



The Power of Precision in WDM Wavelength Testing

## OPTICAL WAVELENGTH METER

## 228 Series

### Reliable accuracy gives you greater confidence in your WDM test results.

Bristol Instruments, the leader in wavelength measurement instrumentation, offers a family of optical wavelength meters specifically developed for the precise characterization of WDM lasers. The 228 Series Optical Wavelength Meter uses proven interferometer-based technology to measure the wavelength of CW lasers to the highest accuracy available. This performance is maintained over long periods of time with continuous calibration using a built-in wavelength standard. What's more, features such as short measurement time, straightforward operation, and rugged design satisfy the needs of both the R&D scientist and the manufacturing engineer.



### KEY FEATURES

- Optical wavelength measured to an accuracy as high as  $\pm 0.3$  pm.
- Continuous calibration with a built-in wavelength standard.
- Measurement confidence level of  $\geq 99.7\%$ .
- Traceable to NIST standards.
- Simultaneous measurement of total optical power to an accuracy of  $\pm 0.5$  dB.
- Operation from 700 to 1650 nm.
- Measurement rate of 10 Hz for reduced testing times.
- High sensitivity of -30 dBm (1  $\mu$ W) with automatic electronic gain control.
- Convenient front-panel display reports measurement data in a variety of formats.
- Interfacing via SCPI using USB, Ethernet, or GPIB.
- Rugged design for manufacturing environments.

It's Our Business to be Exact!

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# SPECIFICATIONS

# 228 Series

MODEL	228A	228B
<b>OPTICAL SIGNAL</b> <sup>1</sup>	CW only	
<b>WAVELENGTH</b>		
Range	700 – 1650 nm (182 – 429 THz)	
Accuracy <sup>2, 3</sup>	± 0.2 parts per million (± 0.3 pm at 1550 nm)	± 0.65 parts per million (± 1.0 pm at 1550 nm)
Repeatability <sup>4, 5, 6</sup>	± 0.03 parts per million (± 0.05 pm at 1550 nm)	± 0.1 part per million (± 0.15 pm at 1550 nm)
Calibration	Continuous - built-in stabilized single-frequency HeNe laser	Continuous - built-in standard HeNe laser
Display Resolution	0.00001 nm	0.0001 nm
Units <sup>7</sup>	nm, cm <sup>-1</sup> , THz	
<b>POWER</b>		
Calibration Accuracy	± 0.5 dB (± 30 nm from 1310 and 1550 nm)	
Linearity <sup>6</sup>	± 0.3 dB (700 – 1600 nm)	
Polarization Dependence	± 0.5 dB (700 – 1600 nm)	
Display Resolution	0.01 dB	
Units	dBm, mW, μW	
<b>OPTICAL INPUT SIGNAL</b>		
Maximum Bandwidth <sup>8</sup>	1 GHz (8 pm at 1550 nm)	10 GHz (80 pm at 1550 nm)
Sensitivity <sup>6, 9</sup>	1250 – 1650 nm: -30 dBm (1 μW) 1000 nm: -25 dBm (3 μW) 700 nm: -10 dBm (100 μW)	
Maximum Power	+ 10 dBm (displayed level), + 18 dBm (safe level)	
Return Loss	35 dB (UPC connector), 50 dB (APC connector)	
<b>MEASUREMENT RATE (TIME)</b>	10 Hz (0.1 s)	
<b>MEASUREMENT MODES</b>	Wavelength and power Maximum, minimum, delta (max-min) of wavelength and power over time Current, start, drift (current-start) of wavelength and power over time	
<b>INPUTS/OUTPUTS</b>		
Optical Input	9/125 μm single-mode fiber (FC/UPC or FC/APC)	
Instrument Interface	Library of commands (SCPI) via USB 2.0, Ethernet, and optional GPIB	
<b>ENVIRONMENTAL</b> <sup>6</sup>		
Warm-Up Time	< 15 minutes	None
Temperature	+15°C to +30°C (-10°C to +70°C storage)	
Pressure	500 - 900 mm Hg	
Humidity	≤ 90% R.H. at + 40°C (no condensation)	
<b>DIMENSIONS AND WEIGHT</b>		
Dimensions (H x W x D)	3.5" x 17.0" x 15.0" (89 mm x 432 mm x 381 mm)	
Weight	17 lbs (7.65 kg)	
<b>POWER REQUIREMENTS</b>	90 - 264 VAC, 47 - 63 Hz, 80 VA max	
<b>WARRANTY</b>	5 years	

- (1) Maximum amplitude noise of 1%.
- (2) Defined as measurement uncertainty, or maximum wavelength error, with a confidence level of ≥ 99.7%.
- (3) Traceable to an NIST standard (SRM 2517a).
- (4) For 228A, standard deviation for a 10 minute measurement period.
- (5) For 228B, standard deviation for a 1 minute measurement period. Long-term measurement variations are < ± 0.4 ppm.
- (6) Characteristic performance, but non-warranted.
- (7) Data in units of nm and cm<sup>-1</sup> are given as vacuum values.
- (8) Bandwidth is FWHM.
- (9) Performance at other wavelengths can be determined from graphs that are available upon request.



Bristol Instruments reserves the right to change the detail specifications as may be required to permit improvements in the design of its products. Specifications are subject to change without notice.