

# Modulation and Deviation Meters

## TF 2304

<b>RF INPUT</b>	
Carrier frequency range	9 to 12.5 MHz and 18 to 1000 MHz with automatic tuning and automatic level setting. Maximum time to reading: approximately 5 s.
Sensitivity	Version 52304-900S (Standard sensitivity). Better than 50 mV up to 600 MHz. Better than 100 mV up to 1000 MHz. Version 52304-302E (High sensitivity). Better than 5 mV up to 600 MHz. Better than 10 mV from 600 to 800 MHz. Better than 20 mV from 800 to 1000 MHz.
Maximum working input	Version 52304-900S 1 V r.m.s. extending to 7 V with switchable 20 dB nominal pad. Version 52304-302E 100 mV r.m.s. extending to 1 V with switchable 20 dB nominal pad.
Maximum safe input	Version 52304-900S 1 W (7 V into 50 $\Omega$ ) continuous. Version 52304-302E 250 mW (3.5 V into 50 $\Omega$ ) continuous, providing the 20 dB attenuator is switched in.
Switchable attenuator	20 dB nominal.
Input impedance	50 $\Omega$ nominal.
Level indication	Two l.e.d. lamps indicate if the input level is too low or too high.
<b>FREQUENCY MODULATION</b>	
Deviation ranges	Eight ranges (using $\times 2$ and $\times 10$ switches) giving full scale peak deviations of 1.5, 3, 5, 10, 15, 30, 50 and 150 kHz. Positive or negative deviation indication is selected by a switch.
Deviation accuracy	$\pm 3\%$ of f.s.d. at 1 kHz modulation frequency.
Modulation frequency range	Over the range 50 Hz to 9 kHz, deviation measurements are within $\pm 0.5$ dB w.r.t. 1 kHz.
Inherent noise	Deviation due to noise is less than 40 Hz at 150 MHz (42 dB down on 5 kHz deviation), measured in 3 dB bandwidth of 15 kHz nominal with 100 mV input.
AM rejection	Better than 26 dB below output corresponding to 5 kHz deviation with 30% a.m. at 1 kHz modulation frequency (normally better than 36 dB).
<b>AMPLITUDE MODULATION</b>	
Modulation depth range	Full scale indication 10%, 30% and 100% (usable up to 95%). Peak or trough indication selected by a switch.
Depth accuracy	$\pm 3\%$ of f.s.d. on 30% and 100% ranges for depths up to 80% and 1 kHz modulation frequency, at carrier frequencies up to 400 MHz.
Modulation frequency range	Over the range 50 Hz to 9 kHz, modulation depth measurements are within $\pm 0.5$ dB w.r.t. 1 kHz.
Noise	Better than 50 dB down on 100% modulation output in a nominal 3 dB bandwidth of 15 kHz at an input level of 100 mV.

<b>IF OUTPUT</b>	
Frequency Level	Available at front panel socket. 400 kHz nominal. 100 mV e.m.f. nominal from 1 k $\Omega$ source.
<b>AF OUTPUT</b>	
Level	Demodulated a.f. output available at front panel socket. 1 mW nominal into 600 $\Omega$ with meter at f.s.d.
3 dB bandwidth	Nominally 20 Hz to 15 kHz.
Distortion	Less than 1% for a.m. up to 80% depth (normally less than 0.5%). Less than 1% for f.m. up to 150 kHz deviation (normally less than 0.5%).
De-emphasis	Switchable to 0 or 750 $\mu$ s. On 750 $\mu$ s position output falls at nominal 6 dB/octave above 300 Hz.
<b>CONNECTORS</b>	
<b>POWER REQUIREMENTS</b>	
AC supply	95 to 130 V and 190 to 264 V 45 to 500 Hz. 6 VA approximately.
Internal battery	21 V rechargeable Nickel Cadmium battery. Nominally eight hours operation on full charge.
<b>SAFETY</b>	
<b>LIMIT RANGE OF OPERATION</b>	
Temperature	0 to 55°C.
<b>CONDITIONS OF STORAGE AND TRANSPORT</b>	
Temperature	-40°C to +70°C.
Humidity	Up to 90% relative humidity.
Altitude	Up to 2500 m (pressurised freight at 27 kPa differential, i.e. 3.9 lbf/in <sup>2</sup> ).
<b>RADIO FREQUENCY INTERFERENCE</b>	
<b>DIMENSIONS AND WEIGHT</b>	
Conforms with the requirements of EEC Directive 76/889 as to limits of r.f. interference.	
Height	100 mm
Width	206 mm
Depth	305 mm
Weight	2.7 kg
	3.9 in 8.1 in 12 in 6 lb
(Weight without battery).	

### VERSIONS AND ACCESSORIES

When ordering please quote eight digit code numbers

Ordering numbers	Versions
52304-900S 52304-302E	FM/AM Modulation Meter TF 2304. TF 2304. High Sensitivity version.
Supplied Accessories	
Mains Lead 43129-003W Instruction Manual.	
Optional Accessories	
Coaxial Lead TM 4969/3. RF Fuse Unit TM 9884. Carrying Case. 12 W, 50 $\Omega$ Termination. 1 W, 50 $\Omega$ , 20 dB Attenuator. 20 W, 50 $\Omega$ , 20 dB Attenuator. Signal Sniffer. Rechargeable Battery, 21 V.	
43126-012S 43281-007C 54112-121N 54422-011A 54431-011D 54431-021B 54452-011E 54463-011D	