



The Power of Precision in Wavelength Measurement

## LASER WAVELENGTH METER

## 871 Series

### Fastest, most reliable method to accurately measure the wavelength of pulsed and CW lasers

The 871 Laser Wavelength Meter from Bristol Instruments is the best way to measure the absolute wavelength of both pulsed and CW lasers and OPOs. By combining proven Fizeau etalon technology with automatic calibration, the reliable accuracy needed for the most meaningful experimental results is ensured. What's more, a sustained measurement rate of 1 kHz enables the wavelength characterization of every single pulse for most lasers. And, the resulting time resolution of 1 ms provides the most detailed analysis of tunable lasers.



### KEY FEATURES

- Operates with both pulsed and CW lasers.
- Wavelength measured to an accuracy as high as  $\pm 0.2$  parts per million ( $\pm 60$  MHz at 1000 nm).
- Automatic calibration with a built-in wavelength standard.
- Operation available from 375 nm to 2.5  $\mu\text{m}$ .
- Minimum input as low as 3 nJ (3  $\mu\text{W}$  at 1 kHz).
- Pre-aligned fiber-optic input eliminates the need to manually optimize the interference signal.
- Asynchronous operation with automatic pulse detection.
- Fastest sustained measurement rate of 1 kHz results in time resolution of 1 ms.
- Built-in PID controller for precise laser stabilization.
- Straightforward operation with PC using USB or Ethernet interfaces.
- Display software provided to control measurement parameters and report wavelength data.
- Convenient tablet/smartphone application reports measurement data anywhere in the laboratory.
- Automatic data reporting using custom or LabVIEW programming eliminates the need for a dedicated PC.

**It's Our Business to be Exact!**

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# SPECIFICATIONS

# 871 Series

MODEL	871A	871B
<b>LASER TYPE</b>	Pulsed and CW	
<b>WAVELENGTH</b>		
Range	<b>VIS:</b> 375 - 1100 nm <b>NIR:</b> 630 - 1700 nm	<b>VIS:</b> 375 - 1100 nm <b>NIR:</b> 630 - 1700 nm <b>NIR2:</b> 1000 - 2500 nm
Accuracy <sup>1, 2, 3</sup>	± 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 <sup>4, 5</sup>	± 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 <sup>6</sup>	Automatic with built-in wavelength standard	
Display Resolution	9 digits	8 digits
Units <sup>7</sup>	nm, μm, cm <sup>-1</sup> , GHz, THz	
<b>OPTICAL INPUT SIGNAL</b>		
Maximum Bandwidth (FWHM)	1 GHz	10 GHz
Minimum Input <sup>8, 9, 10, 11</sup>	<b>VIS:</b> 3 - 300 nJ <b>NIR:</b> 50 - 600 nJ	<b>VIS:</b> 3 - 300 nJ <b>NIR:</b> 30 - 600 nJ <b>NIR2:</b> 50 - 600 nJ
<b>MEASUREMENT RATE</b>	1 kHz	
<b>INPUTS/OUTPUTS</b>		
Optical Input <sup>12, 13</sup>	Pre-aligned FC/PC fiber connector (optional free beam-to-fiber coupler)	
Instrument Interface	USB and Ethernet interface with Bristol's Windows-based display program 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)	
<b>COMPUTER REQUIREMENTS <sup>14</sup></b>	PC running Windows 7, 8, or 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
<b>ENVIRONMENTAL <sup>8</sup></b>		
Warm-Up Time	< 15 minutes	
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)	
<b>DIMENSIONS AND WEIGHT</b>		
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)	
<b>POWER REQUIREMENTS</b>	90 - 264 VAC, 47 - 63 Hz, 50 VA max	

- (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<sup>-1</sup> 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 Bristol's Windows-based display program. Interfacing via SCPI can be done using any PC operating system.



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.