

LASER WAVELENGTH METER



Reliable accuracy gives you greater confidence in your experimental results anywhere from the visible to mid-IR.

Wavelength information is critical for applications such as laser spectroscopy, photochemistry, cooling/trapping, and optical sensing. The best way to accurately measure laser wavelength is with the 671 Series Laser Wavelength Meter. Continuous calibration with a built-in wavelength standard guarantees the reliable accuracy that is required for the most demanding experiments.

Highest guaranteed wavelength accuracy

The 671 Laser Wavelength Meter uses a proven Michelson interferometer-based design to measure the absolute wavelength of CW and quasi-CW lasers. 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).

Continuous calibration for reliable accuracy

To achieve the reliable accuracy that is expected from Bristol Instruments, 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.

Broad wavelength coverage and straightforward operation

The 671 Laser Wavelength Meter is available in four broad wavelength configurations to satisfy virtually any experimental requirement. These ranges are the VIS (375 – 1100 nm), NIR (520 – 1700 nm), IR (1 – 5 μm), and MIR (1.5 – 12 μm). The system operates with a PC, running under Windows, via USB or Ethernet interface. Software is provided to control measurement parameters and to report data, or the system can become part of an experiment using a library of commands for custom or LabVIEW programming. In addition, a web-based application can be used to display or collect measurement data with a tablet or smart phone.

FEATURES

- Absolute wavelength measured to an accuracy as high as ± 0.0001 nm
- Continuous calibration with a built-in wavelength standard
- Operation available from 375 nm to 12 μm
- Simultaneous measurement of total optical power
- Input power requirement as low as 25 μW
- Measurement rate as high as 10 Hz
- Convenient tablet or smart phone display
- Integrates into experiment for automatic wavelength reporting and control



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 IR: 1 - 5 μ m	VIS: 375 - 1100 nm NIR: 520 - 1700 nm IR: 1 - 5 μ m MIR: 1.5 - 12 μ m	
Absolute Accuracy ^{1, 2}	\pm 0.2 ppm \pm 0.0002 nm @ 1000 nm \pm 0.002 cm^{-1} @ 10,000 cm^{-1} \pm 60 MHz @ 300,000 GHz	\pm 0.75 ppm (\pm 1 ppm for MIR) \pm 0.0008 nm @ 1000 nm \pm 0.008 cm^{-1} @ 10,000 cm^{-1} \pm 225 MHz @ 300,000 GHz	
Repeatability ^{3, 4}	VIS / NIR: \pm 0.03 ppm (\pm 0.03 pm @ 1 μ m) IR: \pm 0.06 ppm (\pm 0.2 pm @ 3 μ m)	\pm 0.1 ppm (\pm 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 ⁵	nm, μ m, cm^{-1} , GHz, THz		
POWER (VIS / NIR) ⁶			
Calibration Accuracy	\pm 15%		
Resolution	2%		
Units	mW, μ W, dBm		
OPTICAL INPUT SIGNAL			
Maximum Bandwidth ⁷	1 GHz	10 GHz	
Minimum Input ^{8, 9, 10}	VIS: 250 μ W (375 nm) NIR: 500 μ W (520 nm) IR: 550 μ W (1 μ m) MIR: 750 μ W (1.5 μ m)	30 μ W (750 nm) 25 μ W (1100 nm) 80 μ W (3 μ m) 150 μ W (7 μ m)	125 μ W (1100 nm) 50 μ W (1700 nm) 750 μ W (5 μ m) 950 μ W (12 μ m)
MEASUREMENT RATE	4 Hz (VIS / NIR) 2.5 Hz (IR)	10 Hz (VIS / NIR) 2.5 Hz (IR / MIR)	
INPUTS/OUTPUTS			
Optical Input ¹¹	VIS / NIR: Pre-aligned FC/UPC connector (9 μ m core diameter) - optional free beam-to-fiber coupler IR / MIR: Collimated beam, 2-3 mm diameter aperture, visible tracer beam to facilitate alignment		
Instrument Interface	High-speed USB and Ethernet interface with Windows-based display program Web-based display application SCPI for custom and LabVIEW programming		
COMPUTER REQUIREMENTS	PC running Windows 7 or 8, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device		
ENVIRONMENTAL ⁸			
Warm-Up Time	< 15 minutes	None	
Temperature	+15°C to +30°C (-10°C to +70°C storage)		
Pressure	500 - 900 mm Hg		
Humidity	\leq 90% R.H. at + 40°C (no condensation)		
DIMENSIONS AND WEIGHT			
Dimensions (H x W x L) ¹²	VIS / NIR: 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		

- (1) Defined as measurement uncertainty, or maximum wavelength error, using a coverage factor of 3 providing a confidence level of \geq 99.7%.
- (2) Traceable to accepted physical standards.
- (3) Standard deviation for a 5 minute measurement period after the instrument has reached thermal equilibrium.
- (4) Wavelength resolution is approximately two times repeatability.
- (5) Data in units of nm, μ m, and cm^{-1} are given as vacuum values.
- (6) The IR and MIR versions do not measure absolute power. An intensity meter displays relative power.
- (7) Bandwidth is FWHM. When bandwidth is greater, wavelength accuracy is reduced.
- (8) Characteristic performance, but non-warranted.
- (9) For 621B-VIS and 621B-NIR, required input power is about half of values given.
- (10) Sensitivity at other wavelengths can be determined from graphs that are available upon request.
- (11) IR and MIR required beam height is 5.4 ± 0.25 ".
- (12) IR and MIR instrument height is adjustable (7.25 ± 0.25 " for alignment purposes).



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.



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