

## WM 490 Series

### Waveguide Mixers

Tektronix Waveguide Mixers cover from 18 to 325 GHz with optimum flatness.

They are designed specifically for use with the Tektronix 490 and 2750 Series Spectrum Analyzers, but are compatible with most spectrum analyzers.

Two microwave mixers, with field replaceable diodes, cover ranges 18 to 26.5 GHz and 26.5 to 40 GHz. When used with the 490 and 2750 Series, the frequency response is  $\pm 2$  dB.

Eight millimeter-wave mixers cover the 33 to 220 GHz range in the standard Mil-spec band ranges. J to G band flange transition (119-1728-00) converts the WM 490G mixer to cover the 220 to 325 GHz range.

All mixers are gold-plated brass, conforming to MIL-G-45204 Class I, Type 1 specifications and will withstand harsh environments. Mixer sets come complete with a container for spare diodes, a 28-inch cable, an instruction manual, and a wood storage box with foam cutout storage locations for five mixers.

A Diplexer Assembly is also available. It includes TNC-to-SMA adaptor and SMA semirigid coax. **A diplexer is required for waveguide mixers when used on 490 and 2750 Series spectrum analyzers.**

## CHARACTERISTICS

**For All Waveguide Mixers**—Maximum CW RF Input Level: +20 dBm (100 mW).

**Maximum PULSED RF Input Level**—1 W peak with 0.001 maximum duty factor and 1  $\mu$ s maximum pulse width.

**LO Requirement**—+7 dBm minimum, +15 dBm maximum, +10 dBm typical.

**Bias Requirement**—-2.0 V to +0.5 V with respect to the mixer body through a current limiting resistor, to provide 0 mV to 20 mA of bias current.

**1 dB Compression Point**—+13 dBm typical (at system level). -10 dBm typical when used with the 490 and 2750 Series spectrum analyzers.

### INDIVIDUAL MIXER ELECTRICAL CHARACTERISTICS

Freq. Range (GHz)	Tektronix Model No.	Band Desig.	Sensitivity (dBm)* <sup>1</sup>	Freq. Resp.* <sup>2</sup> (dB)	Conv. Loss* <sup>3</sup> Typ. (dB)	Low-Pass Cut-Off Freq.* <sup>7</sup>
18 to 26.5	WM 490K	K	-100	$\pm 2$	-30	12 GHz
26.5 to 40	WM 490A	A	-95	$\pm 2$	-30	16 GHz
33 to 50	WM 490Q	Q	-95	$\pm 2$	-30	21 GHz
40 to 60	WM 490U	U	-95	$\pm 2.5$	-30	16 GHz
50 to 75	WM 490V	V	-95 at 50 GHz -90 at 75 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-30 at 50 GHz -35 at 75 GHz	28 GHz
60 to 90	WM 490E	E	-95 at 60 GHz -85 at 90 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-30 at 60 GHz -40 at 90 GHz	28 GHz
75 to 110	WM 490W	W	-90 at 75 GHz -80 at 110 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-35 at 75 GHz -45 at 110 GHz	30 GHz
90 to 140	WM 490F	F	-85 at 90 GHz -75 at 140 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-40 at 90 GHz -50 at 140 GHz	32 GHz
110 to 170	WM 490D	D	-80 at 110 GHz -70 at 170 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-45 at 110 GHz -55 at 170 GHz	40 GHz
140 to 220	WM 490G	G	-75 at 140 GHz -65 at 220 GHz typ.	$\pm 3$ typ.* <sup>4</sup>	-50 at 140 GHz -60 at 220 GHz	40 GHz
220 to 325	WM 490G* <sup>6</sup> Opt. 01	J	-65 at 220 GHz -50 at 325 GHz typ.* <sup>5</sup>	$\pm 3$ typ.* <sup>4</sup>	-60 at 220 GHz -70 at 325 GHz	—

\*<sup>1</sup> Equivalent average noise level using a 490 or 2750 Series spectrum analyzer in 1 kHz resolution bandwidth.

\*<sup>2</sup> Maximum amplitude variation across each waveguide mixer band (using a 490 or 2750 Series spectrum analyzer with peaking control optimized at each frequency in response to a -30 dBm CW input signal to the mixer).

\*<sup>3</sup> LO drive +10 dBm peaking control optimized.

\*<sup>4</sup> Over any 5 GHz bandwidth for millimeter wave mixers above 60 GHz.

\*<sup>5</sup> Value estimated at 325 GHz.

\*<sup>6</sup> Tapered waveguide transition allowing WM 490G to cover this range.

\*<sup>7</sup> These low-pass filters are in LO/IF connector.

### INDIVIDUAL MIXER MECHANICAL CHARACTERISTICS

Tektronix Model* <sup>3</sup>	Waveguide (EIA)	Flange (JAN)	Length		Width* <sup>1</sup>		Height* <sup>1</sup>	
			cm	in.	cm	in.	cm	in.
WM 490K	WR-42	UG-595/U	8.97	3.53	2.22	0.875	3.68	1.45
WM 490A	WR-28	UG-599/U	6.93	2.73	1.90	0.750	3.35	1.32
WM 490Q	WR-22	UG-383/U	5.37	2.125	1.84	0.725	2.82	1.110
WM 490U	WR-19	UG-383/U-M	4.52	1.78	1.84	0.725	2.45	0.980
WM 490V	WR-15	UG-385/U	4.31	1.70	0.89	0.350	2.29	0.900
WM 490E	WR-12	UG-387/U	4.31	1.70	0.89	0.350	2.29	0.900
WM 490W	WR-10	UG-387/U-M	4.31	1.70	0.89	0.350	2.29	0.900
WM 490F	WR-08	UG-387/U-M* <sup>2</sup>	4.31	1.70	0.89	0.350	2.29	0.900
WM 490D	WR-06	UG-387/U-M* <sup>2</sup>	4.31	1.70	0.89	0.350	2.29	0.900
WM 490G	WR-05	UG-387/U-M* <sup>2</sup>	4.31	1.70	0.89	0.350	2.29	0.900
119-1728-00 G-J Band flange transition	WR-05 WR-03	74-003 74-005						

\*<sup>1</sup> Physical dimensions exclude contribution due to the diameter of round waveguide flanges in U, V, E, W, F, D, and G bands.

\*<sup>2</sup> All mixers are equipped with standard UG-XXX/U type flanges as indicated. Flange adaptors to standard MIL-F-3022 type flanges are provided in F, D, and G bands at no additional charge.

\*<sup>3</sup> All mixers include a protective flange cover, an LO/IF port protective shorting cap, and two captive flange screws for round flange mixers.

## ORDERING INFORMATION

**18 to 26.5 GHz**—Order WM 490K. **\$1,310**

**26.5 to 40 GHz**—Order WM 490A. **\$1,310**

**33 to 50 GHz**—Order WM 490Q. **\$1,520**

**40 to 60 GHz**—Order WM 490U. **\$1,805**

**50 to 75 GHz**—Order WM 490V. **\$2,045**

**60 to 90 GHz**—Order WM 490E. **\$2,225**

**75 to 110 GHz**—Order WM 490W. **\$2,280**

**90 to 140 GHz**—Order WM 490F. **\$2,445**

**110 to 170 GHz**—Order WM 490D. **\$3,410**

**140 to 220 GHz**—Order WM 490G. **\$3,490**

**220 to 325 GHz**—Order WM 490G

Opt. 1. **\$1,260**

**18 to 40 GHz Set**—Order WM 4902. **\$2,675**

Includes: WM 490K, WM 490A.

**18 to 60 GHz Set**—Order WM 4903. **\$4,515**

Includes: WM 490K, WM 490A, WM 490U.

**18 to 90 GHz Set**—Order WM 4904. **\$6,740**

Includes: WM 490K, WM 490A, WM 490U, WM 490E.

**18 to 140 GHz Set**—Order WM 4905. **\$9,190**

Includes: WM 490K, WM 490A, WM 490U, WM 490E, WM 490F.

**Cable**—Order 012-0649-00. **\$33**

**Case**—Order 016-0465-01. **\$30**

**220 to 325 GHz**—Tapered transition used with WM 490G. Order 119-1728-00. **\$1,495**

**Diplexer Assembly**—Order 015-0385-00. **\$235**

**Diplexer Assembly Cable**—Required for use with Diplexer Assembly. Order 012-0649-00. **\$33**

### GENERAL PURPOSE WAVEGUIDE MIXERS AND SET

**12.5 to 18 GHz**—Order 119-0097-01. **\$335**

**18 to 26.5 GHz**—Order 119-0098-01. **\$455**

**26.5 to 40 GHz**—Order 119-0099-01. **\$500**

**Cable**—Order 012-0748-00. **\$60**

**Case**—Order 016-0465-01. **\$30**

**12.5 to 40 GHz Set**—Order 016-0640-00. **\$1,405**

Includes: 119-0097-01, 119-0098-01, 119-0099-01.