Wavelength Meter

WS5 Series

HighFinesse
Laser and Electronic Systems

Ångstrom

Available measurement ranges

WS5 Standard	330 – 1180 nm
WS5 UV-I	248 – 1180 nm
WS5 UV-II	192 – 800 nm
WS5 VIS / IR [1)]	330 – 1750 nm
WS5 VIS / IR-II [1)]	500 – 2250 nm
WS5 IR-I	630 – 1750 nm
WS5 IR-II	1000 – 2250 nm
WS5 IR-III	1400 – 11000 nm

Absolute (and other) accuracies [2)]

192 – 330 nm (with multi mode fiber)	3 pm
330 – 420 nm	2 pm
420 – 1100 nm	3000 MHz
1100 – 2250 nm	3000 MHz
1400 – 11000 nm	3000 MHz
Quick coupling accuracy (with multi mode fiber)	3000 MHz
Wavelength deviation sensitivity/Measurement resolution [3)]	500 MHz
Linewidth option accuracy [4)]	200 MHz

Measurement speed [5)]

WS5 IR: 1800 Hz; WS5 IR-III: 100 Hz; 950 Hz: all other wavelength ranges

1) These devices have a decreased sensitivity by a factor of 4, compared to the VIS and IR rows in the required input fields, respectively

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

3) Standard deviation. WS6-200 and higher models require singlemode or PC fibers to reach this resolution

4) Not better than 5 % of the linewidth

5) Depending on PC hardware and settings, Highspeed models up to 24 kHz (VIS)/76 kHz (IR) recording speeds, please contact HighFinesse Support for details

This document provides general information only and may be subject to change at any time without prior notice.

Required input energy and power [6)]

WS5 Standard	0.02 – 15 µJ or µW
WS5 UV-I	0.02 – 10 µJ or µW
WS5 UV-II	0.02 – 200 µJ or µW
WS5 IR-I	2 – 200 µJ or µW
WS5 IR-II [7)]	2 – 80 µJ or µW
WS5 IR-III	1 mW

FSR of the Fizeau interferometers (Fine/wide mode)

100 GHz (Each device in each mode can measure lasers with a linewidth up to 30 % of the correspondig FSR)

Calibration

Built-in calibration source
WS5 IR-III: external reference required, e.g. SLR-1532

Recommended calibration period ≤ 1 month

Warm-up time

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

Dimensions L × W × H

360 × 120 × 120 mm

6) The CW power interpretation in [µW] compares to an exposure of 1s (generally the energy needs to be divided by the exposure time to obtain the required power)

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

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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 IR-II, WS5 IR-III: external power supply included; WS5 IR-I: external power supply only

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.

Lasercontrol (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.

Multiplexer (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.

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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 device 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, except IR-III devices. 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 device.

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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