MULTI-WAVELENGTH METER

428 Series

Test your DWDM 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 DWDM signals. The ***428** Series* **Multi-Wavelength Meter** measures the wavelength, power, and OSNR of as many as 250 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 250 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 ± 1.2 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 front panel 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.

Bristol Instruments **The Power of Precision**

FEATURES

- Simultaneously measures wavelength and power of up to 250 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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SPECIFICATIONS

		428A	428B
OPTICAL SIGNAL		CW and modulated	
WAVELENGTH			
	Range	1270 – 1650 nm (182 – 236 THz)	
	Absolute Accuracy [1]	± 0.2 parts per million (± 0.3 pm at 1550 nm)	± 0.75 parts per million (± 1.2 pm at 1550 nm)
	Differential Accuracy [3]	± 0.15 parts per million	± 0.5 parts per million
	Minimum Resolvable Separation [3]	15 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	nm or cm^{-1} (vacuum), THz	
POWER			
	Calibration Accuracy	± 0.5 dB, at ± 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 [2, 3]		> 40 dB with 100 averages, 100 GHz channel spacing > 35 dB with 100 averages, 50 GHz channel spacing	
OPTICAL INPUT SIGNAL			
	Sensitivity — Single line input Multiple lines input [3]	-40 dBm (1270 – 1600 nm), -30 dBm (1600 – 1650 nm) 30 dB below total input power, but not less than single line input sensitivity	
	Maximum Power — Displayed level Safe level	+ 10 dBm, sum of all lines input + 18 dBm, sum of all lines input	
	Return Loss — UPC connector APC connector	35 dB 50 dB	
	Maximum Number of Lines	250	
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	+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) Confidence level of 3σ (≥ 99.6%) and traceable to an NIST standard.
(2) For lines above -25 dBm, 0.1 nm noise bandwidth.
(3) Typical.

CLASS 1
LASER PRODUCT

CE