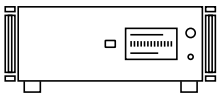

Linewidth Analyzer

LWA-10k NIR

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Wavelength Range	min.	typ.	max.
1064 – 1625 nm	1064 nm	1550 nm	1625 nm

Input power range (@typical wavelength)			
0.5 – 8 mW	0.5 mW	5 mW	8 mW

Required Input Power Stability
± 5 %

Laser type
Laser type CW, single mode

Input fiber type
PM, FC/APC

Maximum frequency stroke (@ f > 10Hz)
40 MHz

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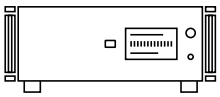

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Frequency Noise Specification

		10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	> 1 Mhz
Noise floor $N_{\Delta\nu}$ @ typ. input power and wavelength [5]	Hz/√Hz	200	100	30	20	15	10
Laser phase noise floor @typ. input power and wavelength [1) 6)]	rad/√Hz	20	1	30 m	2 m	150 µ	10 µ
	dBrad/√Hz	26	0	–30	–54	–76	–100
Equivalent interferometer signal noise @typ. input power and wavelength [1) 3)]	rad/√Hz/m	6.2µ	3.1 µ	920 n	620 n	460 n	310 n
	dBrad/√Hz/m	–104	–110	–120	-124	–126	-130
Frequency noise bandwidth [2)]		10 Hz – 10 MHz					
Minimum measurable intrinsic linewidth (lorentzian linewidth @ 1 µs)		< 2 kHz					
Effective linewidth range (optical linewidth @ 100 ms) [β-separation method]		< 5 k – 30 M					
Relative intensity noise limit (lorentzian linewidth)		–					
Dynamic range		60 dB					

1) Not included in the software, can be calculated by the user from exported data.

2) According to a –3 dB criterion.

3) This is the calculated noise of the interferometer phase of a two path interferometer with length imbalance L (in meters). The alculation is performed for a given frequency noise density floor by $2\pi nL/c \times N_{\Delta\nu}$ with n being the refractive index of the reference fiber interferometer material and c being the speed of light in vacuum. Values in the table are given for an refractive index of n = 1.46 and a reference length of 1 meter.

5) $N_{\Delta\nu}$ is the noise floor of the instrument in terms of the square root of the power spectral density of the frequency noise.

6) The phase noise floor corresponds to the noise floor of the square root of the power spectral density of the phase. It is calculated from $N_{\Delta\nu}$ by the formula $1/f \times N_{\Delta\nu}$. Additionally, phase noise is often specified in terms of L(f) which can be calculated with the formula $L(f) = 1/f^2 \times N^2_{\Delta\nu}/2$.

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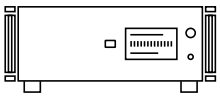

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Lineshape Specification

Effective linewidth range (optical linewidth) [curve fitting method]	< 5 kHz – 10 MHz
Dynamic range	60 dB

Miscellaneous

Interface	Ethernet
Analog Output / error signal	BNC ± 7.5 (50 Ω) ± 15 (high impedance) V, single ended
Cutoff (highpass filter)	10 Hz
Dimensions	440 mm × 340 mm × 155 mm
Weight	12 kg

Digitizer Module

Sample rate	62.5 (max.) MSa/s
Resolution	16 bits
Acquisition time	1 – 100 ms
Evaluation time [4)]	10 m – 1 (typ.) s
Communication	USB 3.0 Type B
Dimensions	210 mm × 200 mm × 74 mm
Weight	2 kg

4) Windows 10 or newer, Intel i5 8600 / AMD Ryzen 5 2600 or better, 16GB RAM or more.

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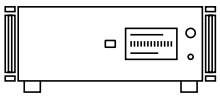

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Further Information

For further technical information, application examples, diagrams and for customisation of linewidth analyzers please contact:

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