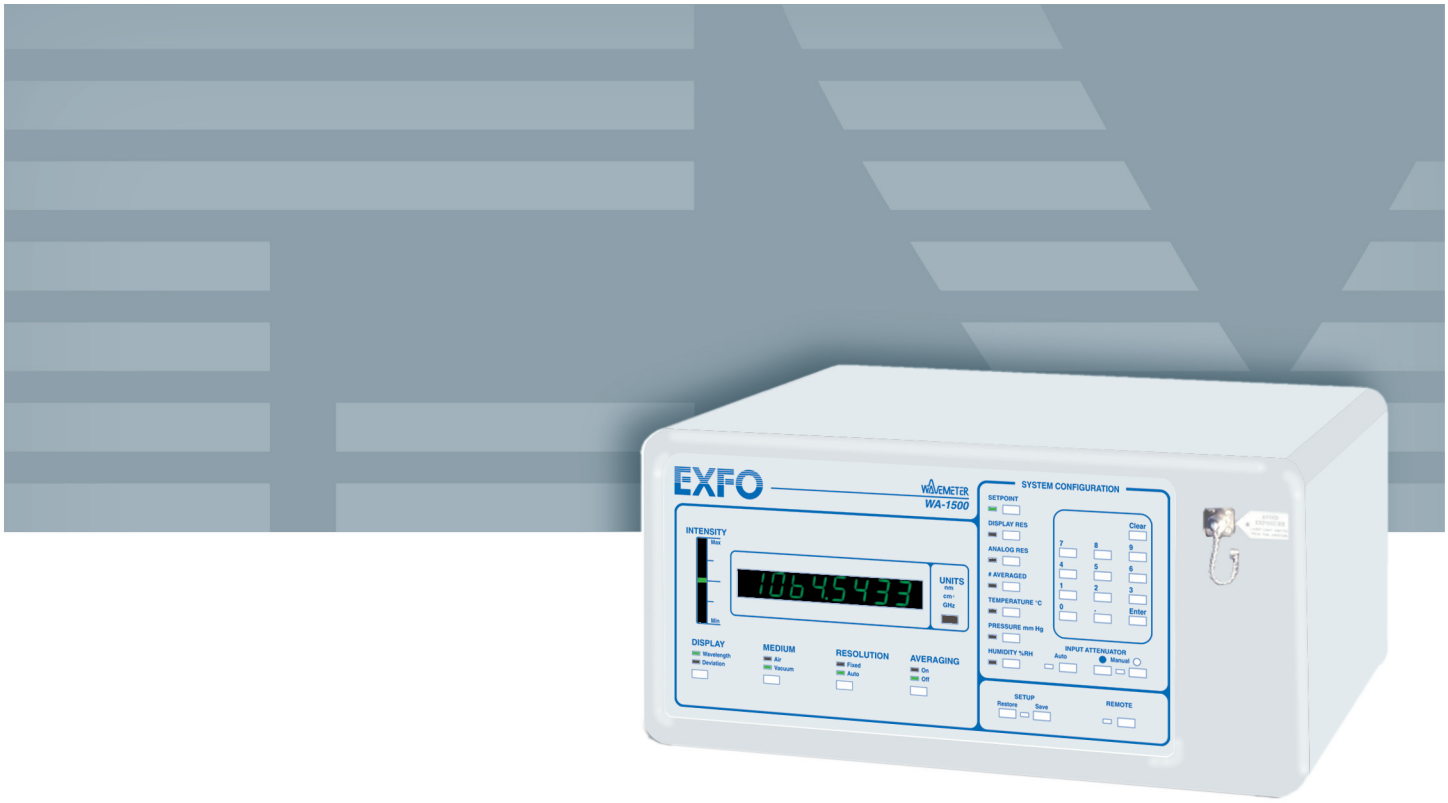
LASER WAVELENGTH METERS

1000/1500 WA-1000/WA-1500 WAVEMETER

R&D AND MANUFACTURING



Most Precise Wavelength Measurement Available

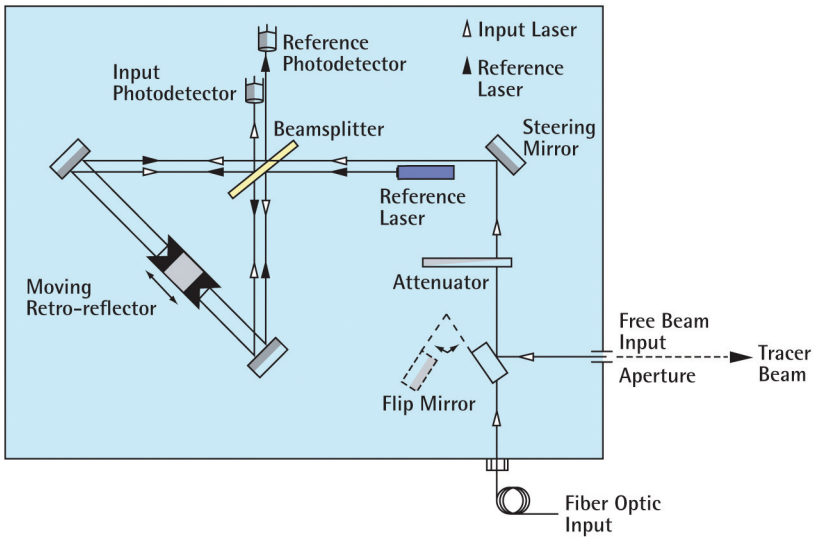
- Real-time laser wavelength verification ensures the most meaningful experimental results
- Highest guaranteed absolute wavelength accuracy of ± 0.2 ppm (± 0.0002 nm at 1000 nm)
- Continuous calibration with built-in wavelength standard
- Wide range of operation from 400 nm to 4 µm

Guarantee Experimental Confidence

The WA-1500 Wavemeter® system is the industry's leading laser wavelength meter, measuring the absolute wavelength of virtually any CW laser to the highest accuracy available, ± 0.2 ppm (± 0.0002 nm at 1000 nm). When the highest accuracy is not required, the WA-1000 is available as a lower-cost alternative, providing an absolute wavelength accuracy of ± 1.0 ppm (± 0.001 nm at 1000 nm).

Proven Wavemeter Technology

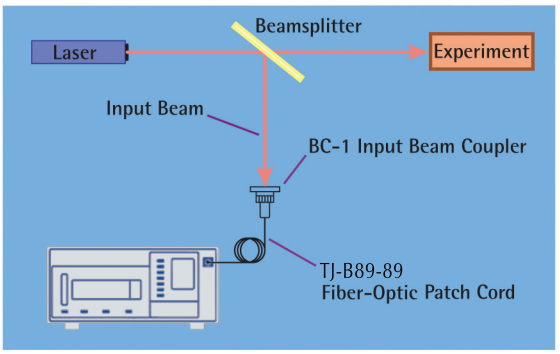
Both the WA-1500 and WA-1000 systems employ proven scanning Michelson interferometer-based Wavemeter technology to determine the absolute wavelength of a laser by comparing its interference fringe pattern with that of a built-in HeNe laser wavelength standard. Unlike other wavelength meters, all factors that can affect the accuracy of the wavelength measurement are taken into account. For example, to measure absolute laser wavelength to the highest accuracy of ± 0.2 ppm, the WA-1500 uses a stabilized single-frequency HeNe laser, with a wavelength known to better than 0.025 ppm, as the internal standard. In addition, both systems use internal temperature and pressure sensors to give the necessary data to correct for any dispersion between the wavelengths of the built-in HeNe laser and the laser under test.



Choice of Operational Wavelength Ranges

Three versions of the WA-1500 and WA-1000 Wavemeter systems are available for different operational wavelength ranges: visible (400 to 1100 nm), near infrared (600 to 1800 nm) and infrared (1.5 to 4.0 µm). Each version includes a photodetector and a beamsplitter optimized for its operational wavelength range. Converting from one wavelength range to another is easy – simply replace the photodetector and beamsplitter.

Convenient Laser Input for Easy Test Set Up



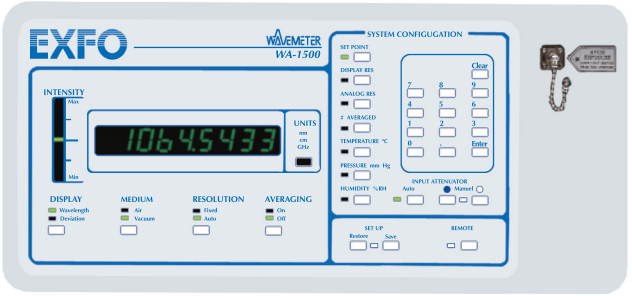
The WA-1500 and WA-1000 Wavemeter systems include two standard methods of laser input. Either a laser beam from an optical fiber enters through a standard FC/PC connector on the front panel or a free-space laser beam enters through an aperture on the side of the system. A flip mirror is used to switch from one input method to the other. The fiber-optic input is used primarily for visible and near infrared wavelengths. EXFO's BC-1 Input Beam Coupler and PC-F-1300 Fiber-Optic Patchcord can be used if the laser beam is not already launched into a fiber. The free-space aperture is necessary for infrared wavelengths when suitable optical fibers are not available.

The fiber-optic input is pre-aligned at EXFO for optimum performance. For free-space laser input, the internal reference HeNe laser beam is emitted from the input aperture as a weak visible tracer beam to facilitate alignment. The laser under test is simply superimposed on the tracer beam.

Because the intensity of a laser can vary, the WA-1500 and WA-1000 systems include an attenuator to provide a total dynamic range of 100 for the optical input. The attenuation is adjusted automatically or it can be set manually. The automatic attenuator mode is particularly useful when scanning a tunable laser over its wavelength range, since the intensity of a tunable laser is quite different at the peak and the ends of its tuning curve.

Display Results in Different Formats

The WA-1500 and WA-1000 Wavemeter systems display either the wavelength (nm) or the wavenumber (cm^{-1}), as an air or vacuum value, or the frequency (GHz) of the laser under test. The resolution of the display depends upon the accuracy to which the wavelength is measured. The highest display resolution is achieved when the laser's bandwidth is less than 1 GHz for the WA-1500 and less than 10 GHz for the WA-1000. As the laser's bandwidth increases, the Wavemeter system automatically displays an appropriately reduced resolution. Therefore, only significant digits are displayed using this auto-resolution feature.



A fixed-resolution mode allows for a fixed display resolution appropriate for a specific application. However, the accuracy of the measurement is still limited by the bandwidth of the laser under test.

These Wavemeter systems also can display a deviation in either wavelength, wavenumber or frequency from any setpoint. Alternatively, a running average of any two to 50 measurements can be calculated.

Remote Control and Analog output

An RS-232 interface is standard with these Wavemeter systems. This interface is bi-directional, making it possible to read the wavelength information and control the status of the system. In addition, an analog output provides a voltage that is proportional to the deviation from a specified wavelength setpoint. This signal can be used to monitor or control a laser's wavelength relative to the setpoint.

Laser Spectrum Analyzer Option

The WA-650 Wavemeter laser spectrum analyzer is used with either the WA-1500 or WA-1000 Wavemeter laser wavelength meters. It automatically derives a laser's spectral characteristics from the Fourier transform of the temporal interference fringe signal form the Wavemeter system. The WA-650 interfaces to a PC via USB, and special Windows-based software generates the laser spectrum for display or for more detailed analysis.

SPECIFICATIONS

	WA-1500	WA-1000
Wavelength		
Range		
VIS	400 to 1100 nm	400 to 1100 nm
NIR	600 to 1800 nm	600 to 1800 nm
IR	1.5 to 4.0 µm	1.5 to 4.0 µm
Absolute accuracy[1]	± 0.2 ppm	± 1.0 ppm
	± 0.0002 nm at 1000 nm	± 0.001 nm at 1000 nm
	± 0.002 cm^{-1} at 10,000 cm^{-1}	± 0.01 cm^{-1} at 10,000 cm^{-1}
	± 0.06 GHz at 300,000 GHz	± 0.3 GHz at 300,000 GHz
Display resolution	0.0001 nm	0.001 nm
	0.001 cm^{-1}	0.01 cm^{-1}
	0.01 GHz	0.1 GHz
Units	nm or cm^{-1} (vacuum or air), GHz	nm or cm^{-1} (vacuum or air), GHz
Optical input signal		
Sensitivity	20 µW (VIS, NIR) 1 mW (IR)	20 µW (VIS, NIR) 1 mW (IR)
Maximum input	2 mW (VIS, NIR) 100 mW (IR)	2 mW (VIS, NIR) 100 mW (IR)
Measurement update		
Time (rate)	1 s (1 measurement/s)	0.25 s (4 measurements/s)
Inputs/outputs		
Optical input		
Fiber	FC/PC	FC/PC
Free space beam	Collimated beam,	Collimated beam,
	2 mm diameter aperture	2 mm diameter aperture
Beam height	165 mm ± 6 mm, adjustable	165 mm ± 6 mm, adjustable
Instrument interface	RS-232 standard	RS-232 standard
Analog output	± 5 volts proportional	± 5 volts proportional
	to wavelength deviation	to wavelength deviation
General Specifications		
Warm-up		
Nominal time	7 minutes	Not applicable
Dimensions and weight		
Dimensions (H x W x D)	20.3 cm x 38.9 cm x 29.2 cm	20.3 cm x 38.9 cm x 29.2 cm
	(8.0 in x 15.3 in x 11.5 in)	(8.0 in x 15.3 in x 11.5 in)
Weight	11.3 kg (25 lbs)	11.3 kg (25 lbs)
Power requirements		
Voltage and frequency	100 to 240 VAC, 50/60 Hz	100 to 240 VAC, 50/60 Hz

1. WA-1500 accuracy of ± 0.2 ppm is achieved when laser spectral bandwidth is less than 1 GHz ((FWHM).
WA-1000 accuracy of ± 1.0 ppm is achieved when laser spectral bandwidth is less than 10 GHz ((FWHM).

ORDERING INFORMATION

WA-1000-XX-89

Model
WA-1000-IR = Wavemeter, 1.5 - 4.0 µm, ±1 ppm
WA-1000-NIR = Wavemeter, 600 - 1800 nm, ±1 ppm
WA-1000-VIS = Wavemeter, 400 - 1100 nm, ±1 ppm

Connector
89 = FC/UPC

Example: WA-1000-VIS-89

WA-1500-XX-89

Model
WA-1500-IR = Wavemeter, 1.5 - 4.0 µm, ± 0.2 ppm
WA-1500-NIR = Wavemeter, 600 - 1800 nm, ± 0.2 ppm
WA-1500-VIS = Wavemeter, 400 - 1100 nm, ± 0.2 ppm

Connector
89 = FC/UPC

Example: WA-1500-VIS-89

ACCESSORIES

WA-650 = Wavemeter
TJ-B89-89 = FC/UPC to FC/UPC
9/125 mm 3M
Test Jumper
BC-1 = Input Beam Coupler

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Printed in Canada 06/06

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