



## Description

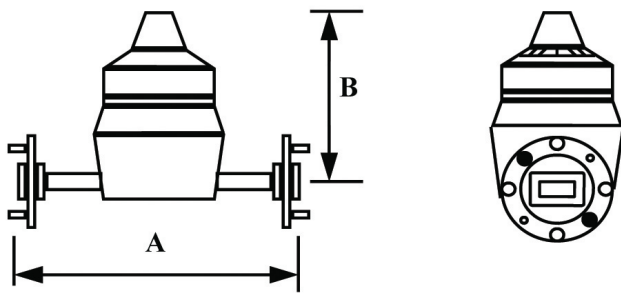
Mi-Wave's 525 Uncalibrated and 526 Calibrated Phase Shifters provide phase shifts from 0° to 180° at any frequency within the waveguide band.

Designed to maintain reliable performance for accurate test measurements, the firm setting control of these devices maintains stable performance under all normal conditions of unit orientation and test bench vibration.

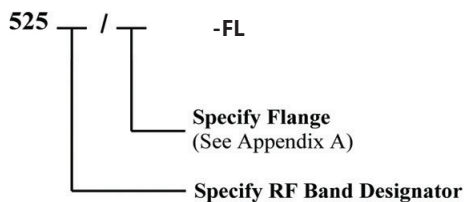
- *Dial Driven*
- *Smooth Phase Shift Control*
- *Compact and Mechanically-stable Design*
- *Settings Maintained in all Orientations*

## Applications

Mi-Wave's 525 Series Uncalibrated Phase Shifters are designed for applications that require variation in the electrical length of a transmission line section with minimum energy loss and reflections. These devices are used in test bench bridge circuits and balanced mixers to provide control of the phase relationship between RF signals. They may also be used to control similar



## Ordering Information



## OTHER BANDS AVAILABLE:

- WR-90, 75, 51, 34

526 Calibrated at 1 frequency

Dimensional Specifications				
Model No.	A		B	
	in.	mm	in.	mm
525K	3.00	76.2	2.35	59.7
525A	2.75	69.9	2.16	54.9
525B	2.75	69.9	2.16	54.9
525U	2.75	69.9	2.16	54.9
525V	2.50	63.5	1.94	49.9
525E	2.50	63.5	1.94	49.9
525W	2.50	63.5	1.94	49.9
525F	2.00	50.8	1.94	49.9
525D	2.00	50.8	1.94	49.9
525G	2.00	50.8	1.94	49.9

Technical Specifications (typical)										
Model No.	525K	525A	525B	525U	525V	525E	525W	525F	525D	525G
Frequency Band (GHz)	18–26.5	26.5–40	33–50	40–60	50–75	60–90	75–110	90–140	110–170	140–220
VSWR Max.	1.15	1.15	1.15	1.20	1.20	1.20	1.20	1.25	1.25	1.25
Phase Shift (degrees) Min.	180	180	180	180	180	180	180	180	180	180
Insertion Loss (dB)	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.8	1.0
Average Power (watts)	1.5	1.0	1.0	1.0	0.8	0.7	0.6	0.4	0.3	0.2
Weight (oz)	8.0	6.0	6.0	6.0	3.0	3.0	3.0	2.5	2.5	2.5

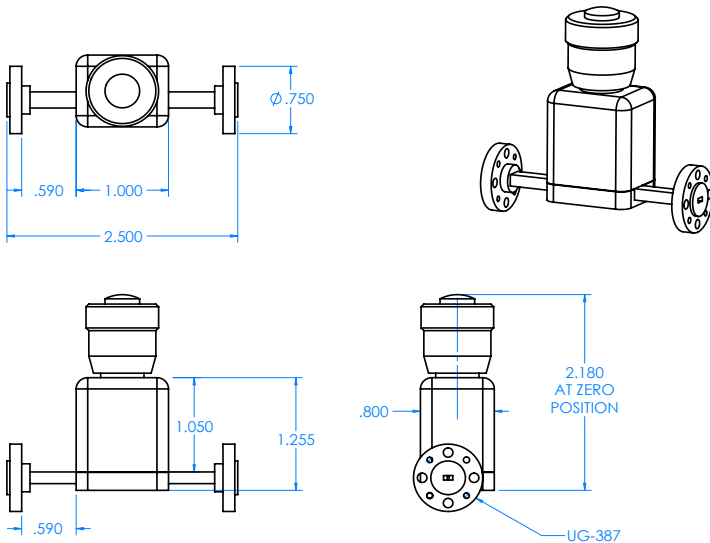


## Description

Mi-Wave's 527 Series Phase Shifters are designed for operation in waveguide sizes from 18 to 220 GHz. This resolution is advantageous since the total travel of the phase shift vane is quite short at high frequencies.

- *Low VSWR*
- *Micrometer Readout*
- *Smooth Anti-Backlash Operation*

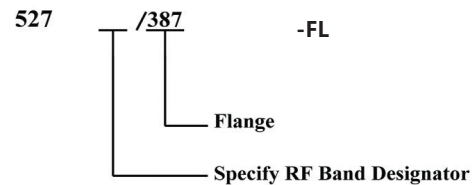
The precise micrometer readout enhances setting and repeatability of these devices tested. Each phase shifter is at the specified frequency. Calibrations are supplied at an additional cost.



Dimensional Specifications				
Model No.	A		B	
	in.	mm	in.	mm
527F	2.0	50.8	4.0	101.6
527D	2.0	50.8	4.0	101.6
527G	2.0	50.8	4.0	101.6

Technical Specifications (typical)			
Model No.	527F	527D	527G
Frequency Band (GHz)	90–140	110–170	140–220
VSWR Max.	1.15	1.15	1.15
Phase Shift (degrees) Min.	180	180	180
Accuracy (°)	+3.0	+3.0	+3.0
Weight (oz)	5.5	5.5	5.5

## Ordering Information



## OTHER BANDS AVAILABLE:

From 18 to 110 GHz

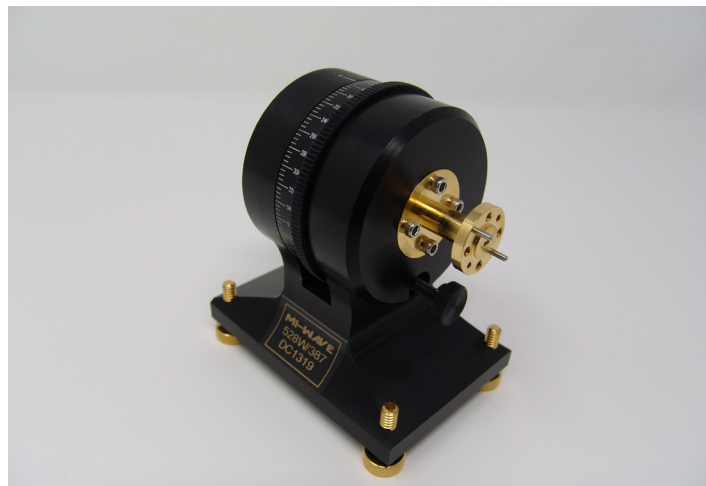
## Description

Mi-Wave's 528 Series Direct-reading Phase Shifters provide highly accurate measurement of phase shift over each full waveguide band from 26.5 to 170.0 GHz. They feature low VSWR, low insertion-loss, and low insertion-loss variation due to the rotation of the phasing section.

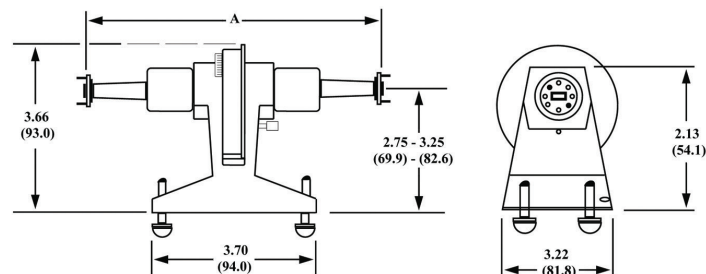
- *Compact & Mechanically-Stable Design*
- *Smooth Anti-backlash Phase Shift Control*
- *High Resolution Over a Wide Phase-shifting Range*

## Applications

The 528 Series Direct-reading Phase shifters offer a convenient, frequency insensitive method of measuring phase shift. These devices are useful in waveguide systems where the phase and amplitude must be measured or adjusted independently. Typical applications include bridge circuits, phased arrays, and interferometers.

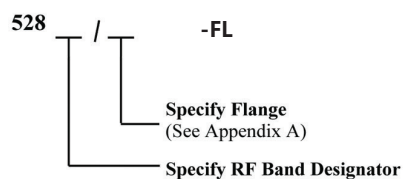


Dimensional Specifications		
Model No.	A	
	in	mm
528A	8.53	217.0
528B	6.85	174.0
528U	5.83	148.0
528V	4.75	121.0
528E	4.16	106.0
528W	3.38	85.8
XXXXXXXX	XXXXX	XXXXX
XXXXXXXX	XXXXX	XXXXX



Operation Specifications	
Phase Shift Range	0° to 360° Direct-reading
Read-out	0° to 360° in 5° Divisions with 0.5s vernier
Loss Variation	1.0 dB (Max.)

## Ordering Information



**OTHER BANDS AVAILABLE**

Technical Specifications (typical)								
Model No.	528A	528B	528U	528V	528E	528W	528F	528D
Frequency Band (GHz)	26.5-40	33-50	40-60	50-75	60-90	75-110	90-140	110-170
Accuracy (degrees) (typ)	± 3	± 3	± 3	± 4	± 5	± 5	± 5	—
Insertion Loss (dB)	1.0	1.2	1.3	1.5	1.8	2.0	3.0	4.0
VSWR (typ)	1.30	1.30	1.30	1.30	1.30	1.35	1.5	1.5
Average Power (watts)	1.0	1.0	1.0	0.8	0.7	0.6	0.5	0.3
Weight (oz)	30	29	28	27	26	24	24	23



## Description

Mi-Wave has developed a new motorized rotary vane phase shifter which is available in W/G bands from 18.0 to 170 GHz. The 529 Series is a computer controlled version of Mi-Waves' standard direct reading phase shifter and features a 0° to 360° range with 0.5 degree resolution. IEEE-488 & USB available.

- High Accuracy
- Digital Readout
- Low Insertion Loss
- Computer Controlled
- Precision Construction
- Full Waveguide Bands

The phase shifter is controlled by a precision stepping motor and all electronics required to drive the motor are contained within the phase shifter housing. Custom microprocessor-based electronics translate the desired phase shifter setting into the required motor position and provide the proper drive signals for the motor.

Motor speed is ramped up and down ensuring accurate positioning and smooth operation. The unit can be controlled remotely through an IEEE-488 interface or manually with a front panel switch. A three-digit readout on the front panel displays the setting. All that is required is a 24 volt, 500 mA supply, which is included.

## Applications

The 529 Series Motorized Direct-reading Phase Shifters are used in all RF automated measurement systems. They are most frequently used in RF substitution type set-ups for precise measurement of characteristics including bridge circuits and phased arrays.

### Dimensional Specifications

Model No.	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
529K	8.48	215.4	4.00	101.6	5.50	139.7	3.50	88.9
529A	6.87	174.5	4.00	101.6	5.50	139.7	3.50	88.9
529B	6.24	158.4	4.00	101.6	5.50	139.7	3.50	88.9
529U	5.74	145.7	4.00	101.6	5.50	139.7	3.50	88.9
529V	4.50	114.3	4.00	101.6	5.50	139.7	3.50	88.9
529E	4.50	114.3	4.00	101.6	5.50	139.7	3.50	88.9
529W	4.50	114.3	4.0	101.6	5.50	139.7	3.50	88.9

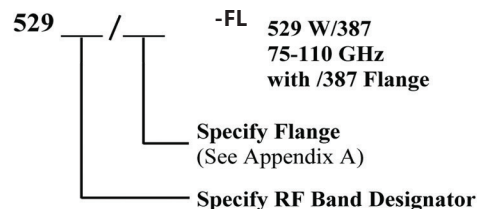
### Electrical Specifications

Model No.	Resolution (degree)	Repeatability	Accuracy	Speed (sec) 0-360
529K	0.5	± 0.5	4 deg.	5 sec
529A	0.5	± 0.5	4 deg.	5 sec
529B	0.5	± 0.5	4 deg.	5 sec
529U	0.5	± 0.5	4 deg.	5 sec
529V	0.5	± 0.5	4 deg.	5 sec
529E	0.5	± 0.5	4 deg.	5 sec
529W	0.5	± 0.5	4 deg.	5 sec
529F	0.5	± 0.5	4 deg.	5 sec
529D	0.5	± 0.5	4 deg.	5 sec

### Technical Specifications

Model No.	Frequency (GHz)	Insertion Loss	VSWR	Average Power	Weight
529K	18.0-26.5	1.0 dB	1.30	1.0 Watts	63 oz
529A	26.5-40.0	1.0 dB	1.15	0.5 Watts	60 oz
529B	33.0-50.0	1.0 dB	1.15	0.5 Watts	60 oz
529U	40.0-60.0	1.1 dB	1.15	0.4 Watts	59 oz
529V	50.0-75.0	1.2 dB	1.20	0.3 Watts	50 oz
529E	50.0-90.0	1.4 dB	1.20	0.2 Watts	30 oz
529W	75.0-110.0	1.5 dB	1.20	0.2 Watts	30 oz
529F	90.0-140.0	2.0 dB	1.30	0.2 Watts	30 oz
529D	110.0-170.0	3.0 dB	1.50	0.1 Watts	30 oz

## Ordering Information



When the unit is connected to 24 VDC with no connection to the IEEE interface. The phase shifter is controlled by a front panel toggle switch. If the toggle is held up or down from 5 counts or more, the phase shifter changes at a rapid rate to facilitate larger changes.