femtoTrain™

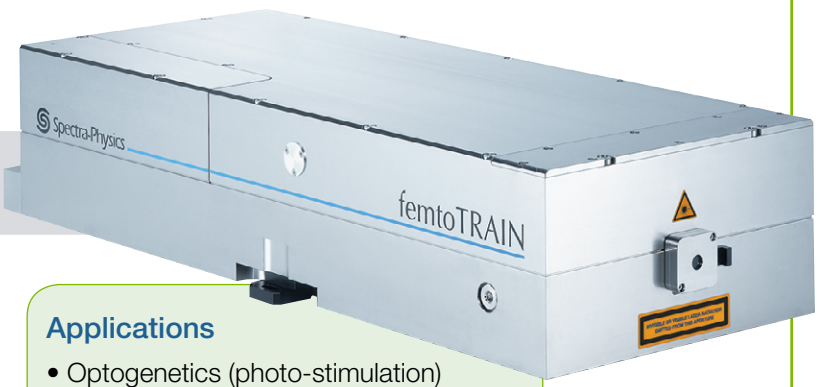
Highest Peak Power Femtosecond Oscillator

mks | Spectra-Physics®

femtoTrain is a family of compact, reliable and true turn-key fixed-wavelength femtosecond oscillator for medical, bio-imaging and other applications. The new femtoTrain 1040-5 offers short pulse widths below 220 fs and high average power of 5 W to deliver 2 MW of peak power. As a compact, reliable and true turn-key fixed-wavelength femtosecond laser, femtoTrain is ideal for medical and bio-imaging applications in general, and specifically for photoactivation in optogenetics.

femtoTrain is specifically designed for applications that require high pulse energy and peak power at a high repetition rate. This laser allows fast scanning or process speeds with a repetition rate of 10 MHz and pulse energy of up to >500 nJ. The femtoTrain platform is optimized for low noise and outstanding long-term stability and is the ideal laser source for sensitive bio-imaging and micro-surgery applications. The pulse is near-transform limited and thus does not need dispersion pre-compensation.

femtoTrain is developed, designed and manufactured with high reliability and quality in mind. The laser is equipped with long life diodes and features a sealed optical cavity, manufactured in a clean room production environment. The result is a dependable laser with long lifetime, high uptime and low cost of ownership. With direct diode pumping technology and an ultra-stable optical cavity design, femtoTrain offers easy-to-use and proven 24/7 operation.



The femtoTrain Advantage

- High pulse energy (>500 nJ) at high repetition rate (10 MHz)
- Highest peak power (2 MW) in its class
- Compact and reliable, turn-key operation
- Proven, dependable performance in 24/7 operation

Applications

- Optogenetics (photo-stimulation)
- Multiphoton imaging (YFP, RFP, SHG)
- Tissue dissection
- Micro-surgery

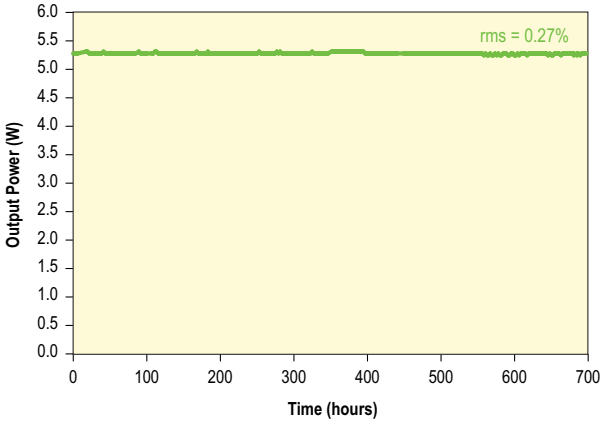
femtoTrain Specifications[1, 2]

	femtoTrain 1040-3	femtoTrain 1040-5
Output Characteristics		
Average Power	>3.5 W	>5.0 W
Pulse Energy	>350 nJ	>500 nJ
Wavelength	1040 nm ±8 nm	
Repetition Rate	10 MHz	
Pulse Width (FWHM)	<370 fs	<220 fs
Peak Power	>830 kW	>2 MW
Power Stability	<1% rms (100 hours) <0.5% rms (12 hours)	
Beam Quality	TEM_{00}, M^2 <1.1	
Beam Diameter, at waist	0.6 ±0.12 mm	
Beam Waist Position (relative to exit)	-155 mm ±100 mm	
Beam Divergence	2.2 ±0.4 mrad	
Polarization	100:1, horizontal	
Ellipticity	<10%	
Beam Height	2 in	
Cold Start Time	30 min	
Warm Start Time	15 min	
Operating Temperature Range	17–30°C	
Cooling Requirements		
Laser Head	Closed-loop chiller included	
Power Supply	Air cooled	
Utility Requirements		
Voltage	100–230 V, 50 Hz / 60 Hz	
Laser Head Physical Characteristics		
Dimensions (L x W x H)	21.33 x 8.97 x 4.52 in (542 x 228 x 115 mm)	
Weight	44 lbs (20 kg)	
Power Supply Physical Characteristics		
Dimensions (L x W x H)	19.29 x 7.87 x 3.54 in (490 x 200 x 90 mm)	
Weight	17 lbs (8 kg)	

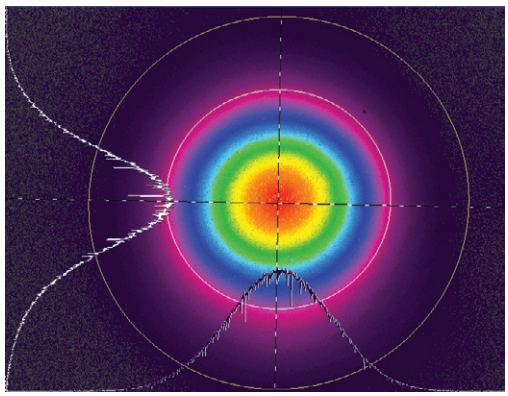
1. Due to our continuous product improvement program, specifications are subject to change without notice.
2. femtoTrain is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

femtoTrain

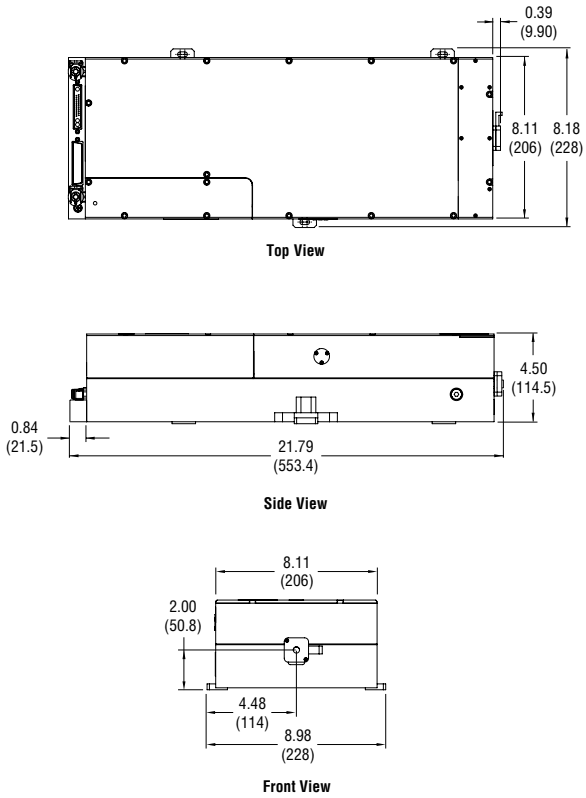
Long-term Measurement >700 Hours[1] – femtoTrain



femtoTrain Beam Profile



1 Typically measured performance; not a guaranteed or warranted specification.



femtoTrain Dimensions

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