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

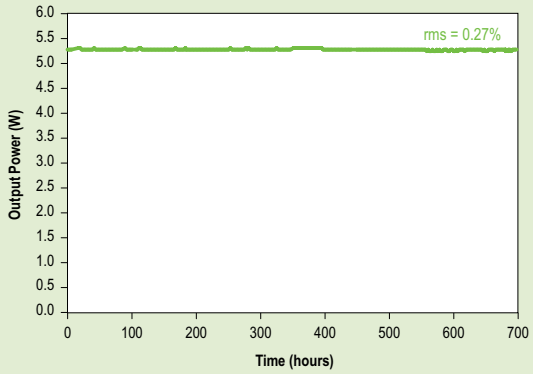
- Optogenetics (photo-stimulation)
- Multiphoton imaging (YFP, RFP, SHG)
- Tissue dissection
- Micro-surgery

femtoTrain Specifications[1, 2]

	femtoTrain 1040-5
Output Characteristics	
Average Power	>5.0 W
Pulse Energy	>500 nJ
Wavelength	1040 nm ±8 nm
Repetition Rate	10 MHz
Pulse Width (FWHM)	<220 fs
Peak Power	>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 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)

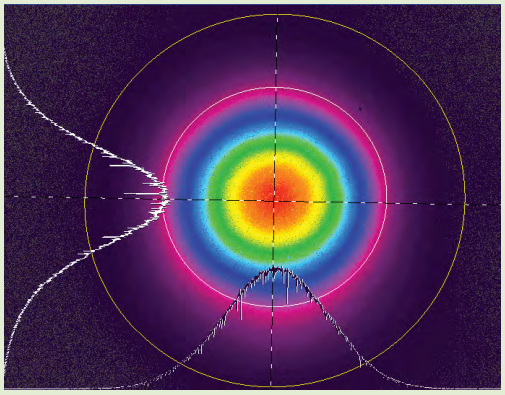
1. Due to our continuous product improvement program, specifications are subject to change without notice.
2. femtoTrain is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular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

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

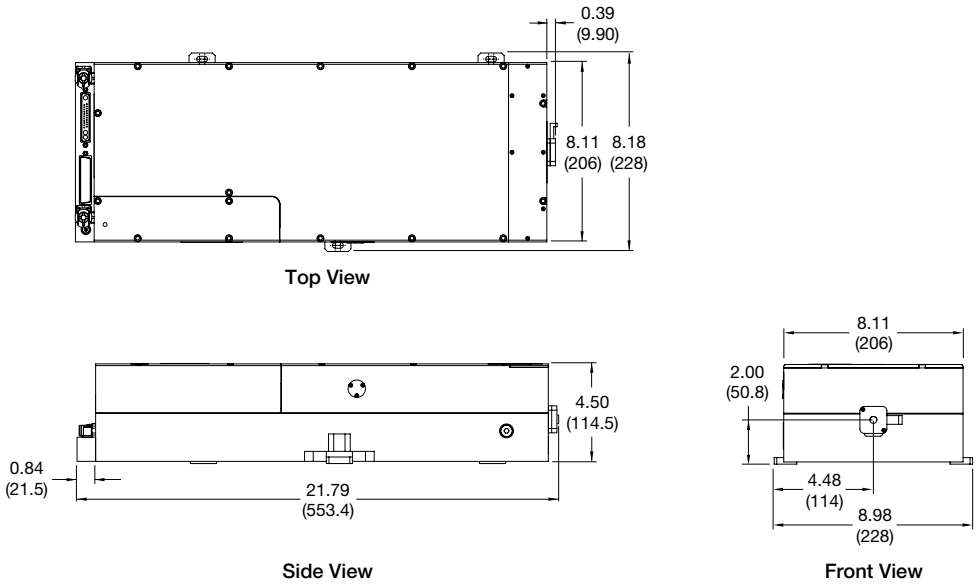


1 Typically measured performance; not a guaranteed or warranted specification.

femtoTrain Beam Profile



femtoTrain Dimensional Drawing



Dimensions in inch (mm)

www.spectra-physics.com

1565 Barber Lane, Milpitas, CA 95035 USA
PHONE: 1-800-775-5273 1-408-980-4300 FAX: 1-408-980-6921 EMAIL: sales@spectra-physics.com

Belgium	+32-(0)0800-11 257	Belgium@newport.com
China	+86 510 8113 2999	spectra-physics-china@mksinst.com
France	+33-(0)1-60-91-68-68	france@newport.com
Germany / Austria / Switzerland	+49-(0)6151-708-0	germany@newport.com
Japan	+81-3-3556-2705	spectra-physics.jp@mksinst.com
Korea	+82-31-8021-1600	korea@spectra-physics.com
Netherlands	+31-(0)30 6592111	netherlands@newport.com
Singapore	+65-6664-0040	sales.sg@newport.com
Taiwan	+886-3-575-3040	sales@newport.com.tw
United Kingdom	+44-1235-432-710	uk@newport.com

femtoTrain 7/25