



Industrial Microwave +
Plasma Systems



Automatic Tuner MW2006H-260EC

Waveguide Components (TRISTAN / 2450 MHz / WR 340 / 10 kW)

Description:

The TRISTAN autotuner integrates an automatic impedance and power measurement system and a three stub motorized tuner in one compact unit. Based on WR 340 waveguide, the system works under the full power operating conditions of microwave generators. The analyzer part measures both magnitude and phase of reflection coefficient as well as incident, reflected and absorbed power and frequency. The motortuner consists of three stepping motor driven tuning stubs spaced in mutual distances of nominally one quarter of guide wavelength. The tuner uses data measured by analyzer for fast automatic impedance matching of time varying loads, e.g. in semiconductor / FDP fabrication and other industrial applications, including plasma. The system is designed for cw, high-ripple (rectified) and pulsed operation modes and can be controlled autonomously or per personal computer via RS232 or CAN Bus interface.

Principle of Operation:

The analyzer part of the TRISTAN is based on the six port reflectometer (SPR) principle. SPR is capable of measuring complex reflection coefficient of a load as well as the incident, reflected and absorbed powers. A frequency counter is also integrated with the system. The conceptual simplicity of SPR facilitates its stable and temperature independent operation over long periods of time. The tuner part uses an accurate measurement based frequency dependent equivalent circuit for finding stub positions needed for matching in terms of the complex reflection coefficient delivered from analyzer part.

TRISTAN supports three modes of signal sampling:

- CW mode is applicable to unmodulated microwave signals with output power ripple $\leq 15\%$ of the peak value
- Rectified mode is designed for slowly pulsing microwave signals (max. 400 Hz)
- Pulsed mode (optional) is intended primarily for sampling fast square pulse modulated microwave signals with pulse widths down to 100 μs .

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Specifications:	
Frequency range:	2425 MHz - 2475 MHz
Waveguide type:	WR 340
Flange type:	IEC
Maximum working power:	10 kW
Minimum working power:	1 W
Dynamic range of working power:	20 dB
Power supply voltage:	24 V DC +/-10 %
Peak current consumption (all stubs moving):	2 A (standard motors) / 3 A (fast motors)
Interface:	RS232 or CAN, DeviceNet, LabView
Modes of operation:	cw, rectified, pulsed
Max. ripple in cw mode:	15 % of peak value
Max. repetition rate of signal envelope in rectified mode:	400 Hz
Min. pulse width in pulsed mode:	100 µs
Tuning range:	VSWR < 10:1
Tuning speed:	3.2 s (standard) / 0.23 s (fast)
Weight:	Approx. 6 kg
Dimensions (L x W x H):	260 mm x 138 mm x 224 mm
Operating temperature range:	+5 °C - +55 °C
Storage temperature range:	-10 °C - +125 °C

Recommended control software:

Windows Control, Visualization and Data-Logging Software with the features:

- Microsoft Windows® environment
- Accurate measurement of complex reflection coefficient and its displaying in various formats
- Measurement of incident, reflected, and absorbed power and its displaying in various formats
- Data logging of all measurement data
- ...

