

VGEN/SPFL

Component Selection Guide



The Spectra-Physics® VGEN/SPFL series of lasers deliver exceptional reliability and versatility for a wide range of applications. Housed in a robust assembly that meets industrial standards and fitted with a metal armored fiber cable, VGEN/SPFL lasers deliver a high quality, near diffraction-limited output beam. VGEN/SPFL's solid construction is maintenance free and reliable, ensuring long-life operation at low operational cost.

VGEN/SPFL series of pulsed green fiber lasers (532 nm) incorporate cutting edge technology to provide top performance for such precision-intensive applications as a solar cell, micro machining, silicon scribing, fine processing and thin film cutting. The VGEN/SPFL lasers are comprised of short-pulse, linearly polarized Ytterbium fiber lasers in MOPA configuration along with SHG (second harmonic generation) module, providing an output power of up to 40 W. VGEN/SPFL lasers offer a high pulse repetition rate (up to 1.5 MHz) combined with a very short pulse (tunable down to 3 ns) and high peak power which enable high system throughput for maximum operation efficiency.

SPFL 532-40 pulsed green fiber lasers provide high power and pulse energy with versatile TimeShift™ programmable pulse capability for demanding manufacturing applications. The laser produces average output power >40 W and pulse energy >180 μJ at 520 nm, and with a near diffraction-limited output beam and excellent power stability, the laser delivers high quality and high throughput micromachining results.

The laser's TimeShift programmable pulse capability provides flexible burst mode operation with adjustable pulse widths, pulse separation and number of pulses in a burst. Pulse widths for single pulses or sub-pulses in a burst are adjustable from <3 to 50 ns. The SPFL 532-40 lasers offer additional flexibility with adjustable repetition rates from single shot up to 2 MHz.








Recommended Optics & Optomechanics

It is critical to choose the right optics and optomechanical components that work best with your VGEN/SPFL laser. VGEN/SPFL's IR and green output power necessitates optics that have a high damage threshold. MKS Newport offers a wide selection of the highest quality optics and optical components covering the entire spectrum UV, VIS, NIR and IR wavelengths to help you with your most challenging applications. In addition, for more than 30 years, we have manufactured the world's most comprehensive line of optical mounts and mechanics. Our precision optomechanics help our customers stay at the leading edge. MKS also offers LaserClean™ components for low-contamination applications.

Please use the following recommendations to determine which components best serve your needs. If you need help making a selection or have questions about the following tables, please contact us at tech@newport.com.

VGEN Component Selection Guide

Recommended Optics & Optomechanics

Optics					Optomechanics		SPFL	VGEN-G				
Optics Type	λ	Part Number	LIDT	Description	Mount P/N	Mount Description	532-40	10	20	HE-10	HE-20	HE-30
 Mirrors	532 nm	10QM20HM.35	20 J/cm ² @ 532 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9817-6-Ni-K	Stability OEM Center Mount, Nickel Plated, 1.0 in., 3 Allen Adjust	•	•	•	•	•	•
	532 nm	10Q20HE.2	15 J/cm ² @ 532 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9814-6-Ni-K	Stability Top Adjust Mirror Mount, Nickel Plated, 1.0 in., 2 Allen-key	•	•	•	•	•	•
	1064 nm	10QM20HM.15	45 J/cm ² @ 1064 nm, 10 ns, 20 Hz	1" dia Mirror, 45° AOI	9817-6	Stability OEM Center Mount, Nickel Plated, 1.0 in., 3 Allen Adjust						
	1064 nm	10Q20HE.1	40 J/cm ² @ 1064 nm, 20 ns, 20 Hz	1" dia Mirror, 45° AOI	9814-6	Stability Top Adjust Mirror Mount, Nickel Plated, 1.0 in., 2 Allen-key						
 Polarizing Cube Beam Splitters	532 nm	05BC15PH.3	10 J/cm ² @ 1064 nm, 10 ns, 10 Hz	0.5" Polarizing Cube BS, High Power	UGP-1 and UGP-KIT-1	Ultima Gimbal Prism Mount, 1 in., 100 TPI Adjustment Screws and Adapter Kit, 0.50in. (12.7mm) Cube Riser	•	•	•	•	•	•
	1064 nm	05BC15PH.9	10 J/cm ² @ 1064 nm, 10 ns, 10 Hz	0.5" Polarizing Cube BS	9481(-M)	Pint-Sized Prism Mount, 0.25 to 1.00 in., ±3.5°, 8-32 (M4)						
 Waveplates	532 nm	10RP02-16	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	1" dia zero order 1/2 waveplate	RSP-1T	360° Continuous Rotation Stage, 1 in Aperture, Coarse & Fine Adj.	•	•	•	•	•	•
	532 nm	10RP04-16	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	1" dia zero order 1/4 waveplate	GM-1RA	Gimbal Tip/Tilt Rotation Mount, Ø1 in., 100 TPI	•	•	•	•	•	•
	1064 nm	05RP02-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1/2" dia zero order 1/2 waveplate	(M-) MT-RS	Polarizer Rotation Mount, 0.5 in., 5° Grad, 0.5° Sens., 8-32						
	1064 nm	10RP02-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1" dia zero order 1/2 waveplate	RSP-1T	360° Continuous Rotation Stage, 1 in Aperture, Coarse & Fine Adj.						
	1064 nm	05RP04-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1/2" dia zero order 1/4 waveplate	(M-) MT-RS	Polarizer Rotation Mount, 0.5 in., 5° Grad, 0.5° Sens., 8-32						
	1064 nm	10RP04-34	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	1" dia zero order 1/4 waveplate	GM-1RA	Gimbal Tip/Tilt Rotation Mount, Ø1 in., 100 TPI						
 Lenses (AR.14 for 532 nm & AR.33 for 1064 nm)	532 nm	SPXxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Plano-convex lens, fused silica, 25.4 mm	LA1V-XY	XY Compact Lens Positioner, 1.0 in. Diameter	•	•	•	•	•	•
	532 nm	SBXxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Bi-convex lens, fused silica, 25.4 mm	P100-At38	Kinematic, Thin Optic Mount, 25.4 mm, 3 Locking Allen-Key, 80 TPI	•	•	•	•	•	•
	532 nm	SPCxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Plano-concave lens, fused silica, 25.4 mm	LP-1A-XY	XY Lens Positioner, 1.0 in. (25.4 mm) Diameter	•	•	•	•	•	•
	532 nm	SBCxxxAR.14	7.5 J/cm ² @ 532 nm, 10 ns, 20 Hz	Bi-concave lens, fused silica, 25.4 mm	LP-1A	XYZ ØXØY Lens Positioner, 1.0 in. Diameter	•	•	•	•	•	•
	1064 nm	SPXxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Plano-convex lens, fused silica, 25.4 mm	(M-)LH-1A	A-LINE Fixed Lens Mount, Ø 1.0 in., 8-32(M4) Thd.						
	1064 nm	SBXxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Bi-convex lens, fused silica, 25.4 mm	LA1V-XY	XY Compact Lens Positioner, Ø 1.0 in.						
	1064 nm	SPCxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Plano-concave lens, fused silica, 25.4 mm	LPV-1	XYZ ØXØY Compact Lens Positioners, Ø 1.0 in.						
	1064 nm	SBCxxxAR.33	7.5 J/cm ² @ 1064 nm, 10 ns, 20 Hz	Bi-concave lens, fused silica, 25.4 mm	LPV-1	XYZ ØXØY Compact Lens Positioners, Ø 1.0 in.						
 High Energy Plano-Convex Lenses	532 nm	SPXxxxAR.2	8 J/cm ² @ 532 nm, 20 ns, 10 Hz	Plano-Convex Lens, Fused Silica, 25.4 mm, AR.2 coated	LP-1A	XYZ ØXØY Lens Positioner, 1.0 in. Diameter	•	•	•	•	•	•
	1064 nm	SPXxxxAR.1	15 J/cm ² @ 1064 nm, 20 ns, 10 Hz	Plano-Convex Lens, Fused Silica, 25.4 mm, AR.1 coated	LP-1A	XYZ ØXØY Lens Positioner, Ø 1.0 in.						
 Nano-Texture Surface Lenses	532 nm	SPXxxxRAR.S	35 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Plano-Convex Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A	XYZ ØXØY Lens Positioner, 0.5 in. Diameter	•	•	•	•	•	•
	532 nm	SPCxxxRAR.S	35 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Plano-Concave Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A-XYZ	XYZ Lens Positioner, 0.5-in.Diameter	•	•	•	•	•	•
	1064 nm	SPXxxxRAR.L	35 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Plano-Convex Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A-XYZ	XYZ Lens Positioner, 0.5-in.Diameter						
	1064 nm	SPCxxxRAR.L	35 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Plano-Concave Lens, Nano-Textured Fused Silica, 12.7 mm	LP-05A	XYZ ØXØY Lens Positioner, 0.5 in. Diameter						•
 Attenuators	532 nm	VA-532 VA-532-CB	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	Manual Variable Attenuator	Pedestal Forks	1.0 in. Pedestal Base Clamping Forks	•	•	•	•	•	•
	532 nm	VA-532-CONEX VA-532-CONEX-CB	2 J/cm ² @ 532 nm, 10 ns, 10 Hz	Motorized Variable Attenuator, CONEX	PS-series Pedestal Spacers	1.0 in. Pedestal Spacers & Extensions	•	•	•	•	•	•
	1064 nm	VA-1064 VA-1064-CB	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Manual Variable Attenuator	PS-series Pedestal Posts	1.0 in. Optical Pedestals, Graduated Diameter						
	1064 nm	VA-1064-CONEX VA-1064-CONEX-CB	2 J/cm ² @ 1064 nm, 10 ns, 10 Hz	Motorized Variable Attenuator, CONEX	PX Forkless Pedestal Posts	1.0 in. PX Forkless Optical Pedestals and Posts						

* Multiple lenses can be mounted with Newport's lens tubes and spacers

** Additional optics types and sizes are available – please go to <http://www.newport.com> or contact your local MKS sales representative

*** The optics listed in this guide will meet the requirements of most customer applications for the VGEN laser. Not all optics have been tested for all potential VGEN applications, so compatibility with all applications cannot be guaranteed. When selecting optics, please evaluate suitability for requirements of your application. If you need assistance, please contact your local MKS sales representative

**** The removable PL15 beam dump that is included with the VA-CB-λ(-CONEX) variable attenuators/splitters has a damage threshold of 30 W/cm² and can't be used with these lasers. The reflected beam will need to be controlled using external beam routing or an external high power beam dump.

Recommended Laser Measurement Sensors*



For optimal application results, it is critical to ensure that the delivered laser power at the sample is precisely controlled. Laser power sensor is a detector that absorbs a laser beam and outputs a signal proportional to the beam's power. MKS Newport offers a wide selection of power sensors to accurately measure the VGEN laser power delivered to the sample. The specific type of sensor depends on the details of the laser beam being measured, including power level, spectral region, beam size, etc.

VGEN Type	VGEN Model	Recommended Sensor	Laser Damage Threshold	Aperture	Power Measurement Range	Spectral Range	Description
VGEN-G	VGEN-G-10	919P-030-18	20 kW/cm ²	17.5 mm	20mW to 30W	0.19 to 11 μm	<ul style="list-style-type: none"> • Spectrally flat broadband coating • NIST-traceable calibration included • Insensitive to beam position • Sensitive with low noise & drift
	VGEN-G-20						
	VGEN-G-HE-10						
	VGEN-G-HE-20						
	VGEN-G-HE-30	919P-050-26	12 kW/cm ²	26 mm	40mW to 50W		
SPFL 532	SPFL 532-40						

* Order a 1 inch optical post holder PS-B-1 and a fork PS-F to mount the sensor vertically

** Additional options from MKS Ophir are available. Please visit www.ophiropt.com or contact your Ophir sales representative for consultation


Recommended Power Meter*

1919-R is one of MKS Newport's most feature rich and technologically advanced power meters. It offers a plug-and-play functionality and is compatible with almost any of the wide range of Newport sensors. 1919-R is also the most precisely calibrated unit on the market thus measuring with the highest accuracy. With its versatility, ease of use, and user-friendly interface, the sensor can be used stand-alone or interfaced with LabVIEW or the user's own software.

Power Meter	Part Number	Description
	1919-R	<ul style="list-style-type: none"> • Compatible with all standard Newport thermal sensors • USB and RS232 interfaces with PMManager PC applications and User Commands document • LabVIEW driver and COM Object Interface • Select between English, Japanese, Russian, and Chinese interfaces

PC Interface (optional)

A PC interface allows you to connect your laser power sensor directly to the PC. The Model 841-PE-USB is a Power Meter with a USB connection to use a computer as the monitor, allowing the user to access the full computing power of the PC.

PC Interface	Part Number	Description
	844-PE-USB	<ul style="list-style-type: none"> • Optical Power and Energy Meter, Virtual, USB • Ideal when equipment space is tight or there is a need to control multiple power meter channels • Has a USB output and 0-1 V analog output. Application installation is simple & takes care of the USB driver installation

* Other Newport display meters are available – please contact your local MKS sales representative

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Recommended Beam Profiler & Attenuators*



In addition to the average or instantaneous Watts or Joules of the laser beam, it is critical to understand how the power is spatially distributed in the cross-section of the beam. A beam profiler can help detect laser performance issues such as beam wander, jitter, divergence and astigmatism. MKS is the market leader with the largest installed base of laser beam profilers. With our unmatched accuracy, customizable layout, cutting edge R&D and global support system, we are ready to help our customers solve their most challenging problems.

VGEN Type	VGEN Model	Recommended beam profiler	Recommended Attenuator	Description
VGEN-G	VGEN-G-10	LBP2-HR-VIS3	LBP2-SAM-VIS2	<ul style="list-style-type: none"> The LBP2-HR Laser Beam Profiler is a powerful software driven system with comprehensive beam diagnostic measurement features. It features a 1624 x 1224 pixel CCD camera for the wavelength range between 190 and 1100 nm. The easy to use graphical user interface includes all of the accuracy and ISO approved quantitative results. The LBP2-SAM beam sampler operates by reflecting the incoming beam from the front surfaces of a pair of wedges through 90 degrees into the camera. Approximately 99% of the beam is transmitted through the beam sampler with 0.01% passed on to the available filter slides where you can add an additional attenuation up to ND6
	VGEN-G-20			
	VGEN-G-HE-10			
	VGEN-G-HE-20			
	VGEN-G-HE-30			
SPFL 532	SPFL 532-40			

* Additional options from MKS Ophir are available. Please visit www.ophiropt.com or contact your Ophir sales representative for consultation

MKS Instruments is your one-stop-shop partner for all the critical components surrounding your workpiece. Working very closely with customers globally and with diverse applications ranging from PCB, ceramic and glass cutting & drilling to micromachining & solar cell processing, chances are we have already experienced & solved the challenges you may be facing now. That is how we **Solve Together, Succeed Together™**.

Make Light

LASERS & LIGHT SOURCES

Ultrafast, Q-switched DPSS, CW, quasi-CW, high-energy pulsed, tunable and fiber lasers, low power laser diode modules, HeNe lasers, incoherent sources, laser diode instrumentation, laser diode reliability & burn-in test systems, electro-optic modulators & accessories. Includes ILX Lightwave, New Focus, Oriel, and Spectra-Physics products and brands.



Manage Light

MOTION CONTROL

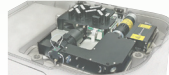
Our motion product portfolio includes high precision XY stages, vertical stages, rotation stages, air bearing stages, custom-made motion systems, XPS high performance universal motion controller/driver and LMS-Pro laser machining software. Over the decades, we have served customers with diverse applications including ablation, ultrafast micromachining, laser additive manufacturing, laser cutting, scribing and drilling.



Measure Light

PRECISION OPTICAL SYSTEMS/ SUBASSEMBLIES

Precision subassemblies and subsystems encompass our knowledge & expertise in optics, lasers, opto-mechanics, motion control, & electro-optics to meet the most demanding customer needs for performance, reliability, value & schedule. Incorporating precision optics fabrication and coating capabilities and components, optical solutions for the DUV, VIS, and NIR spectral ranges are produced from prototype through volume production.



OPTICAL TABLES & VIBRATION ISOLATION

With nearly 50 years of vibration control and vibration isolation design and manufacturing experience, MKS Newport has become the industry standard for optical tables, isolation systems, and vibration control products. Our diverse offering includes optical tables, breadboards, vibration isolators, Guardian Active Isolation workstations and custom built solutions.



Measure Light

LIGHT ANALYSIS

MKS offers industry leading tools for measuring power or energy of an optical beam, profiling a laser, locating the position of a beam, spectral analysis, or characterizing a laser pulse. In addition to Newport brand optical meters, optical sensors, and beam characterization instrumentation, our Ophir Photonics business offers a diverse selection of these products as well.



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The laser measurement sensors, power meter & PC interface, beam profilers & attenuators listed in this document are RoHS compliant