

# Microwave & RF Device Characterization Solutions

## Wide Matching Range Slide Screw Tuners

From



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# WIDE MATCHING RANGE SLIDE SCREW TUNERS

## Series MST981, MST982, MST983 & MST984

### Features

- Slab-line Transmission Structure
- Dual Probes for Improved Matching Characteristics
- LCD Readout for Carriage Position



MST982E35

### General Information

Maury manual tuners are based on precision slide screw technology that utilizes broadband slab line transmission structure and passive probes to create impedances for devices. The probes are designed to be very close to one-quarter wavelength in the linear dimension at the mid-band of each range. Since each tuner has two probes, this results in improved matching characteristics for each unit. Another key feature of this series of tuners is the inclusion of a LCD position readout of the carriage position on those units operating below 18 GHz. Higher frequency tuners utilize a micrometer carriage drive. These are indicated in the Available Models Table on page 2. The positional repeatability and high matching range of these tuners make them ideally suited for use as a variable impedance source in applications like device characterization. Such measurements depend upon the ability of the tuner to establish impedances out near the edge of the Smith chart and to reproduce the electrical characteristics as a function of mechanical position. The tuners in this series are also easy to use due to the nearly independent electrical results of the mechanical motions. The depth of penetration of the probe into the transmission line determines the magnitude of the reflection, while the position of the probe along the line determines the phase. While there is some interaction, the effects are almost independent of each other.

### Functional Description

The dual probe structure in Maury coaxial slide screw tuners is designed so that one probe (the low frequency probe) covers the range from the lowest frequency to the crossover frequency listed in the Available Models Table below. The second probe (the high frequency probe) covers the range from the crossover frequency to the tuner's maximum rated frequency. The optimum crossover frequency varies from tuner to tuner. As each micrometer-driven probe is introduced into the slab-line transmission structure it induces a mismatch in its frequency range. The magnitude of this impedance mismatch is determined by the probe position (depth); the closer the probe approaches the center conductor, the greater the magnitude. The phase of the impedance mismatch is determined by the carriage position along the slab-line. The probes operate independently of each other with little or no interaction. Each probe will meet its specifications over its rated frequency range, and typically has considerably higher matching capability in the middle of its band. Figure 1 shows responses that are typical of those seen in a low frequency/high frequency pair of probes.

### Available Models Table

Model	Frequency Range (GHz)	Connector Type	VSWR Matching Range	Maximum Loss (Probes Retracted)	Probe Crossover Frequency	Power Handling <sup>1</sup> (Ave/Peak Watts)	Dimension "A"	
							Inches	(CM)
MST981BN MST981B35	0.4 – 4.0	Type N <sup>4</sup> 3.5mm <sup>3</sup>	25:1	0.2 dB	1.4 GHz	250/2500 125/1250	14.95	(37.937)
MST981EN MST981E35	0.8 – 8.0	Type N <sup>4</sup> 3.5mm <sup>3</sup>	35:1	0.2 dB	2.8 GHz	250/2500 125/1250	7.88	(20.015)
MST982VN MST982V35	0.6 – 8.0	Type N <sup>4</sup> 3.5mm <sup>3</sup>	20:1	0.5 dB	2.8 GHz	50/500 25/250	13.3	(33.8)
MST982BN MST982B35	0.8 – 18.0	Type N <sup>4</sup> 3.5mm <sup>3</sup>	10:1	0.6 dB	4.6 GHz	50/500 25/250	7.8	(19.812)
MST982AN MST982A35	1.8 – 18.0	Type N <sup>4</sup> 3.5mm <sup>3</sup>	12:1	0.4 dB	5.5 GHz	50/500 25/250	3.4	(8.636)
MST983B35	12.0 – 34.0	3.5mm <sup>3, 5</sup>	10:1	0.7 dB	16.0 GHz	15/150	0.417	(1.059)
MST984A24	12.0 – 50.0	2.4mm <sup>2, 5</sup>	10:1	1.0 dB	21.5 GHz	15/150	0.417	(1.059)

<sup>1</sup> Within rated matching range.

<sup>2</sup> Precision 2.4mm per Maury data sheet 5E-064.

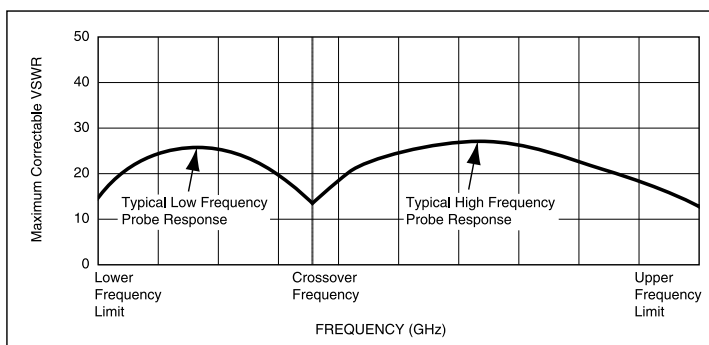
<sup>3</sup> Precision 3.5mm per Maury data sheet 5E-062.

<sup>4</sup> Precision type N per Maury data sheet 5E-049.

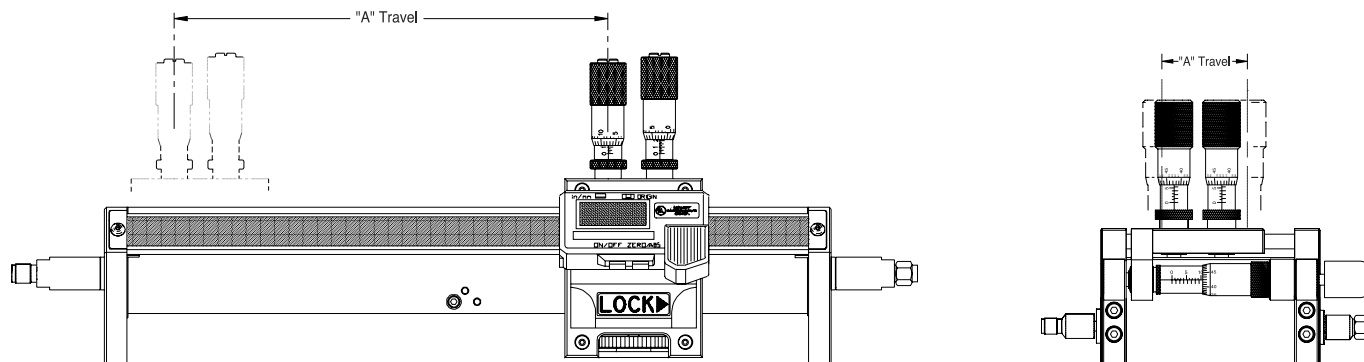
<sup>5</sup> Non LCD readout model, micrometer-driven carriage.

### Typical Responses

Figure 1. Typical responses seen in low frequency and high frequency probes as they are used in Maury coaxial slide screw tuners.



### Typical Dimensions



Models with LCD readouts for carriage position.  
Note: The replacement battery for the LCD is a Duracell® 76S.

Models with micrometer-driven carriage blocks.

Figure 2. Typical dimensions for Maury slide screw tuners. See the Available Models table for model-specific dimensions ("A" reference).



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