

## 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  $\pm 0.2$  parts per million ( $\pm 0.0002$  nm at 1000 nm). For experiments that are less exacting, the model 671B is a lower-priced alternative with an accuracy of  $\pm 0.75$  parts per million ( $\pm 0.0008$  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  $\pm 0.0001$  nm.
- Continuous calibration with a built-in wavelength standard.
- Operation available from 375 nm to 12  $\mu\text{m}$ .
- Convenient pre-aligned fiber-optic input for visible/near-IR wavelengths.
- 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
<b>LASER TYPE</b>	CW and quasi-CW (repetition rate > 10 MHz)	
<b>WAVELENGTH</b>		
Range	VIS: 375 - 1100 nm NIR: 520 - 1700 nm IR: 1 - 5 $\mu$ m	VIS: 375 - 1100 nm NIR: 520 - 1700 nm IR: 1 - 5 $\mu$ m MIR: 1.5 - 12 $\mu$ m
Accuracy <sup>1,2</sup>	$\pm 0.2$ ppm  $\pm 0.0002$ nm @ 1000 nm $\pm 0.002$ cm <sup>-1</sup> @ 10,000 cm <sup>-1</sup> $\pm 60$ MHz @ 300,000 GHz	$\pm 0.75$ ppm ( $\pm 1$ ppm for MIR)  $\pm 0.0008$ nm @ 1000 nm $\pm 0.008$ cm <sup>-1</sup> @ 10,000 cm <sup>-1</sup> $\pm 225$ MHz @ 300,000 GHz
Repeatability <sup>3,4,5</sup>	VIS/NIR: $\pm 0.03$ ppm ( $\pm 0.03$ pm @ 1 $\mu$ m) IR: $\pm 0.06$ ppm ( $\pm 0.2$ pm @ 3 $\mu$ 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 <sup>6</sup>	nm, $\mu$ m, cm <sup>-1</sup> , GHz, THz	
<b>POWER (VIS / NIR)<sup>7</sup></b>		
Calibration Accuracy	$\pm 15\%$	
Resolution	2%	
Units	mW, $\mu$ W, dBm	
<b>OPTICAL INPUT SIGNAL</b>		
Maximum Bandwidth <sup>8</sup>	1 GHz	10 GHz
Minimum Input <sup>9,10</sup>	VIS: 20 - 250 $\mu$ W NIR: 10 - 580 $\mu$ W IR: 65 - 750 $\mu$ W	VIS: 10 - 110 $\mu$ W NIR: 10 - 250 $\mu$ W IR: 65 - 750 $\mu$ W MIR: 120 - 925 $\mu$ W
<b>MEASUREMENT RATE</b>	4 Hz (VIS / NIR) 2.5 Hz (IR)	10 Hz (VIS / NIR) 2.5 Hz (IR / MIR)
<b>INPUTS/OUTPUTS</b>		
Optical Input <sup>11</sup>	VIS/NIR: Pre-aligned FC/UPC or FC/APC connector (9 $\mu$ m 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	
<b>COMPUTER REQUIREMENTS<sup>12</sup></b>	PC running Windows 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
<b>ENVIRONMENTAL<sup>10</sup></b>		
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)	
<b>DIMENSIONS AND WEIGHT</b>		
Dimensions (H x W x D) <sup>13</sup>	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)	
<b>POWER REQUIREMENTS</b>	90 - 264 VAC, 47 - 63 Hz, 50 VA max	
<b>WARRANTY</b>	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  $< \pm 0.4$  ppm.
- (5) Wavelength resolution is approximately two times repeatability.
- (6) Data in units of nm,  $\mu$ m, and cm<sup>-1</sup> are given as vacuum values.
- (7) The 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 graphs that are 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. Specifications are subject to change without notice.

