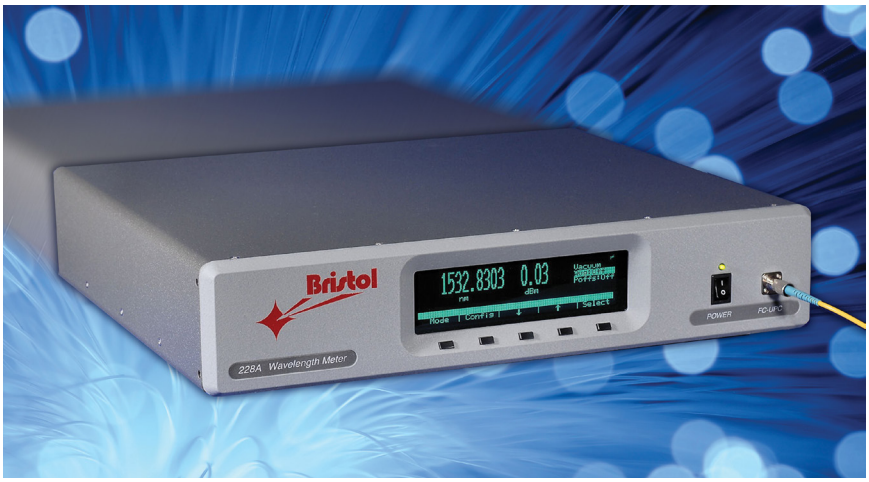
Bristol Instruments

228 Series

OPTICAL WAVELENGTH METER



Reliable accuracy gives you greater confidence in your WDM wavelength test results

Bristol Instruments, a leader in wavelength measurement technology, offers a family of optical wavelength meters specifically designed for the precise characterization of WDM lasers. The 228 Series Optical Wavelength Meter combines high accuracy and exceptional repeatability to achieve the most meaningful test results. 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.

Highest guaranteed wavelength accuracy

The 228 Optical Wavelength Meter uses a proven optical interferometer-based design to measure absolute wavelength of CW lasers to the highest accuracy available. Two versions are offered. The model 228A is the most accurate, measuring wavelength to an accuracy of ± 0.3 pm. For less exacting test requirements, the model 228B is a lower-priced alternative with a wavelength accuracy of ± 1.0 pm.

Continuous calibration and exceptional repeatability

The accuracy of the 228 Optical Wavelength Meter is maintained over long periods of time because it is continuously calibrated with a built-in HeNe laser wavelength standard. In order to achieve the highest accuracy, the model 228A uses a single-frequency HeNe laser that is stabilized using a precise balanced longitudinal mode technique. A standard HeNe laser is used as the wavelength reference in the model 228B. A unique Michelson interferometer design minimizes the variation between consecutive wavelength measurements resulting in a repeatability that supports a confidence level of ≥ 99.7%. To verify this performance, every 228 system is rigorously tested with laser sources that are traceable to NIST standards.

Designed for productivity and convenience

The 228 Optical Wavelength Meter is the most efficient way to analyze the wavelength characteristics of WDM lasers. The measurement cycle time is only 0.1 seconds. The optical signal enters the 228 system through an FC (UPC or APC) fiber-optic connector on the front panel. The system's high sensitivity results in a minimum input requirement as low as -30 dBm (1 µW). Automatic electronic gain control instantly adjusts the photodetector signal for optimum performance. The controls of the model 228 are user-friendly and conveniently located on the front panel along with the measurement display. The measured wavelength and power, maximum and minimum values, and total drift over time are reported in various formats. These results can also be sent to a PC via SCPI using a standard USB or Ethernet interface, or an optional GPIB interface. Finally, the 228 system is packaged in a rugged chassis (bench top or rack-mounted) for use in typical laboratory or manufacturing environments.

FEATURES

- Absolute wavelength measured to an accuracy as high as ± 0.3 pm
- Continuous calibration with a built-in wavelength standard
- Measurement confidence level of ≥ 99.7%
- Traceable to NIST standards
- Simultaneous measurement of total optical power
- Measurement time of only 0.1 s
- Input power requirement as low as -30 dBm
- Rugged design for manufacturing environments

The Power of Precision in Wavelength Measurement

SPECIFICATIONS — 228 Series

MODEL		228A	228B
OPTICAL SIGNAL		CW only	
WAVELENGTH			
	Range	700 –1650 nm (182 – 429 THz)	
	Absolute Accuracy [1,2]	± 0.2 parts per million (± 0.3 pm at 1550 nm)	± 0.65 parts per million (± 1.0 pm at 1550 nm)
	Repeatability [3,4]	± 0.1 part per million (± 0.15 pm at 1550 nm)	± 0.3 parts per million (± 0.5 pm at 1550 nm)
	Calibration	Continuous with built-in stabilized single-frequency HeNe laser	Continuous with built-in standard HeNe laser
	Display Resolution	0.00001 nm	0.0001 nm
	Units [5]	nm, cm^{-1}, THz	
POWER			
	Calibration Accuracy [4, 6]	± 0.5 dB (± 30 nm from 1310 and 1550 nm)	
	Linearity [4]	± 0.3 dB (700 – 1600 nm)	
	Polarization Dependence	± 0.5 dB (700 – 1600 nm)	
	Display Resolution	0.01 dB	
	Units	dBm, mW, µW	
OPTICAL INPUT SIGNAL			
	Maximum Laser Bandwidth [7]	1 GHz (8 pm at 1550 nm)	10 GHz (80 pm at 1550 nm)
	Sensitivity [4, 6]	1250 – 1650 nm: -30 dBm (1 µW) 1000 nm: -25 dBm (3 µW) 700 nm: -10 dBm (100 µW)	
	Maximum Power — Displayed level Safe level	+ 10 dBm (10 mW) + 18 dBm (63 mW)	
	Return Loss — UPC connector APC connector	35 dB 50 dB	
MEASUREMENT TIME (RATE)		0.1 s (10 Hz)	
MEASUREMENT MODES		Wavelength and power Wavelength maximum, minimum, total drift over time Power maximum, minimum, total drift over time	
INPUTS/OUTPUTS			
	Optical Input	Pre-aligned FC/UPC or FC/APC connecter (9/125 µm optical fiber)	
	Instrument Interface	SCPI via USB 2.0, Ethernet, and GPIB (optional)	
ENVIRONMENTAL [4]			
	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)	
DIMENSIONS AND WEIGHT			
	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)	
POWER REQUIREMENTS		90 - 264 VAC, 47 - 63 Hz, 80 VA max	

(1) Defined as measurement uncertainty, or maximum wavelength error, using a coverage factor of 3 providing a confidence level of ≥ 99.7%.
(2) Traceable to an NIST standard (SRM 2517a).
(3) For a 10 minute measurement period given at three times the standard deviation (3σ).
(4) Characteristic performance, but non-warranted.
(5) Data in units of nm and cm^{-1} are given as vacuum values.
(6) Performance at other wavelengths can be determined from graphs that are available upon request.
(7) Bandwidth is FWHM. When bandwidth is greater, wavelength accuracy is reduced.

CE CLASS 1 LASER PRODUCT