



The Power of Precision

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

Bristol Instruments, founded by former employees of Burleigh®, has developed a new family of optical wavelength meters specifically for DWDM testing applications. The 228 Series Optical Wavelength Meter combines high accuracy and exceptional repeatability to achieve the most meaningful test results.

In addition to its reliable accuracy, features such as short measurement time, straightforward operation, and rugged design satisfy the needs of both the R&D scientist and the manufacturing engineer. The model 228 is the ideal instrument for precise wavelength characterization of tunable DWDM lasers, DFB lasers, and VCSELs. It can also be used to calibrate passive DWDM component test equipment such as optical spectrum analyzers.

FEATURES

- Absolute optical wavelength measured to the highest accuracy of ± 0.3 pm
- Continuous calibration with a built-in wavelength standard
- Optical wavelength measured to a confidence level of 3σ ($\geq 99.6\%$)
- Simultaneous measurement of total optical power
- Measurement time as short as 0.1 s
- Rugged design for manufacturing environments

OPTICAL WAVELENGTH METER 228 SERIES



Highest guaranteed wavelength accuracy

The 228 Series Optical Wavelength Meter uses a proven optical interferometer-based design to measure absolute wavelength to the highest accuracy available. Two versions are offered. The model 228A is used for the most demanding applications, measuring wavelength to an accuracy of ± 0.3 pm. For less exacting test requirements, the model 228B is a lower-price alternative with a wavelength accuracy of about ± 1 pm.

Continuous calibration and exceptional repeatability

The accuracy of the 228 Series 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 3-sigma. This means that $\geq 99.6\%$ of the wavelength measurements will fall within the specified accuracy limits. To verify this performance, every 228 system is rigorously tested with laser sources that are traceable to NIST-accepted physical standards.

Designed for productivity and convenience

The 228 Optical Wavelength Meter is the most efficient way to analyze the wavelength characteristics of DWDM lasers. A measurement cycle time of 0.1 seconds is the shortest available. And, straightforward operation requires virtually no learning curve.

The optical signal enters the 228 system through an FC/UPC or an FC/APC fiber-optic connector on the front panel. The system's high sensitivity results in a minimum input requirement of only $1 \mu\text{W}$ (-30 dBm). 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 directly to a PC using a high-speed USB or Ethernet interface.

SPECIFICATIONS

		228A	228B
WAVELENGTH			
Range	1250 - 1650 nm (240 - 182 THz)		
Absolute Accuracy ¹	± 0.2 parts per million ± 0.3 pm @ 1550 nm	± 0.75 parts per million ± 1.2 pm @ 1550 nm	
Repeatability ²	± 0.1 part per million ± 0.15 pm @ 1550 nm	± 0.3 parts per million ± 0.5 pm @ 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	nm or cm ⁻¹ (vacuum or standard air), THz		
POWER			
Calibration Accuracy	± 0.5 dB (at ± 30 nm from 1310, and 1550 nm)		
Linearity	± 0.3 dB (1250 - 1600 nm)		
Polarization Dependence	± 0.5 dB (1250 - 1600 nm)	± 1.0 dB (1600 - 1650 nm)	
Display Resolution	0.01 dB		
Units	dBm, μW, mW		
OPTICAL INPUT SIGNAL			
Maximum Laser Bandwidth ³	1 GHz 8 pm at 1550 nm	10 GHz 80 pm at 1550 nm	
Sensitivity	-30 dBm (1 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 MODES			
Display Options	Wavelength and power Wavelength maximum, minimum, total drift over time Power maximum, minimum, total drift over time		
MEASUREMENT CYCLE TIME			
Time (Rate)	0.25 s (4 Hz)	0.1 s (10 Hz)	
INPUTS/OUTPUTS			
Optical Input	9/125 μm single-mode fiber (FC/UPC or FC/APC)		
Instrument Interface	USB 2.0, Ethernet		
ENVIRONMENTAL			
Warm-Up Time	< 15 minutes	None	
Temperature ⁴	+15°C to +30°C (-10°C to +70°C storage)		
Pressure ⁴	500 - 900 mm Hg		
Humidity ⁴	≤ 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			
Voltage and Frequency	90 to 260 VAC, 50/60 Hz		
Power	80 VA max		

- (1) Confidence level of 3σ (≥99.6%) and traceable to NIST-accepted physical standards.
 (2) For a 10 minute measurement period given at 3σ. Standard deviation is one-third of the value given.
 (3) Bandwidth is FWHM. When bandwidth is greater, wavelength accuracy is reduced.
 (4) Typical

**CLASS 1 LASER PRODUCT
 COMPLIES WITH
 21 CFR 1040.10 AND 1040.11**



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.

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