

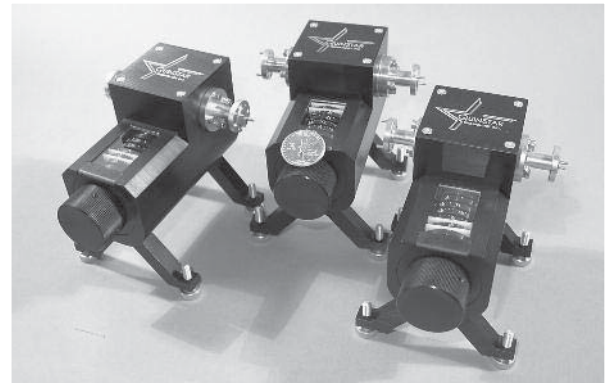


# Direct Reading Attenuators, and Phase Shifters

## QAD/QPS

### Characteristics

- ◆ Fullband Coverage
- ◆ Accurate Direct Readings
- ◆ Highly Repeatable Settings
- ◆ Easy to Use



### Product Description

QuinStar Technology's **direct reading attenuators**, and **phase shifters** are designed and built for precision millimeter-wave measurements. These instruments cover the range of 26.5-110 GHz in six waveguide bands. Series **QAD direct reading attenuators** and series **QPS direct reading phase shifters** are of classical rotary vane construction. They offer highly repeatable settings and frequency independent readings. Both instruments have low VSWR. In addition, the attenuator has negligible phase

shift versus attenuation setting while the phase shifter has low insertion loss.

Both instruments are well suited for accurate millimeter-wave measurements. Direct reading attenuators and phase shifters are available in motorized versions for ATE or other applications requiring remote control.

### Specifications

FREQUENCY BAND	K	Ka	Q	U	V	E	W
Frequency Range (GHz)	18-26.5	26.5-40	33-50	40-60	50-75	60-90	75-110
Waveguide Size	WR-42	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10
<b>DIRECT READING PRECISION ATTENUATORS</b>							
Insertion Loss (dB max)	0.5	0.5	0.6	0.7	0.8	1.0	1.2
VSWR (typical)	1.15	1.15	1.15	1.15	1.20	1.20	1.25
Average Power (Watts)	0.5	0.5	0.5	0.4	0.3	0.2	0.2
Attenuation Range <sup>1</sup>	0 dB to 50 dB (above insertion loss) over full waveguide band						
Accuracy	Atten. ≥10dB	0.2 dB					
	Atten.	2%					
<b>DIRECT READING PHASE SHIFTERS</b>							
Accuracy (degrees)	3		3	3	4	4	4
Insertion Loss (dB)	1.0		1.2	1.3	1.5	1.8	2.0
VSWR (typical)	1.30		1.30	1.30	1.35	1.35	1.35
Average Power (Watts)	1.0		1.0	1.0	0.8	0.7	0.6
Phase Shift Range	0 to 360 degrees direct reading						
Read-Out	0 to 360 degrees in 5 degree divisions						
Loss Variation	1.0 dB (max)						

Other waveguide sizes are available.

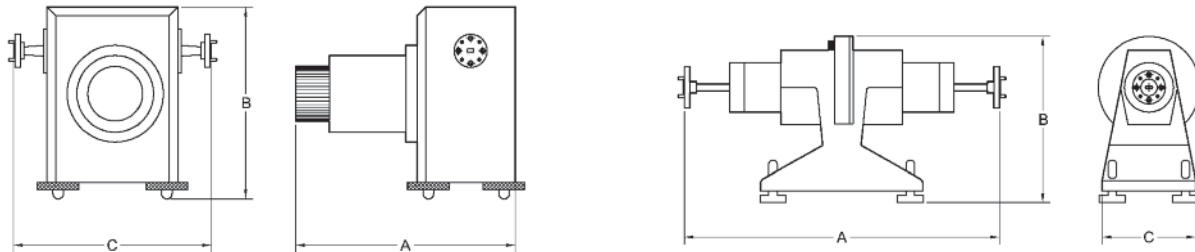
<sup>1</sup> Scale increments: 0dB to 0.1dB = 0.01dB; 0.1dB to 1.0dB = 0.05dB; 1.0dB to 10dB = 0.10dB; 10.0dB to 20.0dB = 0.20dB; 20.0dB to 30.0dB = 0.5dB; 30.0dB to 50.0dB = 1.0dB. Maximum setting 60dB typical.



# Direct Reading Attenuators and Phase Shifters

## QAD/QPS

### Outline Drawings/Mechanical Specifications



Series QAD

Series QPS

SERIES QAD DIRECT READING ATTENUATOR				
FREQUENCY BAND	WAVEGUIDE SIZE	OUTLINE DIMENSIONS, inches/mm		
		A	B	C
Ka	WR-28	5.00/127.0	4.00/102.0	6.87/174.5
Q	WR-22	5.00/127.0	4.00/102.0	6.24/158.4
U	WR-19	5.00/127.0	4.00/102.0	6.0/152.4
V	WR-15	5.00/127.0	4.00/102.0	4.4/111.8
E	WR-12	5.00/127.0	4.00/102.0	4.2/106.7
W	WR-10	5.00/127.0	4.00/102.0	4.0/101.6

SERIES QPS DIRECT READING PHASE SHIFTER				
FREQUENCY BAND	WAVEGUIDE SIZE	OUTLINE DIMENSIONS, inches/mm		
		A	B	C
Ka	WR-28	8.53/216.7	3.66/93.0	3.22/81.8
Q	WR-22	6.85/174.0	3.66/93.0	3.22/81.8
U	WR-19	6.0/152.4	3.66/93.0	3.22/81.8
V	WR-15	4.85/123.2	3.66/93.0	3.22/81.8
E	WR-12	4.2/106.7	3.66/93.0	3.22/81.8
W	WR-10	3.7/94.0	4.00/102.0	4.50/114.3



# Direct Reading Attenuators and Phase Shifters

## QAD/QPS

### Ordering Information

Direct Reading Attenuators:

Model Number QAD - **A 00000**

waveguide band designator ←

- |             |            |
|-------------|------------|
| K = K-band  | V = V-band |
| A = Ka-band | E = E-band |
| Q = Q-band  | W = W-band |
| U = U-band  |            |

Direct Reading Phase Shifters:

Model Number QPS - **A 00000**

waveguide band designator ←

- |             |            |
|-------------|------------|
| A = Ka-band | V = V-band |
| Q = Q-band  | E = E-band |
| U = U-band  | W = W-band |