

LASER WAVELENGTH METER

671 Series



Reliable accuracy gives you greater confidence in your experimental results.

The 671 Series Laser Wavelength Meter from Bristol Instruments uses proven Michelson interferometer-based technology to accurately measure the wavelength of CW lasers that operate from the visible to mid-infrared.

Two versions are available. The model 671A is the most precise, measuring wavelength to an accuracy of ± 0.2 parts per million (± 0.0002 nm at 1000 nm). For experiments that are less exacting, the model 671B is a lower-priced alternative with an accuracy of ± 0.75 parts per million (± 0.0008 nm at 1000 nm).

To guarantee wavelength measurement accuracy, the 671 Laser Wavelength Meter is continuously calibrated with a built-in HeNe laser. This is an ideal reference source because its wavelength is well-known and fixed by fundamental atomic structure. To achieve the highest accuracy, the 671A system 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 671B.

Key Features:

- Wavelength accuracy up to ± 0.0001 nm.
- Continuous calibration with a built-in wavelength standard.
- Operation available from 375 nm to 12 μm .
- Convenient pre-aligned fiber-optic input for wavelengths up to 2.6 μm .
- Free-space aperture input with visible alignment aid for IR/mid-IR wavelengths.
- Straightforward operation with a PC using USB or Ethernet.
- Display software provided to control measurement parameters and report wavelength data.
- 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.

SPECIFICATIONS

671 Series

MODEL	671A	671B
LASER TYPE	CW and quasi-CW (repetition rate > 10 MHz)	
WAVELENGTH		
Range	VIS: 375 - 1100 nm NIR: 520 - 1700 nm NIR2: 1 - 2.6 μm IR: 1 - 5 μm MIR: 1.5 - 12 μm	
Accuracy ^{1,2}	± 0.2 ppm (± 1 ppm for MIR $\lambda > 5 \mu\text{m}$) ± 0.0002 nm @ 1000 nm ± 0.002 cm^{-1} @ 10,000 cm^{-1} ± 60 MHz @ 300,000 GHz	± 0.75 ppm (± 1 ppm for MIR $\lambda > 5 \mu\text{m}$) ± 0.0008 nm @ 1000 nm ± 0.008 cm^{-1} @ 10,000 cm^{-1} ± 225 MHz @ 300,000 GHz
Repeatability ^{3,4,5}	VIS/NIR/NIR2: 0.03 ppm (0.03 pm @ 1000 nm) IR: 0.06 ppm (0.2 pm @ 3 μm) MIR: 0.1 ppm (1 pm @ 10 μm)	0.1 ppm (0.1 pm @ 1000 nm)
Calibration	Continuous - built-in stabilized single-frequency HeNe laser	Continuous - built-in standard HeNe laser
Display Resolution	9 digits	8 digits
Units ⁶	nm, μm , cm^{-1} , GHz, THz	
POWER (VIS / NIR) ⁷		
Calibration Accuracy	$\pm 15\%$	
Resolution	2%	
Units	mW, μW , dBm	
OPTICAL INPUT SIGNAL		
Maximum Bandwidth ⁸	1 GHz	10 GHz
Minimum Input ^{9,10}	VIS: 10 - 500 μW NIR: 5 - 225 μW NIR2: 125 - 500 μW IR: 65 - 750 μW MIR: 120 - 925 μW	
Maximum Input	10 mW	
MEASUREMENT RATE	4 Hz (VIS / NIR / NIR2) 2.5 Hz (IR / MIR)	10 Hz (VIS / NIR / NIR2) 2.5 Hz (IR / MIR)
INPUTS/OUTPUTS		
Optical Input ¹¹	VIS/NIR: Pre-aligned FC/UPC or FC/APC connector (9 μm core diameter) - optional free beam-to-fiber couplers NIR2: Pre-aligned FC/UPC or FC/APC connector (7 μm core diameter) - optional free beam-to-fiber couplers IR/MIR: Collimated beam, 2-3 mm diameter aperture, visible tracer beam to facilitate alignment	
Instrument Interface	USB and Ethernet interface with Windows-based display program, and browser-based display application Library of commands (SCPI) for custom and LabVIEW programming using any PC operating system	
COMPUTER REQUIREMENTS ¹²	PC running Windows 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
ENVIRONMENTAL¹⁰		
Warm-Up Time	< 15 minutes	None
Temperature Pressure Humidity	+15°C to +30°C (-10°C to +70°C storage) 500 - 900 mm Hg $\leq 90\%$ R.H. at + 40°C (no condensation)	
DIMENSIONS AND WEIGHT		
Dimensions (H x W x D) ¹³	VIS / NIR / NIR2: 5.6" x 6.5" x 15.0" (142 mm x 165 mm x 381 mm)	IR / MIR: 7.5" x 6.5" x 15.0" (191 mm x 165 mm x 381 mm)
Weight	14 lbs (6.3 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 $\geq 99.7\%$.
- (2) Traceable to accepted physical standards.
- (3) For 671A, standard deviation for a 10 minute measurement period after the instrument has reached thermal equilibrium.
- (4) For 671B, standard deviation for a 1 minute measurement period after the instrument has reached thermal equilibrium.
Long-term measurement variations due to longitudinal mode drift of the HeNe reference laser are < 0.4 ppm.
- (5) Wavelength resolution is approximately two times repeatability.
- (6) Data in units of nm, μm , and cm^{-1} are given as vacuum values.
- (7) The NIR2, IR, and MIR versions do not measure absolute power. An intensity meter displays relative power.
- (8) Bandwidth is FWHM. When bandwidth is greater, wavelength accuracy is reduced.
- (9) Sensitivity at specific wavelengths can be determined from a graph provided in the 671 Series Product Details brochure.
- (10) Characteristic performance, but non-warranted.
- (11) IR and MIR required beam height is $5.4 \pm 0.25"$.
- (12) For use with Windows-based display program. Interface with SCPI can be done using any PC operating system.
- (13) IR and MIR instrument height is adjustable ($7.25 \pm 0.25"$) for alignment purposes.



Bristol Instruments reserves the right to change the specifications as may be required to permit improvements in the design of its products.