

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) ± 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 ppm @ 1000 nm) IR: 0.06 ppm (0.2 ppm @ 3 μm) MIR: 0.1 ppm (1 ppm @ 10 μm) | 0.1 ppm (0.1 ppm @ 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 REQUIREMENTS¹² | 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.