



# Rotary-Field Phase Shifters

## Data Sheet

**L-Band to Ku-Band • Unlimited Phase Shift • Highly Accurate**

MAG Analog Rotary-Field Ferrite Phase Shifters are uniquely designed to provide unlimited phase shift with modulo-360 degree phase control characteristics that are independent of frequency, temperature, power level, and ferrite material parameters. These units, available in frequency ranges from L-Band to Ku-Band, are capable of handling high power levels while maintaining rms phase error to less than one degree. A very successful application of these units is the low sidelobe, single-axis scanning antenna of the E-3 Airborne Warning and Control System (AWACS).

Rotary-Field Phase Shifter geometry consists of a transducer from rectangular to circular ceramic filled waveguide, a linear to circular polarizer, a rotatable half-wave plate, a circular to linear polarizer, and a transducer back from circular to rectangular waveguide. The phase shift angle is proportional to twice the angle of rotation of the half-wave plate, controlled electronically by digital or analog drivers. Major design choices involving ferrite material type and size, quarter-waveplate, matching transformer, and driving yoke are optimized for specific system requirements. See back of sheet for typical data at various frequency ranges.



## Rotary-Field Phase Shifters

PARAMETER	FREQUENCY				
	L-BAND	S-BAND	C-BAND	X-BAND	Ku-BAND
Percent Bandwidth .....	15	12.7	8.8	10.5	5.0
Average Insertion Loss (dB) .....	1.2	0.6	0.6	0.7	0.7
Insertion Loss Modulation (dB) .....	0.2	0.3	0.3	0.3	0.3
Maximum Return Loss (dB) .....	-13.98	-14.0	-15.6	-17.7	-17.0
Peak RF Power (Kilowatts) .....	8	40	25	4	2
Average RF Power (Watts) .....	400	600	250	60	40
Typical RMS Phase Error (Degrees) .....	4.0	1.0	1.0	1.0	1.0
Switching Time (Microseconds) .....	250	300	250	200	200
Switching Time with Boost (Microseconds) .....	250	100	100	100	100
Coil Current (Milliamperes) .....	2400	900	500	230	160
Coil Resistance (Ohms) .....	1.0	1.0	3.0	9.5	14.0
Size (Inches) .....	2.5 x 7.0 x 13.4	2.0 x 6.6 x 8.0	2.0 x 3.0 x 4.8	1.25 x 1.25 x 3.2	1.0 x 1.25 x 2.0
Weight (Ounces) .....	282	62	30	6	4
Operating Temperature Range (Degrees C) .....	0 to 55	0 to 50	-20 to 50	-40 to 70	-40 to 90



MICROWAVE APPLICATIONS GROUP