

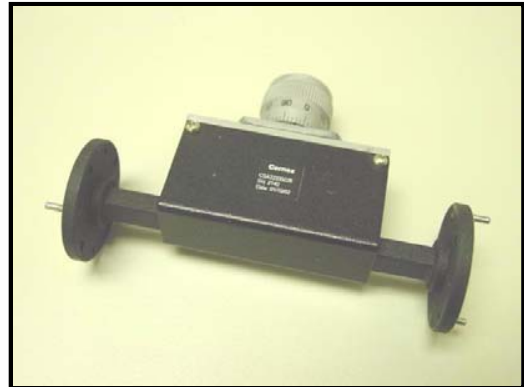
Ferrite Phase Shifters

FEATURES:

- ❖ Fast Rise Time
- ❖ 360° Phase Shift
- ❖ Remote Controlled

APPLICATIONS:

- ❖ Remote Control Operation
- ❖ High Speed Phase Modulation



DESCRIPTION:

CFS Series

Cernex's CFS series is a suppressed rotation reciprocal ferrite phase shifter, built completely in rectangular waveguide to suppress Faraday rotational tendencies in the ferrite at the frequency of operation. This construction allows a low variation in loss as phase is changed. Rise time is optimized through the use of stainless steel waveguide.

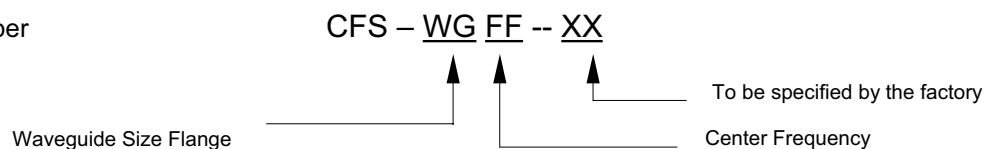
SPECIFICATIONS:

Waveguide Band	Ka	Q	U	V	E	W
Waveguide Size	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10
Frequency Range (GHz)	26.5 to 40	33 to 50	40 to 60	50 to 75	60 to 90	75 to 110
Insertion Loss (db) Max.	2.5	2.7	2.7	3.0	3.0	3.0
VSWR Max.	1.30	1.30	1.30	1.30	1.35	1.35
Phase Shift ¹						
Bandwidth ²	2%	2%	2%	2%	2%	1%
Switching Speed (μsec)	20	20	20	15	15	15
Average Power (Watts)	5.0	4.0	2.0	1.0	1.0	0.5
Power, Peak (kW)	2.0	1.5	1.0	0.7	0.5	0.3
Weight (oz)	9.0	8.0	6.0	4.0	3.0	3.0

Notes: 1. Consult factory for amount of phase shift. 2. Specify center frequency.

HOW TO ORDER:

Specify Model Number



Example: To order WR-15 waveguide ferrite phase shifters with center frequency of 62 GHz, specify CFS-1562-XX

CERNEX RESERVE THE RIGHT TO CHANGE THE SPECIFICATIONS WITHOUT NOTICE

Variable Phase Shifters

FEATURES:

- ❖ Rugged construction
- ❖ Full band operation
- ❖ 180 ° phase shifting
- ❖ Low cost

APPLICATIONS:

- ❖ Test equipment
- ❖ Subsystems
- ❖ Prototypes



CPS Series

DESCRIPTION:

Cernex CPS Series variable phase shifters are offered for the frequency range of 18 to 110 GHz in seven waveguide bands. The phase shifters utilize low loss dielectric material, which offers minimum insertion loss. The standard phase shifters are equipped with a micrometer dial, which allows for fine, accurate and repeatable phase settings. The variable phase shifters are typically used in the test setups and prototype assemblies where a certain amount of phase shift is required.

SPECIFICATIONS:

Waveguide Band	K	Ka	Q	U	V	E	W
Frequency Range (GHz)	18 to 26.5	26.5 to 40	33 to 50	40 to 60	50 to 75	60 to 90	75 to 110
Waveguide Size	WR-42	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10
Variable Phase Shifting Range	0 to 180 degrees						
VSWR (Typical)	1.4:1						
Insertion Loss (dB, Typical)	0.4	0.4	0.5	0.6	0.7	0.8	1.0
Power Rating (Maximum)	0.6	0.6	0.5	0.5	0.4	0.3	0.3

Contact factory for other waveguide bands and specifications.

HOW TO ORDER:

Specify Model Number **CPS - WG LF HF IL -XX** ← To be determined by the factory

Waveguide Size ↑ ↑ ↑ ↑ Insertion Loss
 Low End Frequency ——— ——— ——— High End Frequency

Example: To order a full band WR-15 level setting phase shifter with 1.0 dB maximum attenuation level, specify CPS – 15FF10.

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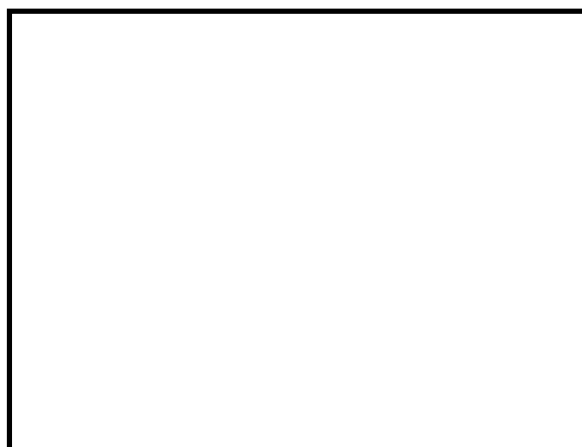
Digital Phase Shifters

FEATURES:

- ❖ Frequency Range: 1.0-37GHz
- ❖ High Performance and Compact size
- ❖ Available in 4 to 6 bits resolution
- ❖ Economically Priced

APPLICATIONS:

- ❖ Satellite Communication
- ❖ Radar System
- ❖ Transmit/Receive
- ❖ Phased Arrays



CSD Series

SPECIFICATIONS:

Model Number	Frequency Range (GHz)	BIT-NUMBER	Insertion Loss (dB) Typ.	Accuracy (°) Max.	VSWR	Operating Temp. (°C)
CSD01010506TY	1.0-1.9	6	5.3	±6.6	1.3/1.2	*
CSD01010305T	1.0-1.2	5	3	±3	1.5 max.	*
CSD01010206HE	1.2-1.4	6	3	±1 typ.	1.5	-55 to +85
CSD02040305T	2.0-4.0	5	4	±3	1.5 max	*
CSD02020204HE	2.2-2.3	4	3	±1 typ.	1.5	-55 to +85
CSD02040506TY	2.3-4.1	6	6	±6	1.5/1.2	*
CSD03060606TY	3.5-6.0	6	7	±8	1.5/1.7	*
CSD04080505T	4.0-8.0	5	6	±3	1.5 max.	*
CSD05060204HE	5.0-6.0	4	4	±1 typ.	1.5	-55 to +85
CSD06181205TY	6.0-18.0	5	12	±10	1.6	*
CSD06180905HE	6.0-18.0	5	9	±11 typ.	2	-55 to +85
CSD06181205T	6.0-18.0	5	12	±11.2	2	*
CSD07121006TY	7.0-12.0	6	10	±6	2.5/1.8	*
CSD08121005HE	8.0-12.0	5	10.0±5	±5 typ.	2	-55 to +85
CSD08110506TQ	8.5-11.0	6	7	*	*	*
CSD09100806HE	9.0-10.0	6	8.0±2.0	±2 typ.	1.5	-55 to +85
CSD09100604HE	9.0-10.0	4	6.0±5	±5 typ.	1.5	-55 to +85
CSD18200505TQ	18.0-20.0	5	7	±3	*	*
CSD28320605TQ	28.0-32.0	5	9	*	*	*
CSD32370705TQ	32.0-37.0	5	10	*	*	*

OTHER FREQUENCIES ARE ALSO AVAILABLE

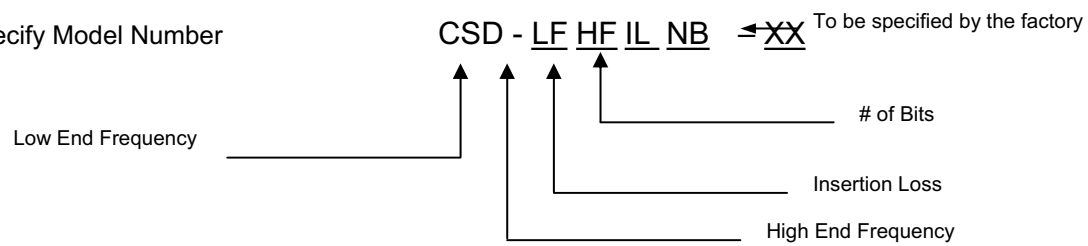
*CONSULT THE FACTORY



Digital Phase Shifters

HOW TO ORDER:

Specify Model Number



Example: To order a CSD with Low End Frequency at 1.0GHz and High End Frequency at 1.9GHz with 6-Bit at Insertion Loss of 5.3dB , specify CSD0105306-XX.

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Motorized Rotary Vane Phase Shifters

FEATURES:

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

APPLICATIONS:

- ❖ RF automated Measurement Systems
- ❖ Characterization



CMP Series

DESCRIPTION:

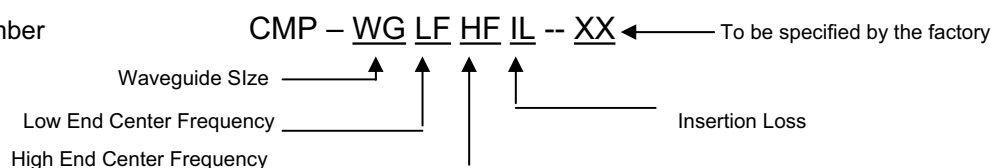
Cernex's **CMP** series motorized rotary vane phase shifter is available in W/G bands from 18.0 to 110 GHz. The CMP series is a computer controlled version of Cernex's standard direct reading phase shifter and features a 0 to 360 degree range with 0.5-degree resolution. The phase shifter is controlled 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.

SPECIFICATIONS:

Waveguide Band	K	Kb	Ka	Q	U	V	E	W
Waveguide Size	WR-42	WR-34	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10
Frequency Range (GHz)	18 to 26.5	22 to 33	26.5 to 40	33 to 50	40 to 60	50 to 75	50 to 90	75 to 110
Insertion Loss (dB) Max.	1.0	1.0	1.0	1.0	1.1	1.2	1.4	1.5
VSWR	1.30	1.35	1.15	1.15	1.15	1.20	1.20	1.20
Average Power (Watts)	1.0	0.5	0.5	0.5	0.4	0.3	0.2	0.2
Weight (oz)	63	63	60	60	59	50	30	30
Resolution (degree)	----- 1 -----							
Repeatability	----- ±1 -----							
Accuracy	----- 4 -----							
Speed (Sec) 0-360	----- 5 -----							

HOW TO ORDER:

Specify Model Number



Example: To order a WR15 Rotary vane phase shifter, specify CMP1155075-XX

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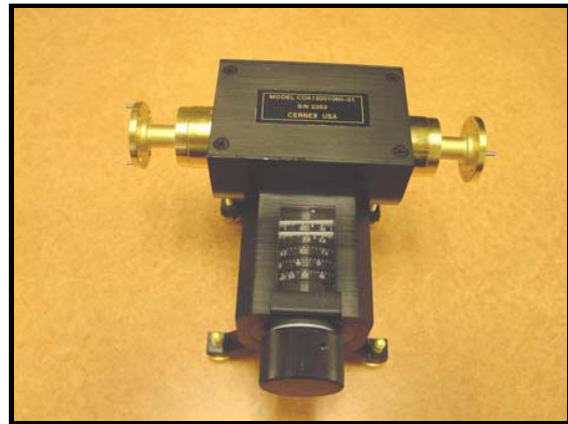
Direct-Reading Phase Shifters

FEATURES:

- ❖ High Accuracy
- ❖ Direct Reading Dial
- ❖ Frequency Independent
- ❖ Direct Drive With No Gears
- ❖ Continuously Adjustable Phase
- ❖ Low VSWR & Low Insertion Loss

APPLICATIONS:

- ❖ Test Equipment
- ❖ Subsystems
- ❖ Phased Arrays
- ❖ Interferometers



CDS Series

DESCRIPTION:

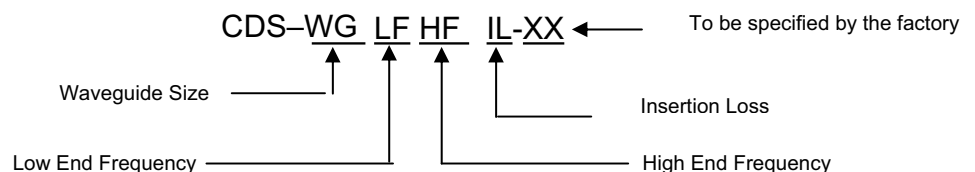
Cernex's CDS direct reading phase shifters provide highly accurate measurement of phase shift over each full waveguide band from 26.5 to 110.0 GHz. They feature low VSWR, low insertion loss, and low insertion loss variation due to the rotation of the phasing section.

SPECIFICATIONS:

Waveguide Band	Ka	Q	U	V	E	W
Waveguide Size	WR-28	WR-22	WR-19	WR-15	WR-12	WR-10
Frequency Range (GHz)	26.5 to 40	33 to 50	40 to 60	50 to 75	60 to 90	75 to 110
Accuracy (degrees)	3	3	3	4	4	4
Insertion Loss (dB)	1.0	1.2	1.3	1.5	1.8	2.0
VSWR Max.	1.30	1.30	1.30	1.30	1.30	1.35
Average Power (Watts)	1.0	1.0	1.0	0.8	0.7	0.6
Weight (oz.)	30	29	28	27	26	24
Operating Specifications						
Phase Shift Range	0° to 360° Direct Reading					
Read-Out	0° to 360° in 5° divisions, with 0.5° vernier					
Loss Variation	1.0 dB (Max.)					

HOW TO ORDER:

Specify Model Number



Example: To order WR-15 direct reading phase shifter, specify CDS-15507501-XX

Micrometer-Driven Calibrated Phase Shifters

FEATURES:

- ❖ Low VSWR
- ❖ Micrometer Readout
- ❖ Smooth Anti-Backlash Operation
- ❖ Differential Screw Drive for Increased Phase Shift Resolution



DESCRIPTION:

CMS Series

Cernex's CMS series micrometer-driven calibrated phase shifters are designed for operation in three waveguide sizes from 90 to 220 GHz. The differential screw drive provides an increased resolution when compared with single screw drives. This resolution is advantageous since the total travel of the phase shift vane is quite short at high frequencies. The precise micrometer readout enhances the set ability and repeatability of these devices. Each phase shifter is calibrated at the specified frequency and a curve of phase shift vs. micrometer readout is supplied. Additional calibrations are supplied at an additional cost.

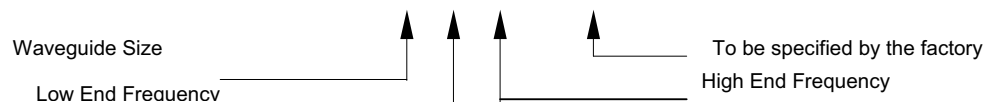
SPECIFICATIONS:

Waveguide Band	F	D	G
Waveguide Size	WR-8	WR-7	WR-5
Frequency Range (GHz)	90 to 140	110 to 170	140 to 220
VSWR Max.	1.25	1.25	1.25
Phase Shift (degree) Min.	180	180	180
Accuracy (°)	±3.0	±3.0	±3.0
Weight (oz)	5.5	5.5	5.5

HOW TO ORDER:

Specify Model Number

CMS – WG LF HF-- XX



Example: To order WR-7 waveguide phase shifter, specify CMA-110170-XX.

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