BRISTOL INSTRUMENTS

Accuracy. Reliability. Confidence.

LASER WAVELENGTH METER

871 Series

Fast, accurate, and reliable wavelength measurement of pulsed and CW lasers.

The 871 Series Laser Wavelength Meter from Bristol Instruments uses a proven Fizeau etalon design to measure the wavelength of pulsed and CW lasers to an accuracy as high as ± 0.0001 nm. The system generates a spatial interferogram that is detected by a fast photodetector array. An on-board digital signal processor quickly converts the interferometric information to wavelength resulting in a sustained measurement rate as high as 1 kHz.

Two versions of the 871 Laser Wavelength Meter are available. The model 871A is the most precise, providing an accuracy of ± 0.2 parts per million (± 60 MHz at 1000 nm). For experiments that are less exacting, the model 871B is a lower-priced alternative with an accuracy of ± 0.75 parts per million (± 225 MHz at 1000 nm). Automatic calibration with a built-in wavelength standard guarantees this performance to ensure the most meaningful experimental results.

Key Features:

- Wavelength accuracy up to ± 0.0001 nm.
- Automatic calibration with a built-in wavelength standard.
- Operation available from 375 nm to 2.5 µm.
- Sustained measurement rate of 1 kHz.
- Convenient pre-aligned fiber-optic input.
- Asynchronous operation with automatic pulse detection.
- Straightforward operation with a PC using USB or Ethernet.
- Display software provided to control measurement parameters and report wavelength data.
- Built-in PID controller for precise laser stabilization.
- Automatic data reporting using custom or LabVIEW programming eliminates the need for a dedicated PC.
- Convenient tablet/smartphone application reports measurement data anywhere in the laboratory.
- Five-year warranty covers all parts and labor.

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SPECIFICATIONS — 871 Series

MODEL	871A	871B
LASER TYPE	Pulsed and CW	
WAVELENGTH		
Range	VIS: 375 - 1100 nm NIR: 630 - 1700 nm	VIS: 375 - 1100 nm NIR: 630 - 1700 nm NIR2: 1000 - 2500 nm
Accuracy [1, 2, 3]	± 0.2 ppm (single-mode fiber) ± 0.0002 nm @ 1000 nm ± 60 MHz @ 300,000 GHz	± 0.75 ppm (single-mode fiber) ± 0.0008 nm @ 1000 nm ± 225 MHz @ 300,000 GHz ± 1 ppm (multi-mode graded-index fiber ≤ 62.5 µm diameter) ± 0.001 nm @ 1000 nm ± 300 MHz @ 300,000 GHz
Repeatability [3, 4, 5]	0.0075 ppm 0.0075 pm @ 1000 nm 2.25 MHz @ 300,000 GHz	0.0125 ppm 0.0125 pm @ 1000 nm 3.75 MHz @ 300,000 GHz
Calibration [6]	Automatic with built-in wavelength standard	
Display Resolution	9 digits	8 digits
Units [7]	nm, µm, cm^{-1}, GHz, THz	
OPTICAL INPUT SIGNAL		
Maximum Bandwidth (FWHM)	1 GHz	10 GHz
Minimum Input [8, 9, 10, 11]	VIS: 3 - 300 nJ NIR: 50 - 600 nJ	VIS: 3 - 300 nJ NIR: 30 - 600 nJ NIR2: 50 - 600 nJ
Maximum Input	CW: 10 mW Pulsed: 0.5 mJ (10 ns duration)	
MEASUREMENT RATE	1 kHz (VIS / NIR)	1 kHz (VIS / NIR) 1.5 kHz (NIR2)
INPUTS/OUTPUTS		
Optical Input [12, 13]	Pre-aligned FC/PC fiber connector (optional free beam-to-fiber coupler)	
Instrument Interface	USB and Ethernet interface with Windows-based display program, and browser-based display application Streaming via RS-422 (internal or external TTL trigger) Internal data storage for up to 1 million measurements Library of commands (SCPI) for custom and LabVIEW programming using any PC operating system PID controller (± 5 V output)	
COMPUTER REQUIREMENTS [14]	PC running Windows 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
ENVIRONMENTAL[8]		
Warm-Up Time	< 15 minutes	
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)	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, 50 VA max	
WARRANTY	5 Years (parts and labor)	

(1) Defined as measurement uncertainty, or maximum wavelength error, with a confidence level of ≥ 99.7%.
(2) Traceable to accepted physical standards.
(3) Single-mode input fiber must have single-mode performance at the wavelength of the laser under test.
(4) Standard deviation for a 1 minute measurement period after the instrument has reached thermal equilibrium. Standard deviation for a 10 minute period is about twice the 1 minute specification.
(5) Wavelength resolution is approximately two times repeatability.
(6) For VIS version, stabilized single-frequency HeNe laser. For NIR and NIR2 versions, laser diode locked to acetylene absorption (NIST Special Publication 260-133).
(7) Data in units of nm, µm, and cm^{-1} are given as vacuum values.
(8) Characteristic performance, but non-warranted.
(9) Required minimum energy from a single laser pulse. Greater sensitivity is achieved by increasing the length of the measurement window to allow for the integration of a greater number of laser pulses.
(10) Required minimum power is approximated by multiplying the required minimum energy by the selected measurement rate.
(11) Sensitivity at specific wavelengths can be determined from graphs that are provided in the 871 Series Product Details brochure.
(12) Visual inspection and optimization of the interference fringe pattern is not required.
(13) An FC/PC terminated input fiber is required. System will not operate with FC/APC terminated fiber.
(14) For use with Windows-based display program. Interfacing via SCPI can be done using any PC operating system.

CE