MULTI-WAVELENGTH METER

428 Series

Test your WDM signals with the confidence that results from reliable accuracy.

Bristol Instruments, a leader in optical wavelength measurement technology, offers a family of multi-wavelength meters for testing WDM signals. The ***428 Series*** **Multi-Wavelength Meter** measures the wavelength, power, and OSNR of as many as 1000 optical channels. What's more, with features such as straightforward operation and rugged design, the model 428 satisfies the needs of both the R&D scientist and the manufacturing engineer.

Simultaneous wavelength, power, and OSNR measurement

The 428 Multi-Wavelength Meter combines proven Michelson interferometer-based technology with fast Fourier transform analysis. This results in the ability to measure the wavelength and power of up to 1000 discrete optical signals. Wavelength is measured to an accuracy as high as ± 0.3 pm and power is measured to an accuracy of ± 0.5 dB. In addition, the 428 system automatically calculates OSNR to greater than 40 dB.

Reliable accuracy with continuous calibration

Two versions of the 428 Multi-Wavelength Meter are available. The model 428A is the most accurate, measuring wavelength to ± 0.3 pm. For less exacting test requirements, the model 428B is a lower-priced alternative with a wavelength accuracy of ± 1.0 pm. The wavelength accuracy of the 428 system 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 428A 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 428B.The result is a measurment confidence level of 3-sigma. To verify this performance, every 428 system is rigorously tested with laser sources that are traceable to NIST standards.

Designed for productivity and convenience

Operation of the 428 Multi-Wavelength Meter is straightforward. The optical signal enters the model 428 through an FC (UPC or APC) fiber-optic connector on the front panel. The system's high sensitivity results in an input power requirement of only 0.1 µW. Automatic electronic gain control instantly adjusts the photodetector signal for optimum performance. The controls of the 428 system are user-friendly and conveniently located on the frontpanel along with the measurement display. The wavelength, power, and OSNR data can be reported in a variety of formats. Data from a specific optical channel can be displayed, or lists of data from all channels, sorted by wavelength or power, can be displayed. The measurement information can also be sent to a PC using a standard USB or Ethernet interface, or an optional GPIB interface. Finally, the 428 system is packaged in a rugged chassis (bench top or rack-mounted) for use in typical laboratory or manufacturing environments.

FEATURES

- Simultaneously measures wavelength and power of up to 1000 optical signals
- Absolute optical wavelength measured to an accuracy as high as ± 0.3 pm
- Continuous calibration with a built-in wavelength standard
- Measurement confidence level of 3σ
- Calculates OSNR to > 40 dB
- Operation with CW and modulated signals
- Rugged design for manufacturing environments

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Bristol Instruments

The Power of Precision

SPECIFICATIONS

	428A	428B
OPTICAL SIGNAL	CW and modulated	
WAVELENGTH		
Range	1270 – 1650 nm (182 – 236 THz)	
Absolute Accuracy [1, 2]	± 0.2 parts per million (± 0.3 pm at 1550 nm) (± 0.3 pm at 1310 nm)	± 0.65 parts per million (± 1.0 pm at 1550 nm) (± 0.9 pm at 1310 nm)
Differential Accuracy [3]	± 0.15 parts per million	± 0.5 parts per million
Minimum Resolvable Separation [2, 3]	10 GHz (equal power lines input)	
Calibration	Continuous with built-in stabilized single-frequency HeNe laser	Continuous with built-in standard HeNe laser
Display Resolution	0.0001 nm	
Units [4]	nm, cm^{-1}, THz	
POWER		
Calibration Accuracy	± 0.5 dB (± 30 nm from 1310 and 1550 nm)	
Flatness [3]	± 0.2 dB (1270 – 1600 nm), 30 nm from any wavelength	
Linearity [3]	± 0.3 dB (1270 – 1600 nm), lines above -30 dBm	
Polarization Dependence	± 0.5 dB (1270 – 1600 nm)	
Display Resolution	0.01 dB	
Units	dBm, mW, µW	
SIGNAL-TO-NOISE RATIO [3, 5]	> 40 dB (100 averages), 100 GHz channel spacing > 35 dB (100 averages), 50 GHz channel spacing	
OPTICAL INPUT SIGNAL		
Sensitivity — Single line input	-40 dBm (1270 – 1600 nm), -30 dBm (1600 – 1650 nm)	
Sensitivity — Multiple lines input [3]	30 dB below total input power, but not less than single line input sensitivity	
Maximum Power — Displayed level	+ 10 dBm, sum of all lines input	
Maximum Power — Safe level	+ 18 dBm, sum of all lines input	
Return Loss	35 dB (UPC connector), 50 dB (APC connector)	
Maximum Number of Lines [6]	1000	
MEASUREMENT TIME (RATE)	0.25 s (4 Hz)	
MEASUREMENT MODES		
Data Mode	Single channel, list by wavelength table, list by power table	
Delta Mode	Delta wavelength from ITU grid, delta wavelength and power from reference channel	
Drift Mode	Maximum, minimum, drift (max-min) of wavelengths and powers over time Current, start, drift (current-start) of wavelengths and powers over time	
INPUTS/OUTPUTS		
Optical Input	9/125 µm single-mode fiber (FC/UPC or FC/APC)	
Instrument Interface	SCPI via USB 2.0, Ethernet, and optional GPIB (LabVIEW examples provided)	
ENVIRONMENTAL [3]		
Warm-Up Time	< 15 minutes	None
Temperature | Pressure | Humidity	+15°C to +30°C (-10°C to +70°C storage) | 500 – 900 mm Hg | ≤ 90% R.H. at + 40°C (no condensation)	
DIMENSIONS AND WEIGHT		
Dimensions (H x W x D) | Weight	3.5" x 17.0" x 15.0" (89 mm x 432 mm x 381 mm) | 17 lbs (7.65 kg)	
POWER REQUIREMENTS	90 - 264 VAC, 47 - 63 Hz, 80 VA max	

(1) Confidence level of 3σ (≥ 99.6%) and traceable to an NIST standard.
(2) For multi-wavelength measurement, >15 GHz channel separation is required to achieve specified wavelength accuracy.
(3) Characteristic performance, but non-warranted.
(4) Data in units of nm and cm^{-1} are given as vacuum values.
(5) For lines above -25 dBm, 0.1 nm noise bandwidth.
(6) OSNR is reduced as the number of lines is increased.

CE

CLASS 1
LASER PRODUCT

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