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Millimeter-Wave Technology & Solutions

SERIES FXA/LSA/VPS

PRECISION AND GENERAL PURPOSE FIXED ATTENUATORS, LEVEL SET ATTENUATORS, AND VARIABLE PHASE SHIFTERS



FEATURES:

- Fixed attenuators 0 to 40 dB
- Level set attenuators 0 to 25 dB
- Variable phase shifters 0-180°

APPLICATIONS:

- Test and instrumentation
- Laboratory equipment
- Subsystems

DESCRIPTION

Millitech series FXA precision fixed attenuators are made using a rugged split-block design. These devices can be used as the laboratory standard against which other instruments or components are calibrated. Series FXA general purpose and series LSA level set attenuators consist of a section of waveguide with a precisely cut resistive vane. In the level set attenuator, the micrometer drive sets the level of attenuation by movement of the vane.

Series VPS variable phase shifters consist of a waveguide section with a movable dielectric vane driven by a micrometer. The micrometer-driven phase shifters have 180° phase shift range and are offered from 26.5 to 170 GHz. If precise measurements of attenuation and phase are required, series DRA direct reading attenuators and series DRP direct reading phase shifters are also available.

Millitech, Inc. • 29 Industrial Dr. East • Northampton, MA 01060
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Millimeter-Wave Technology & Solutions

ELECTRICAL SPECIFICATIONS

Model Number	FXA-42	FXA-28	FXA-22	FXA-19	FXA-15	FXA-12	FXA-10	FXA-08	FXA-06
General Purpose Fixed Attenuators									
Frequency band and range (GHz)	K 18-26.5	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-170
Attenuation at center frequency range (dB)*1	3, 6, 10, 20, 30, 40								
VSWR (max)	1.15:1	1.15:1	1.15:1	1.15:1	1.15:1	1.15:1	1.15:1	1.20:1	1.5:1
Power rating (W) (max)*2	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
Precision Fixed Attenuators									
Attenuation across waveguide band	---	3, 6, 10, 20, 30, 40						---	---
Accuracy (±dB/%)*3	---	0.7/4.0	0.7/4.0	0.7/4.0	0.7/4.0	0.7/4.0	0.7/4.0	---	---
Flatness (±dB) (max)*4	---	0.7	0.7	0.7	0.7	0.7	0.7	---	---
VSWR (max)	---	1.05:1	1.05:1	1.06:1	1.08:1	1.08:1	1.08:1	---	---
Power rating (W) (max)	---	1.0	1.0	1.0	1.0	0.5	0.5	---	---

*1 – ±0.3 dB at center frequency. Please contact Millitech for attenuation values over full bandwidth.
*2 – Higher power versions are available in all frequency bands. Please contact Millitech for details.
*3 – Whichever is greater throughout the waveguide band.
*4 – Flatness within the entire waveguide band.

Model Number	LSA-42	LSA-28	LSA-22	LSA-19	LSA-15	LSA-12	LSA-10	LSA-08	LSA-06
Level Set Attenuators									
Frequency band and range (GHz)	K 18-26.5	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-170
Attenuation (dB)*1	0-25	0-25	0-25	0-25	0-25	0-25	0-25	0-25	0-25
Insertion loss (dB) (max)	0.5	0.5	0.5	0.7	0.7	1.0	1.0	1.2	1.2
VSWR (max)	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.5:1
Power rating (W) (max)*2	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3
Model Number	**VPS-42**	**VPS-28**	**VPS-22**	**VPS-19**	**VPS-15**	**VPS-12**	**VPS-10**	**VPS-08**	**VPS-06**
Variable Phase Shifters									
Insertion loss (dB) (max)	---	0.5	0.5	0.7	0.7	1.0	1.0	1.2	1.2
Phase shift range (degrees)*3	---	0-180	0-180	0-180	0-180	0-180	0-180	0-180	0-180
VSWR (max)	---	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.5:1
Power rating (W) (max)	---	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

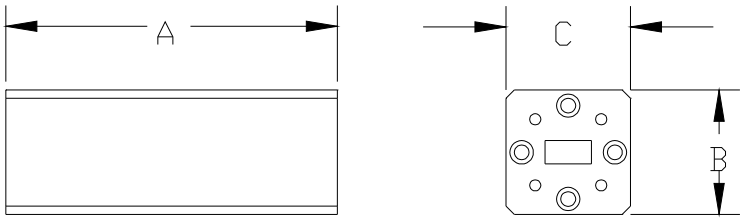
*1 – Micrometer reading vs. attenuation value available upon request.
*2 – Higher power versions are available in all frequency bands. Please contact Millitech for details.
*3 – Measurements are made at the lowest frequency of the waveband guide.

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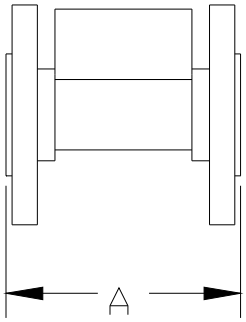
OUTLINE DRAWINGS*

FXA Models

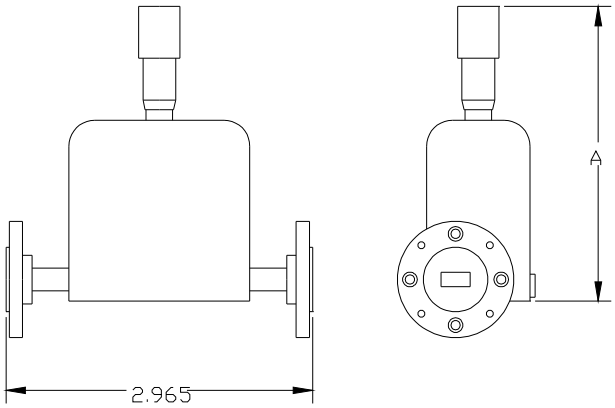
Precision Fixed



General Purpose Fixed



LSA and VPS (dimensions in inches)



*The outlines shown may not reflect the latest information. Please contact Millitech for current outline drawings.

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MECHANICAL SPECIFICATIONS

Model Number	FXA-42	FXA-28	FXA-22	FXA-19	FXA-15	FXA-12	FXA-10	FXA-08	FXA-06
General Purpose Fixed Attenuators									
A (in/mm)	2.0/51	2.0/51	2.0/51	2.0/51	1.6/41	1.6/41	1.6/41	1.6/41	1.6/41
Precision Fixed Attenuators									
A (in/mm)	*1	7.26/184	6.08/154	5.32/135	3.98/101	3.31/84	3.12/79	---	---
B (in/mm)	*1	0.93/24	1.30/33	1.30/.33	0.86/22	0.86/22	0.86/22	---	---
C (in/mm)	*1	1.33/34	1.33/34	1.33/34	1.20/30	1.20/30	1.20/30	---	---
Model Number	**LSA-42**	**LSA-28**	**LSA-22**	**LSA-19**	**LSA-15**	**LSA-12**	**LSA-10**	**LSA-08**	**LSA-06**
Model Number	**VPS-42**	**VPS-28**	**VPS-22**	**VPS-19**	**VPS-15**	**VPS-12**	**VPS-10**	**VPS-08**	**VPS-06**
Level Set Attenuators/Variable Phase Shifters									
A (in/mm)	*1	3.45/88	3.40/86	3.40/86	3.25/83	3.25/83	3.25/83	3.17/81	3.17/81
Flange MIL.F-3922	/54-001*2	/54-003*2	/67B-006	/67B-007	/67B-008	/67B-009	/67B-010	/67B-M08	/67B-M06

*1 – Please contact Millitech for dimensions.
*2 – With #4-40 threaded holes.

HOW TO ORDER

Specify Model Number
LSA-XX-AØØØØ
VPS-XX-AØØØØ
FXA-XX-ABBCØ

XX = Waveguide Band
WR – number

A = Flange Type
R – round (not available in WR-42)
S – square (WR-42 and WR-28 only)
P – pin contact (general purpose fixed attenuators WR-08 and WR-06 only)
N – nonstandard (not available for precision fixed attenuators)

BB = Attenuation Values*
03 – 3 dB
06 – 6 dB
10 – 10 dB
20 – 20 dB
30 – 30 dB
40 – 40 dB

C = Attenuator Type
G – general purpose fixed version
P – precision fixed version (WR-28 through WR-10 only)

***Custom attenuation values available upon request for general purpose fixed attenuators.**

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