Wavelength Meter

WS5 Series

HighFinesse
The Standard of Accuracy

Ångstrom

Available Measurement Ranges

WS5 Standard (VIS)	330 – 1180 nm
WS5 UV-I	248 – 1180 nm
WS5 UV-II	192 – 800 nm
WS5 VIS / IR-I	330 – 1750 nm
WS5 VIS / IR-II	500 – 2250 nm

Absolute (and Other) Accuracies [1)]

192 – 330 nm (with multi mode fiber)	3 pm
330 – 800 nm	3000 MHz
800 – 2250 nm	2000 MHz
Quick coupling accuracy (with 50 µm multi mode fiber)	3000 MHz
Wavelength deviation sensitivity/Measurement resolution [2)]	500 MHz
Linewidth estimation accuracy [3) 4)]	2000 MHz

Measurement Speed [5)]

On request IR-I & IR-II: 1500 Hz; all other wavelength ranges: 950 Hz

1) According to 3σ criterion, but never better than 20 % of the laser linewidth.

2) Standard deviation.

3) Not better than 20 % of the linewidth.

4) Each instrument in each mode can measure lasers with a linewidth up to 30 % of the correspondig FSR.

5) Depending on PC hardware and settings.

Required Minimum Input Energy and Power [6)]

Standard (VIS)	0.02 – 15 µJ or µW
UV-I	0.02 – 10 µJ or µW
UV-II	0.02 – 200 µJ or µW
VIS/IR-I	VIS: 0.08 – 60 µJ or µW / IR-I: 8 – 800 µW
VIS/IR-II	VIS: 0.08 – 60 µJ or µW / IR-II: 8 – 320 µW

For low power instruments with increased sensitivity, please contact HighFinesse support.

FSR of the Fizeau Interferometers (Fine/Wide Mode)

100 GHz [4)]

Calibration

Built-in calibration source

Recommended calibration period ≤ 1 month

Warm-up Time

No warm-up time under constant ambient conditions; WS5 VIS/IR-II: > 30 min. warm-up, or until ambient equilibrium

Dimensions L × W × H

360 × 120 × 120 mm

4) Each instrument in each mode can measure lasers with a linewidth up to 30 % of the correspondig FSR.

6) µJ interpretation for pulsed lasers. CW signals need more power in [µW] since the exposure is limited at IR-II instruments.

Weight

2.8 kg

Interface

High-speed USB 2.0 connection

Power Supply

Power consumption < 2.3 W, power provided directly via USB cable
WS5 VIS/IR-II: external power supply included

Options

External Trigger (TTL)

All wavelength meters detect and measure pulsed signals automatically. Additionally, this option allows the user to trigger pulsed measurements externally. The TTL option guarantees synchronization between pulsed excitation and measurement. It provides low-noise signals without parasitic parts when measuring pulsed signals with low duty cycles.

Please note, if the option MC is ordered together with the TTL option, the TTL mode can only be used if the switch is set fixed to one input channel.

Laser Control (PID)

With the PID option it is possible to stabilize the frequency of a laser connected to the wavelength meter using a software based proportional-integral-derivative controller (PID controller). Unlike analog PID electronics, the PID option provides software based signal processing, allowing the laser to be stabilized to a specific user defined frequency or regulated with an arbitrary pattern.

This makes it extremely useful in experiments where the laser frequency has to be actively regulated or varied to fit changing experimental conditions, such as laser cooling, atomic detection, trapping and spectroscopy.

Combined with the MC option the wavelength meter can be used to stabilize multiple lasers simultaneously. The regulation speed, quality and absolute accuracy match the measurement speed, relative accuracy and absolute accuracy of the wavelength meter respectively. The measurement speed is not affected by the regulation.

Multichannel Switch (MC)

In order to measure the frequencies of more than just one laser at a time, an opto-mechanical switch is used. The combination of our high-speed wavelength meters with one of the quickest fiber switches (MEMS) available allows up to eight channels to be measured almost simultaneously. Exposure time and other parameters can be defined independently for each light source. You can choose between singlemode or multimode fiber switches, depending on the required accuracy level of your measurements.

Please note, if the option MC is ordered together with the TTL option, the TTL mode can only be used if the switch is set fixed to one input channel.

Options

Linewidth Estimation (L)

The linewidth estimation of a singlemode laser source is performed by a special algorithm which eliminates the interferometer's instrument response function. The algorithm enables the estimation of the linewidth with an accuracy better than the tenth of the instrument FSR.

The linewidth option can also be used for measuring the linewidth of multimode lasers or lasers with sidebands. In this case, the longitudinal mode splitting needs to be less than the instruments spectral resolution and the calculated result is the FWHM of the envelope function of the multiline spectrum. Any instrument can be upgraded with the L-option.

Singlemode fibers are required.

Spectrometer (D)

The spectrometer option allows the analysis of emission spectra to an accuracy of 6 GHz, for laser sources with broad emission. The software automatically searches the spectral section where the laser emission line is located and displays it on the screen. In combination with the additional Fizeau interferometer array this allows wide range applications with a single instrument.

External Calibration (CAL)

Standard HighFinesse wavelength meters up to an absolute accuracy of 60 MHz feature autocalibration via an integrated calibration source. This guarantees the accuracy and stability of measurements with our wavelength meters. For the higher accuracies we offer a variety of frequency stabilized, narrow linewidth, laser sources with up to ± 10 kHz frequency stability for different applications.

For further information see our product description here: **https://www.highfinesse.de/cal**

Typical Applications

The WS5 series offers an accuracy of 3000 MHz. It is mostly chosen for pulsed lasers and broad CW lasers (linewidth > 3000 MHz) when the targeted absolute accuracy is 3000 MHz or less stringent.

Further Information

For further technical information, application examples, diagrams and for customization of the WS5 series please contact:

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