to 18	1.6 to 4 1.5 to 18	1.6 to 6 1.5 to 18	-
973	- -	1.5 to 11 -	1.6 to 4 1.5 to 11	1.7 to 6 1.5 to 11

Zero Loss typically 0.5 to 1.0 dB

Frequency Correction Data Provided.

Temperature: Full power from 0° C to +25° C; de-rated linearly to 10% at +85° C. 0° C to +85°

Physical Dimensions:

Model	DIM "A"	Weight kg / lb
953/953B	213 (8.4)	0.4 / 0.8
973	359 (14.1)	0.6 / 1.3

Scale divisions in ½ dB increments.

Model	Power
953	1W CW / 1Kw peak
953B	1W CW / 1Kw peak
973	1W CW / 1Kw peak

Note: Dimensions are given in mm (inched) and are maximum, unless otherwise specified.



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Continuously Variable Attenuator

Model 953K

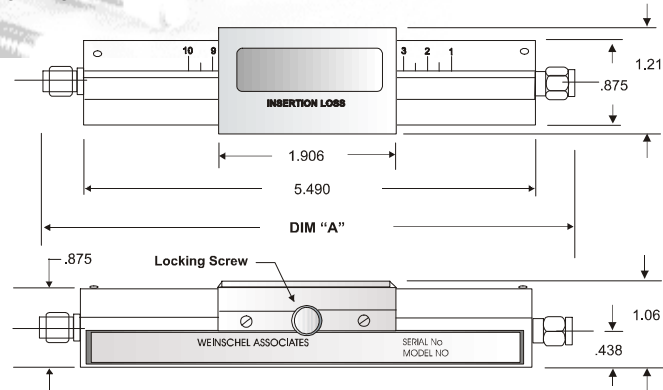
1.0 – 40.0 GHz

1 WATT



953K shown on bottom

SLIDE CONTROL



Maximum dimensions in inches (cm).

Mates with SMA, 3.5 mm, Type K⁽¹⁾.

⁽¹⁾ K Connector is a registered trademark of Wiltron Co.

BROADBAND FREQUENCY RANGE – 1.0 TO 40.0 GHz in 3 dB model. Other models have slightly less range

DIRECT READING SCALE – Insertion loss scales are individually calibrated. A permanently attached table shows small corrections to the calibrations above and below mid-frequency.

CONTINUOUSLY VARIABLE – Attenuation is continuously variable over near linear scale using a simple slide control.

SMALL PHASE SHIFT – Total insertion length remains constant for all attenuation settings, resulting in very small phase shift vs. attenuation
 $\approx 1^\circ/\text{dB}/\text{GHz}$.

NON-CONTACTING CONTROL DEVICE – Attenuator control is capacitively coupled to attenuating element to avoid wear and insure smooth operation.

STABILITY – These attenuators contain *Weinschel Associates* high quality, stable film resistors on a ceramic base.

STAINLESS STEEL CONNECTORS – Stainless steel connectors ensure maximum life and minimum wear. Critical dimensions are held more closely than required by applicable military specifications.

NOMINAL IMPEDANCE: 50 Ohms

ATTENUATION RANGE: 3, 10 AND 20 dB

CONNECTORS: Stainless steel 2.92 mm, Male, Female

PHASE SHIFT WITH CHANGE IN ATTENUATION:
 $\sim 1^\circ/\text{dB} \times f$ (GHz) maximum

INPUT POWER RATING (when properly terminated):
 0.5 watt average, 100 watt peak; de-rated linearly to zero from 25 to 85°C.

POWER COEFFICIENT: $< 0.001 \text{ dB}/\text{dB} \times W$

TEMPERATURE COEFFICIENT: $< 0.0003 \text{ dB}/\text{dB} \times ^\circ\text{C}$

TEMPERATURE RANGE: 0° TO 85°C

WEIGHT: Net 0.37 kg (13 oz); Shipping 0.60 kg (1 lb., 5 oz)

Characteristic	Model 953K		
	3 dB	10 dB	20 dB
Frequency Range	1 – 40 GHz	3–40 GHz	4–40 GHz
<i>Characteristic Insertion Loss, Residual</i>	1.0 dB max at 18 GHz	1.5 dB max at 18 GHz	2.0 dB max at 18 GHz
Direct Reading Scale Calibration	18 GHz	18 GHz	18 GHz
<i>Insertion Loss Corrections</i>	Min. 1, 2 & 3 dB at 1 and 40 GHz	Min. 2, 4, 6 & 10 dB at 3 and 40 GHz	Min. 5, 10, 15 & 20 dB at 4 and 40 GHz
Max. Correction from Scale Value	$\pm 1.0 \text{ dB}$	$\pm 2.5 \text{ dB} -1.0 \text{ dB}$	$\pm 2.5 \text{ dB}$
<i>Calibration Accuracy (Incl. Resetability)</i>	0.1 dB	0.2 dB	0.3 dB
Scale Resolution	$\sim 0.60 \text{ in} / \text{dB}$	$\sim 0.25 \text{ in} / \text{dB}$	$\sim 0.12 \text{ in} / \text{dB}$
<i>Scale Increments</i>	0.2 dB	0.5 dB	0.5 dB
Max. VSWR			
To 18.0 GHz	1.50	1.50	1.50
To 40.0 GHz	1.35	1.35	1.50



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EMAIL: sales@WeinschelAssociates.com

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Specification
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DC – 6.0 GHz

0.3 WATTS

Overview

The DA Series of Digital Attenuators represents the latest in programmable attenuator technology. The DA Series combines the rugged design and superior performance that comes standard with Weinschel Associates products with modern innovations to achieve new levels of ease of integration and price performance.

The DA Series is ideal for a multitude of applications including:

- Test Instrumentation
- Base Station Infrastructure
- Broadband Telecommunications
- Microwave and VSAT Radios
- Military

Features

- Broadband Frequency Coverage
- High Accuracy and Repeatability
- Easy Programmability
 - USB Interface
 - Software Driver/Application
- Rugged Construction

Specifications

Frequency Range: DC - 6.0 GHz

Attenuation Range:

Model DA6-30:	30 dB
Model DA6-60:	60 dB
Model DA6-90:	90 dB

Step Size: 0.5 dB

Insertion Loss (max):

Model	Insertion Loss vs Freq (GHz)	
	DC - 4	4 - 6
DA6-30	3.0	4.0
DA6-60	7.0	9.0
DA6-90	11.0	13.0

VSWR (max): 1.50:1

Accuracy: ± 0.5 dB Typical

Switching Speed: <100 ns

Input power for 0.1 dB Compression: +22 dBm

Input Third Order Intercept Point: +32 dBm

Power Rating: 0.3 Watt CW, +25 dBm max

Phase Shift with Change in Attenuation:
1° / dB x f (GHz) maximum

Temperature:

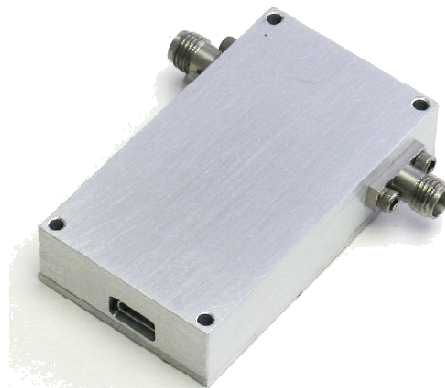
Operating: -55 to + 85 °C
Storage: -60 to +125 °C

Connectors: SMA stainless steel M/F connectors per MIL-STD-348A, interface dimensions mate nondestructively with MIL-C-39012.

Programming Interface:

Options: USB-2.0 (standard)
RS-232
802.11g Wireless
Manual Control
Software: LabView Driver
Standalone Program

Input Power Requirement: Powered via USB
Options: AC Power Adapter
EMI Feed thru



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WEB: <http://www.WeinschelAssociates.com>

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DC – 13.0 GHz

0.3 WATTS

Overview

The DA Series of Digital Attenuators represents the latest in programmable attenuator technology. The DA Series combines the rugged design and superior performance that comes standard with Weinschel Associates products with modern innovations to achieve new levels of ease of integration and price performance.

The DA Series is ideal for a multitude of applications including:

- Test Instrumentation
- Base Station Infrastructure
- Broadband Telecommunications
- Microwave and VSAT Radios
- Military

Features

- Broadband Frequency Coverage
- High Accuracy and Repeatability
- Easy Programmability
 - USB Interface
 - Software Driver/Application
- Rugged Construction

Specifications

Frequency Range: DC - 13.0 GHz

Attenuation Range:

Model DA13-30: 30 dB
 Model DA13-60: 60 dB
 Model DA13-90: 90 dB

Step Size: 0.5 dB

Insertion Loss (max):

Model	Insertion Loss vs Freq (GHz)		
	DC – 4	4 – 8	8 – 13
DA13-30	4.0	5.0	6.0
DA13-60	8.0	10.0	12.0
DA13-90	12.0	15.0	18.0

VSWR (max): 1.50:1

Accuracy: ± 0.5 dB Typical

Switching Speed: <100 ns

Input power for 0.1 dB Compression: +22 dBm

Input Third Order Intercept Point: +32 dBm

Power Rating: 0.3 Watt CW, +25 dBm max

Phase Shift with Change in Attenuation:
 1° / dB x f (GHz) maximum

Temperature:

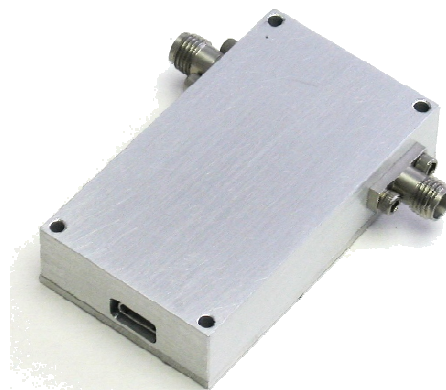
Operating: -55 to + 85 °C
 Storage: -60 to +125 °C

Connectors: SMA stainless steel M/F connectors per MIL-STD-348A, interface dimensions mate nondestructively with MIL-C-39012.

Programming Interface:

Options: USB-2.0 (standard)
 RS-232
 802.11g Wireless
 Manual Control
 Software: LabView Driver
 Standalone Program

Input Power Requirement: Powered via USB
 Options: AC Power Adapter
 EMI Feedthru



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