

# Manual Phase Shifters



- 10-1000 MHz Frequency Range
- 10% Standard Bandwidth
- 0-90°, 0-180° and 0-360° Phase Shift Ranges
- Multi-Turn, Infinite Resolution
- Low Loss, High Phase Stability
- PC Mount and Connectorized

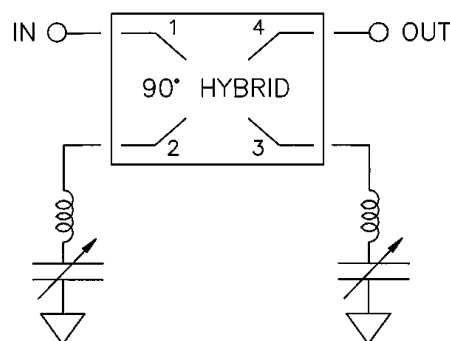
## Applications

- Closed-Loop Tracking System
- Fine Grain Phase Control
- Path Equalization or Balance

Lorch Microwave's MP-Series, Manual Phase Shifters, are mechanically variable devices offering a continuously variable phase shift over a 0-90 or 0-180 degree range. These devices use a lumped element quadrature hybrid along with a pair of matched variable LC networks. The LC networks are tied to ports 2 and 3 of the quad hybrid (See Figure 1) to form a "sliding" short. These elements, when placed at the output ports of the hybrid, will reflect incident energy back into the hybrid. The reflected energy then appears at port 4, the isolated port. As the LC elements are varied, the apparent distance (or electrical length) of the sliding short, changes the phase angle of the reflected signal.

The phase adjustment is via a 34 turn mechanically variable capacitor. Phase shift verses number of turns is shown in Figure 2.

**FIGURE 1  
SCHEMATIC**



### TYPICAL PERFORMANCE SPECIFICATIONS

Frequency (MHz)	Bandwidth	Phase Shift	INS Loss (dB)	VSWR
10 - 500	10%	90°	1.3	1.6:1
20 - 500	10%	180°	1.8	1.6:1

**Notes:**

1) All units rated at 0.5 Watts Avg, 2 Watts Peak. The Peak/Average power handling capacity applies for thru-line VSWR's of 1.25:1 max.

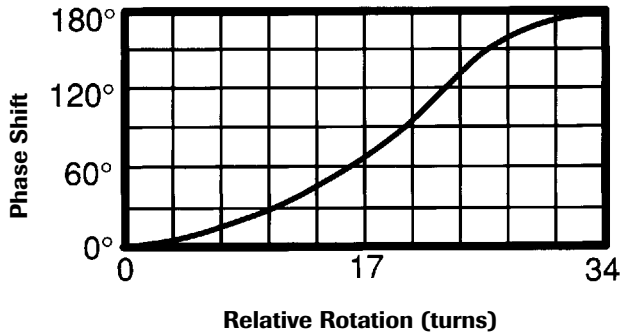
The units listed are designed to provide optimum performance over the full 10% bandwidth. If the band of interest is narrower than listed, it should be indicated when ordering (See "Creating a Part Number"). Performance will be optimized over the band of interest and improved performance may be offered at no extra cost.



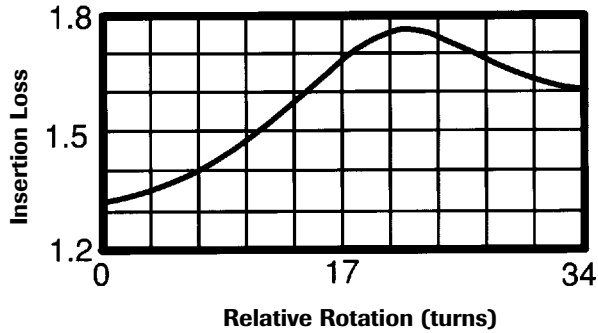
1725 N. Salisbury Blvd. · PO Box 2828 · Salisbury, MD 21802  
Ph. 800-780-2169, 410-860-5100 · Fax 410-860-1949  
Web <http://www.lorch.com> · E-mail [lorchsales@lorch.com](mailto:lorchsales@lorch.com)

# Manual Phase Shifters

**FIGURE 2**  
TYPICAL PHASE SHIFT VS. RELATIVE ROTATION



**FIGURE 3**  
TYPICAL INSERTION LOSS VS. RELATIVE ROTATION



## Part Number Description

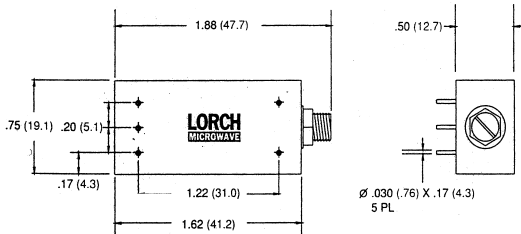
$\frac{MP}{1}$  -  $\frac{180}{2}$  -  $\frac{120}{3}$  -  $\frac{12}{4}$  -  $\frac{S}{5}$  -  $\frac{75}{6}$

- 1** **MP** Series, Manual Phase Shifter
- 2** **180** Phase Shift in Degrees
- 3** **120** Center Frequency in MHz
- 4** **12** Bandwidth in MHz
- 5** **S** Package Style, S-SMA, P-PC Mount
- 6** **75** Input Impedance, if other than 50 Ohms

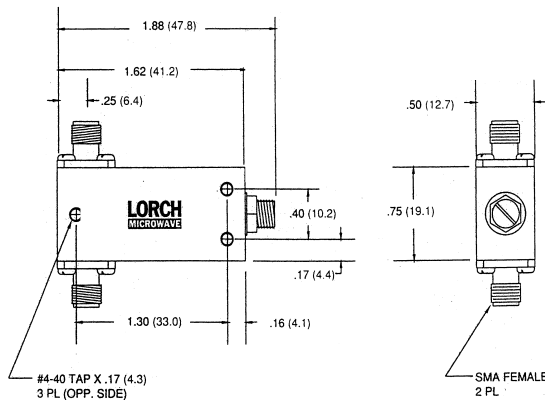
## Creating a Part Number

Lorch Microwave's MP-Series, Manual Phase Shifters, have descriptive part numbers indicating the important electrical characteristics that define the unit. A list of typical performance specifications are given in the preceding section. For specifications outside these operating parameters, please contact the factory.

## OUTLINE, PC MOUNT



## OUTLINE, CONNECTORIZED



1725 N. Salisbury Blvd. · PO Box 2828 · Salisbury, MD 21802  
 Ph. 800-780-2169, 410-860-5100 · Fax 410-860-1949  
 Web <http://www.lorch.com> · E-mail [lorchsales@lorch.com](mailto:lorchsales@lorch.com)

