

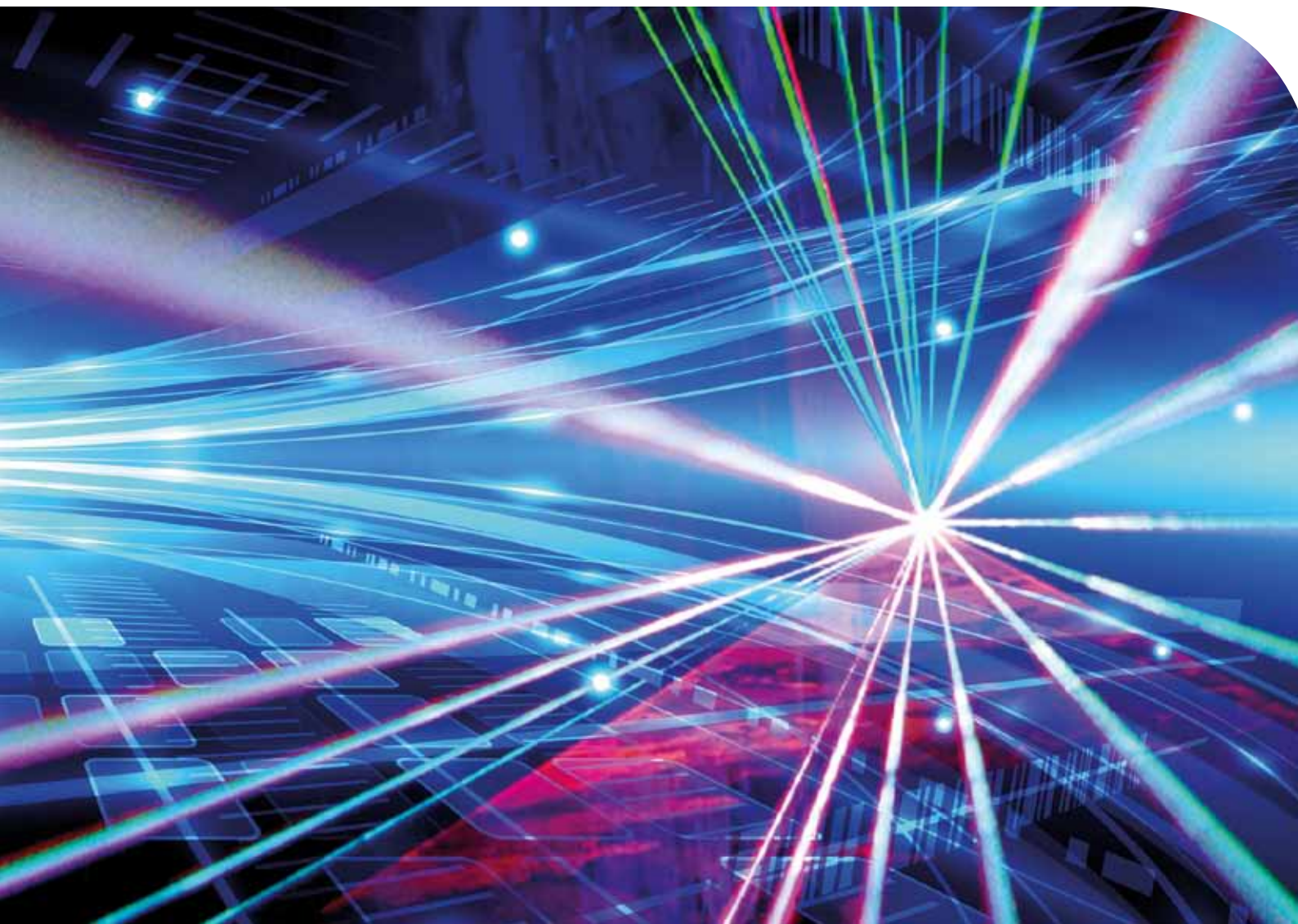


LASER 2000

Systems, Modules and Components

Laser & Light Sources

Laser & Light Sources



Laser Test & Measurement Network Systems
Scan & Motion Systems Laser Material Processing

Laser & Light Sources

Laser Safety Fiber Optics Cameras Fiber Preparation
Test & Measurement Optics & Optomechanics
Machine Vision

Experts in Europe! Laser 2000 is headquartered in the **Munich** Metropolitan Region. We are driven by global thinking and local action. To meet the needs of individual markets and customers, we have subsidiaries and offices all across Europe. Our team also serves you from direct offices in **Paris, Bordeaux, Madrid, Gothenburg, and Stockholm**. Together with affiliated companies in Great Britain, Belgium, and the Netherlands we ensure international proximity to our customers.

For more than 30 years, Laser 2000 has been supplying Photonics and FiberOptic solutions for even the most demanding applications. We cooperate with global leaders to supply customer-specific solutions from a single source. Our passion for the fascinating world of photonics is the basis of our thinking and actions. We are avid promoters of optical technologies and are always on the cutting edge of development, products and application options.

We rely on innovation, the highest quality standards and in particular on the knowledge, creativity and enthusiasm of our employees. An excellent team of university-educated physicists and engineers who have many years of experience. Photonics is our passion and profession alike. It is also the basis for ensuring full customer satisfaction for us as a leading player on the European market for optical technologies in the photonics century.

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Introduction

Laser & Light Sources – Systems, Modules and Components

Optical technologies play an important role worldwide. Quotes such as "The future is in the light" or "Light creates jobs" are not just empty words. The optical technologies are considered to be the pacemaker technologies for the modern industry and society. In the course of this, laser sources are assumed as one of the most important pillars of the optical technologies. While laser sources are already established in industrial production and also used routinely in many applications in metrology, medical and fundamental research, recent research activities show entirely new perspectives for the use of laser light. The fiber laser technology allows laser powers in the kW range generated in compact and modular systems. Cutting, welding and other applications in material

processing can be done with fastest processing speed. New semiconductor laser wavelengths extend the working range of these lasers in biological and medical applications. Fluorophores bonded to cell structures and excited by laser light give deeper and more detailed views into biological and medical procedures. The VCSEL technology enables the production of laser diodes with excellent beam qualities and smallest dimensions. VCSELs provide ideal light sources for many applications in sensors and analytics. This catalog gives you an insight into our extensive portfolio of laser and light sources. To find the perfect laser source for your application our product specialists are available at any time to advise you.

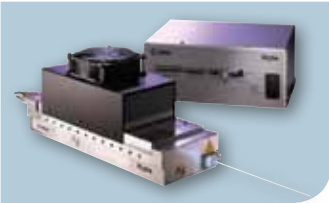


Chapter in detail



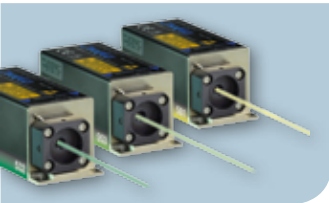
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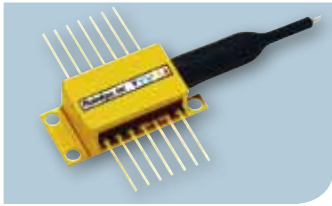
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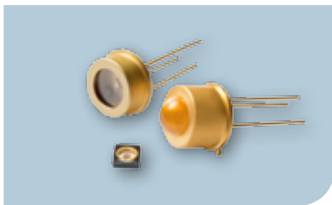
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High Power Lasers

Technical Guidance and Sales Support

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High Power Blue Lasers



NUBURU™ Series Blue Lasers

NUBURU'S™ unique AO™ laser product line includes a suite of fiber coupled high power blue lasers at a wavelength of 450 nm with optical powers ranging from 150 W to 2000 W. These true cw lasers are easy to use plug-and-play systems providing a breakthrough in material processing.

Currently IR laser are at their technical limits in terms of speed, resolution and process quality. The key for higher throughput and production efficiency is the absorption of the laser light. Compared to the industry-standard IR lasers, the absorption in the blue is 3 to 20 times higher. This results in a 2 to 10 times higher process speed. In addition, the 450 nm blue lasers provide a significant better spot size compared to IR lasers or even green lasers. Therefore, the new high power blue NUBURU™ lasers improve existing applications and enable new applications where materials and objects have to be melted, fused, illuminated or cut.

The applications range from aviation, automotive industry, medical engineering and watch making to electro mobility. In addition, the NUBURU™ lasers cover new applications which are not possible with the previous laser technologies at all.

- AO™ 150 is the market's first high-power blue laser
- Blue dramatically improves existing or enables new processes
- Blue surpasses IR and green even at equal power
- Very simple to use true cw laser
- High efficiency and low energy consumption
- Ideal laser for applications with noble metals, e. g. copper and its alloys

kW Fiber Lasers



CORELIGHT™ Series Fiber Laser Engines

CORELIGHT's 2.1 kW, 4.2 kW and 6.3 kW fiber laser Series engines are based on highly advanced, compact 2.1 kW ytterbium fiber laser modules. It offers straightforward integration into new and existing manufacturing tools and use a customer's existing power and control system for cost efficiency. Engine control and monitoring are accomplished through analog, RS-232, and Ethernet communication ports. Multiple, user-accessible, real-time system logs assure detailed operational history and is available for review at any time.

- Compact and powerful design – industry leading 2.1 kW optical output per module
- Strong back-reflection immunity – fast processing of reflective materials
- Flexible modular approach – enables easy integration into new and existing tools

Turnkey Fiber Laser System, 1,080 nm, 6 kW cw

Lumentum CORELIGHT AJ-Series 2 kW, 4 kW, and 6 kW turnkey fiber laser systems offer a complete high-power and high brightness solution for the most demanding macromaterial processing applications. Built upon the highly efficient, field proven Lumentum CORELIGHT Series ytterbium fiber laser modules, CORELIGHT AJ-Series products seamlessly integrate into new and existing machine tools. Control and monitoring are accomplished through industry-standard interfacing. Multiple, user-accessible, real-time system logs ensure detailed operational history and is available for review at any time.

- High brightness optical output
- Power options: 2 kW, 4 kW and 6 kW, cw
- Compact design
- Full-featured and industry-standard interfacing
- Wavelength: 1,080 nm

Short Pulse Lasers

Technical Guidance and Sales Support

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Picosecond Lasers UV



Xcyte Solid-State Laser, Quasi-CW, 355 nm

The Xcyte series lasers offer the advantages of diode-pumped solid-state lasers in quasi-CW 355 nm air-cooled format. The Xcyte series lasers provide near diffraction-limited beam profile, excellent stability, long lifetime and low amplitude noise. These qualities make the Xcyte laser the ideal replacement for bulky and inefficient HeCd and argon lasers in varied applications such as flow cytometry, microstereolithography and semiconductor wafer inspection.

All Xcyte series lasers feature the rugged and efficient DCP "engine" platform and passive mode-locking based on a proven, robust Saturable Bragg Reflector (SBR). Passive mode locking with an SBR requires only a single semiconductor device that functions as one cavity mirror, making this technique simpler and more robust than other passive mode locking approaches. Directly coupling the pump light to the crystal means fewer optical surfaces between the diode and the lasing crystal, resulting in lower losses and enhanced efficiency.

The high internal reflection of the side-pumped geometry ensures uniform pumping and gain for high mode quality. The high Pulse Repetition Frequency (PRF) of the Xcyte laser series (**100 MHz**) is sufficiently fast that it is seen as effectively CW in low bandwidth systems (i.e., systems with long response times).

Xcyte lasers provide industrial reliability for applications ranging from biomedical to rapid prototyping.

- Pulse length: > 10 ps
- Power options: 20, 60, 100, 150 mW
- TEM₀₀ mode quality
- RS-232-controllable
- Solid-state design
- Rugged industrial platform
- Air-cooled

Picosecond Lasers IR



Tunable picosecond lasers

The picosecond lasers are tunable in wavelength, pulse width, repetition rate and power. As synchronized versions they incorporate a tunable laser and a MOPA into a single source. These compact fiber lasers are ideal for applications such as CARS and Stimulated Raman Scattering (SRS).

- Center wavelengths 793 nm to 1,950 nm
- Raman shift range 2,815 cm⁻¹ to 3,350 cm⁻¹
- Single sources and synchronized dual sources
- No moving parts
- Easy and fast setup

Picosecond Diode Lasers



EPL Series

Picosecond pulsed diode lasers

The EPL series lasers are a new excitation source for fluorescence lifetime measurements. They are pre-adjusted for an optimum pulse width at different selectable pulse repetition rates. The EPL lasers are robust, maintenance free, easy to operate, and have proprietary beam conditioning optics.

- Wavelengths 375 nm to 980 nm
- Pulse widths 90 ps to 180 ps
- Average powers 100 to 250 µW
- Spectrally purified output
- Fully integrated, compact design

Solid State Lasers

Pulsed Solid State Lasers



Q Series Solid State Lasers

Q-Switched, 355/532 nm, up to 40 W

The Q series lasers lead the market for high-power Q-switched DPSS UV and green lasers for micromachining applications. Due to the self-stabilizing characteristics of intracavity UV harmonic generation, all Q series lasers exhibit inherently high energy, high pulse-to-pulse stability and long-term output power stability.

- More than 40 W of UV output power
- Large selection of pulse energies, widths and repetition rates
- No cavity optic coatings exposed to UV
- Unique intracavity harmonic generation



TiSon Series Ti:Sapphire Lasers

High energy pulsed nanosecond Ti:Sapphire Lasers

The TiSon series Ti:Sapphire lasers are extremely compact, easy-to-use and maintenance-free tunable laser sources. The wavelength tuning is done fully automated either continuously or randomly within milliseconds. The required pump laser is fully integrated in the laser housing.

- Wavelength tuning range 700 nm - 910 nm
- Pulse energy up to 1 mJ
- Puls duration 10 ns
- Integrated pump laser
- Maintenance-free operation



QL Series

Pulsed DPSS lasers for research applications

The QL series lasers are compact, actively q-switched, pulsed lasers with superior performance. The design is flexible enough to optimize the repetition rate, the pulse width or the pulse energy to meet the requirements of many applications in research.

- Wavelengths 262 nm to 1,342 nm
- Pulse energies 25 μ J (262 nm) to 480 μ J (1,053 nm)
- Pulse repetition rates from single shot to 200 kHz
- Excellent beam quality
- Low power consumption air-cooled design



Tech Series

High pulse energy DPSS lasers for industrial applications

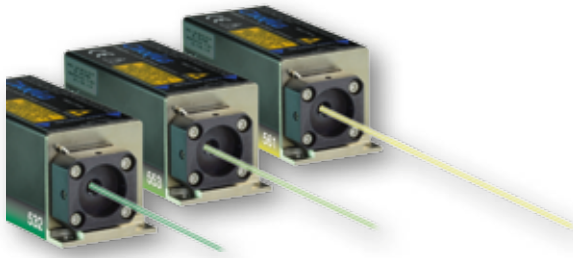
The Tech series actively q-switched DPSS lasers are intended to be used in industrial OEM applications. Due to the combination of high pulse energy, superior pulse-to-pulse stability, ultra-compact footprint and maintenance-free operation they meet perfectly the OEM requirements.

- Wavelengths 263 nm, 351 nm, 527 nm and 1,053 nm
- High pulse energies up to 2,000 μ J at 1 kHz and 1,053 nm
- Short pulse durations down to 3 ns
- Perfect beam quality
- Ultra-compact maintenance-free design

Technical Guidance and Sales Support

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CW Solid State Lasers



LaserBoxx Series

Low noise cw solid state lasers

The LaserBoxx series solid state lasers are based on an alignment-free, monolithic resonator design. The elements in the cavity are assembled into a single, ultra-low loss, optical sub-system which results in highly reliable, stable, and low noise laser output.

- Wavelengths 532 nm, 553 nm, 561 nm
- Optical powers up to 500 mW
- Ultra-low noise
- Excellent beam quality
- Graphic user interface with USB or RS-232 remote diagnostics



CNI Series

Full spectrum cw solid state lasers

The CNI series lasers are compact, low cost, and easy operating laser systems for research and industrial applications. They cover a huge range of different wavelengths and optical output powers which makes it easy to find the best solution for many applications.

- Wavelengths 261 nm to 2,096 nm
- Free space output or fiber coupling options
- Powell lens line generator options
- TTL and analog modulation
- Lab power supplies or OEM circuit boards

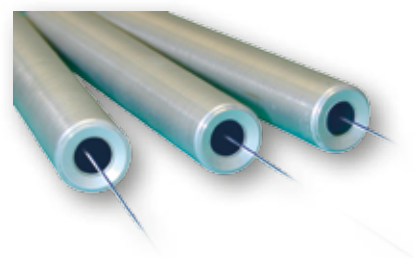


CL Series

CW solid state lasers from VIS to IR

The CL series lasers cover a broad wavelength range from the visible to the infrared spectrum. Low noise versions are available as well as lower costs standard versions. All lasers feature excellent TEM₀₀ beam parameters and highly stable output power.

- Wavelengths 473 nm to 1,342 nm
- High quality beam parameters
- Low noise options
- TTL and analog modulation options
- Fiber coupling options



LCL-LCM Series

CW solid state laser OEM modules

The LCL-LCM series laser modules are highly reliable and industrially verified during many years. The small size and the easy installation make the LCL-LCM series a perfect laser source for OEM applications in test and measurement or alignment procedures.

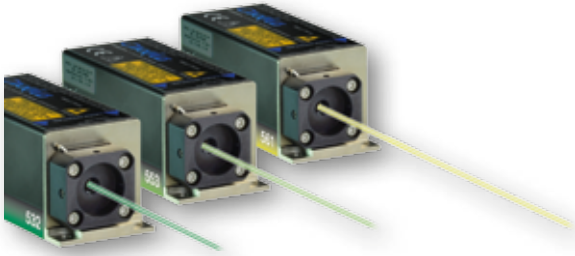
- Wavelengths 532 nm, 1,064 nm
- Output power up to 20 mW (532 nm) and 200 mW (1,064 nm)
- Stable output
- High quality beam parameters
- Incorporated driver for operation voltage of 3.5 VDC

Solid State Lasers

Technical Guidance and Sales Support

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Narrow Linewidth Solid State Lasers



LaserBoxx SLM Series

High power SLM solid state lasers

The unique feature of the LaserBoxx SLM series is a proprietary, alignment-free, monolithic resonator design which makes these lasers extremely robust over time and insensitive to mechanical vibrations. It provides ultra narrow linewidth, low noise and excellent temperature stability.

- Wavelengths 532 nm, 553 nm, 561 nm
- Optical powers 25 mW to 800 mW SLM (532 nm)
- Linewidth < 1 MHz
- Fiber coupling and optical isolator options
- Graphic user interface with remote diagnostics via USB or RS-232



CL-S Series

Broad wavelength range SLM solid state lasers

The CL-S series lasers are ultra-compact diode-pumped solid state laser systems providing narrow linewidth laser radiation over a broad range of wavelengths. The lasers feature high reliability, high stability and excellent beam quality.

- Wavelengths 527 nm to 1,342 nm
- Optical powers 5 mW to 1 W (1,064 nm)
- Linewidth < 0,01 pm
- Excellent beam quality
- Fiber coupling and optical isolator options



LUV Series

Narrow linewidth deep UV lasers

The LUV series is an ultra compact deep UV laser offering excellent performance and reliability thanks to its sealed monolithic BBO resonant cavity and its monolithic crystal DPSS laser pump source. The narrow linewidth makes the LUV series an ideal laser source for UV Raman applications.

- Wavelengths 266 nm or 280 nm
- Optical powers up to 10 mW cw
- Single Longitudinal Mode
- Narrow spectral linewidth 300 kHz
- Adjustable power 10 % - 100 %



NPRO® Series

Tunable single frequency solid state lasers

The NPRO® series lasers are based on a nonplanar ring oscillator design. They provide single frequency output at either 1,064 nm or 1,319 nm. Key features include fiber coupled or free space output, narrow linewidth, low noise, frequency tunability and adjustable output power.

- Wavelengths 1,064 nm or 1,319 nm
- Frequency tuning range 30 GHz
- Optical power up to 200 mW (1,319 nm)
- Linewidth < 5 kHz/ms
- Superior power stability

Gas Lasers

Technical Guidance and Sales Support

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Excimer Lasers



MLI Series

These compact stand-alone excimer UV lasers offer the best life times and reliability available on the market. With a homogeneous beam profile and active energy stabilization they are ideal for demanding applications.

With the many years of experience MLase has once again re-invented the mini excimer laser now making it even more attractive for industrial use. Simple connection via USB and control with the included software allows a quick setup and an easy integration. Customized OEM versions with individual features can also be offered. Integrators benefit from standardized interfaces and a strong local support team.

MLI models with the suffix "LC" come with the optional active water cooling (either via domestic water, or external heat exchanger, no DI water required) and thus allow a stable continuous operation at 100 % duty cycle at 1,000 Hz. Standard wavelengths are 193 nm (gas: ArF – Argonfluorid) and 248 nm (gas: KrF – Kryptonfluorid). Other wavelengths are available on request. Maximum pulse energies range from 10 mJ (ArF) to 16 mJ (KrF).

- Lowest running costs excimer laser on the market
- 100 % metal sealing
- Solid state pulsed power module
- Corona pre-ionization
- Active energy stabilization
- Optional water cooling
- Wavelength options at 193 nm, 248 nm etc.

FIR and THz Lasers



FIRL 100

The model FIRL100 has both the CO₂ pump laser and the FIR laser housed in an integrated structure. The lasers and coupling optics are mounted within a 5 bar invar rod frame for excellent thermal and mechanical stability. The CO₂ laser output is coupled into the FIR laser via two steering mirrors and a ZnSe focussing lens.

Model 295

The model 295 is a stand-alone FIR laser designed for operation with high power CO₂ lasers. The 295 has a 3 bar invar support frame and features the same optical design as used in the FIRL 100. It has been engineered to allow UHV pumping for extended sealed operation, maximum power and number of lines.

Model 395 Twin Laser

The model 395 features two identical FIR laser cavities within a single 5 bar invar stabilised frame. Both FIR cavities are pumped by a single CO₂ laser to ensure optimum stability of the intermediate frequency.

- Wavelength range 40 μ m to 1.22 mm (0.25 – 7.5 THz)
- Output power up to 500 mW
- Invar stabilized resonator
- Hollow dielectric waveguide for low propagation loss
- Dichroic output coupler for optimum system performance
- Motorized and manual cavity length control options
- High vacuum integrity

Gas Lasers

Technical Guidance and Sales Support

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Gas Lasers



Tunable CO and CO₂ lasers

The Edinburgh Instruments series of cw and pulsed, grating tuned, infrared gas lasers sets the standard for high power, stable sources for a wide variety of applications from molecular spectroscopy, non-linear optics, interferometry and process control.

- Wavelength tunable over 90 lines CO₂ (9.1 - 10.9 μm) and 60 lines CO (5.2 - 6.2 μm)
- Optical power cw up to 180 W CO₂ and 1 W CO
- Active output power stabilization
- Sealed-off and flowing gas modes



Air-cooled Argon-Ion lasers

The air-cooled Argon-Ion lasers are designed for complex, high-resolution applications such as flow cytometry, confocal microscopy, DNA sequencing and semiconductor inspection. An axial airflow guarantees an exceptional beam pointing stability and a fast warm-up.

- Single line operation at 458 nm, 488 nm or 515 nm
- Multi line operation up to 40 mW
- Ultralow noise
- Rugged and vibration isolated construction
- Cylindrical and rectangular industry-standard package



Red HeNe lasers

The red Helium-Neon lasers offer low noise, high power stability and long lifetime for the most demanding applications. Hard-sealed internal mirrors result in highest reliability. With more than 1.5 million units sold, Lumentum lasers are the industry standard for many advanced system designs.

- Long operating life
- Low noise
- Exceptional beam-pointing stability
- Long-term amplitude stability
- Optical powers up to 22.5 mW at 632.8 nm



Deep UV lasers at 224 nm and 248 nm

The Deep UV series lasers provide deep UV laser radiation in a compact, rugged and air-cooled design. The self-contained, integrated, laser controller enables remote computer control for easy operation and flexible data collection via LabView software.

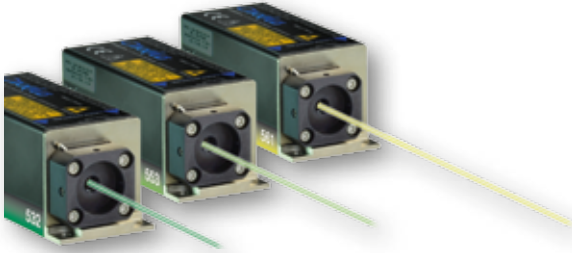
- Wavelengths 224.3 nm or 248.6 nm
- Square pulse width from 10 - 200 μs
- Pulse power up to 50 mW (224 nm) and 250 mW (248 nm)
- Narrow line width < 3 GHz (0.5 pm or 0.1 cm^{-1})
- USB or Ethernet interface with LabView

Diode Lasers

Technical Guidance and Sales Support

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Diode Lasers



LaserBoxx Series

High modulation bandwidth diode lasers

The LaserBoxx is a performing controller integrated platform for laser diode modules in an industry standard package. The LaserBoxx provides superior beam quality, excellent stability and fast modulation capabilities. High power versions are available either as free space or fiber coupled.

- Low noise
- Fast TTL and analog modulation
- Remote control box with manual power setting
- USB and RS232 interface
- Wavelengths 375 nm to 980 nm



L-Mini Series

Miniaturized diode laser modules

The L-Mini series is currently the world's smallest complete diode laser module. In a remarkably small design, it includes the laser diode as collimated free-space or fiber coupled output and the laser controller with power supplied via USB connection.

- Wavelengths 375 nm - 1550 nm
- Optical powers up to 100 mW
- Dimensions 40 x 25 x 25 mm
- USB powered
- Operation software included



L-Beam Series

Compact diode laser modules

The L-Beam series offers high performance diode laser modules in a very compact design. High durability, excellent beam quality and various options for system integration guarantee highest flexibility in industrial, scientific and medical applications.

- Wavelengths 375 nm - 1064 nm
- Optical powers up to 1000 mW
- Modulation bandwidth 1.5 MHz
- Temperature stabilized
- Fiber coupling options



CNI Series

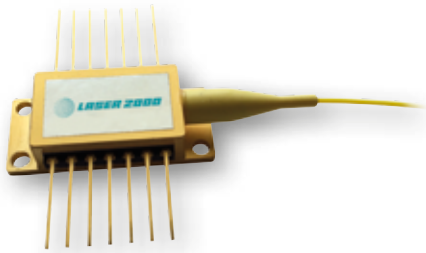
Diode lasers "Economy Class"

The CNI series diode lasers are affordable, easy-to-use laser systems for applications which do not require high-end laser specifications. A huge variety of wavelengths, optical powers and controller options makes it easy to find the perfect match to your needs.

- Available with nearly all wavelengths
- Low power to highest power range
- TTL and analog modulation options
- Fiber coupling options
- Wavelengths 375 nm to 2,200 nm

Diode Lasers

Narrow Linewidth Diode Lasers



IPS Series Laser diodes

Ultrastable narrow linewidth laser diodes

Based on Volume Bragg Grating technology the IPS series laser diodes provide highest wavelength stability and extremely narrow spectral linewidth. The lasing wavelength can be accurately specified and repeatedly manufactured to within 0.1 nm.

- Standard wavelengths 633 nm to 1,064 nm
- High power single mode (single spatial & SLM) output
- Ultra narrow spectral bandwidth (< 100 kHz instantaneous)
- Stabilized output spectrum (< 0.007 nm/°C)
- Excellent beam quality ($M^2 < 1.1$)



IPS Series Modules

Ultrastable narrow linewidth diode lasers

The IPS series single frequency lasers are made for the most demanding applications in interferometry, metrology and Raman. Based on Volume Bragg Grating technology they provide highest wavelength stability and extremely narrow spectral linewidth.

- Standard wavelengths 405 nm to 1,064 nm
- Wavelength selectable to ± 0.1 nm
- Instantaneous spectral linewidth < 100 kHz
- Optical output power up to 150 mW
- Fiber coupling options



IPS OEM Series

Ultrastable narrow linewidth OEM modules

The IPS series proprietary wavelength stabilized lasers feature high output power with narrow spectral bandwidth. The laser's stabilized peak wavelength remains "locked" regardless of the case temperature between 15 and 45 °C.

- Wavelengths 532 nm to 1,064 nm
- PM or MM fiber coupled
- Optical power up to 500 mW
- Spectral linewidth < 100 MHz
- Integrated optical isolator option



IPS MOPA Series

Amplified narrow linewidth diode lasers

Based on a Master Oscillator Power Amplifier the IPS MOPA series of spectrum stabilized lasers features highest output power with narrow spectral linewidth. An integral fiber coupling guarantees stable and reliable optical output power out of the fiber.

- Wavelengths 760 nm, 780 nm, 785 nm
- Optical power up to 1 W free space
- Circularized and collimated free space beam
- Optical power up to 300 mW PM fiber coupled
- Integrated optical isolator option

Technical Guidance and Sales Support

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Tunable Diode Lasers



Precision Tunable Diode Lasers

Lasy 633 Series

The Lasy 633 diode laser easily replaces conventional He-Ne lasers in applications, where wavelength precision matters. In contrast to the gas laser, the Lasy 633 can be wavelength-tuned over several hundred picometer. This makes the Lasy 633 a superior light source for interferometry and spectroscopy.

- Iodine-referenced absolute frequency stabilization
- Arbitrary, hysteresis-free tuning due to interferometric reference
- High coherence length
- Fiber coupling with active stabilization
- USB remote control



iScan®

Frequency control for tunable lasers

The interferometric frequency control iScan® is designed for research laboratories as an universal tool for static and dynamic control of the frequency and mode properties of tunable lasers. The iScan® system consists of a patented interferometer setup and the control electronics.

- Fast and precise scanning of tunable lasers
- Stepping to different arbitrary wavelengths
- Surveillance of the scan behaviour of tunable lasers
- Measurement of the wavelength of tunable lasers
- Measurement of the single-mode stability of tunable lasers



Tunable DWDM Channel Laser Source

TLS-101 tunable laser

The TLS-101 can be step-tuned across the C or L band communication channels with a tuning resolution of 50 GHz in less than 20 ms. The internal wavelength locker assures that the wavelengths are exactly on the ITU grid of the DWDM channels.

- Wavelengths 1528.77 - 1563.86 nm or 1568.77 - 1607.47 nm
- Fast tuning speed
- High output power
- ITU grid locking
- Ethernet, GPIB, USB and RS-232 interfaces



Laser Stabilization

Stabilization electronics for intensity or frequency

The NoiseEater controls the laser power by means of acousto-optics, electro-optics or by rotating polarization optics. LaseLock® scans the laser frequency, displays the absorption spectrum and stabilizes the laser frequency to the desired absorption line.

- Intensity noise cancellation
- Controlled laser power setting or switching
- Side-of-fringe and top-of-fringe stabilization
- Two independent PID regulators
- Built-in oscilloscope functionality

Diode Lasers

Technical Guidance and Sales Support

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High Power Diode Lasers



High-power Direct Diode Laser Head Dlight

With a short wavelength and 50 % high power conversion efficiency, the new product has a significant advantage over the traditional CO₂ laser in regards of stability, processing control and as to flexibility.

- Wavelengths: 808 nm, 976 nm
- Power options: 2 kW, 3 kW, 4 kW, 5 kW
- Spot size (mm x mm) at 2 kW: 4 x 4 or 2 x 4
- Spot size (mm x mm) at > 2 kW: 2.5 x 11.5
- Working distance: 300 mm



High power fiber coupled diode lasers

The CNI series diode lasers have the laser diode, fiber coupling optics, laser power supply and temperature control in one box. Its compact dimension and convenient functions, such as power adjustment and temperature control make it suitable for scientific research and industrial applications.

- Wavelengths 639 nm to 1,940 nm
- Optical powers between 3 W and 50 W
- 400 μ m multimode fiber with SMA connector
- Analog and TTL modulation options
- Adjustable output collimator option



IDL-Series Direct-Diode Lasers

The IDL Series direct-diode laser products provide up to **180 watts** output with **600 μ m** fiber delivery and comes with integrated red pilot laser.

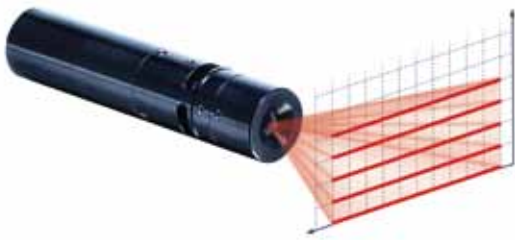
IDL Series air-cooled, direct-diode laser systems combine our high-reliability L4 diode lasers with a unique fused-fiber individual-emitter architecture and novel health-monitoring system to yield an extremely reliable and scalable product that performs in the most demanding industrial manufacturing environments. Providing up to 180 watts of multimode laser output, these products are ideally suited for plastics welding, selective soldering and heat treating, handling a greater diversity of materials and reducing costs while increasing throughput in existing operations.

Unlike bar-based diode-laser products, IDL Series fused-fiber, individual-emitter architecture offers exceptional thermal isolation between emitters, eliminating severe thermal reliability issues. Modulated operation does not shorten product lifetime. The fused-fiber construction further eliminates sources of contamination, ensuring uninterrupted, reliable performance for the lifetime of the laser. Additionally, the individual-emitter construction enables individual device monitoring, control and simple, low-cost serviceability.

Designed for ease of integration and operation, these air-cooled systems require only standard wall-plug power. Both analog and RS232 ports offer system control. A flexible armored cable with an industry-standard SMA905 optical connector allows quick connection with commercially available beam-delivery optical packages.

- Multipoint health monitoring
- Best-in-class top-hat beam profile
- 600 μ m, 0.22 NA output available
- Armored fiber delivery

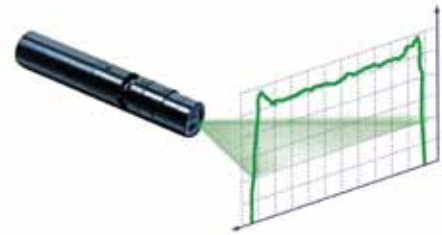
Diode Laser Modules



Streamline Laser Module – SL

High performance, high reliability and superior beam shaping capabilities in a self contained laser module for 3D structured light applications.

- Superior beam shaping (single or multiline)
- Wavelengths 405 nm to 830 nm
- Externally focusable
- High pointing and focus stability
- ESD, overvoltage & over temperature protected
- 6 different focusing options
- Up to 2 years warranty



Compact Laser Module – CL

High performance, high reliability with superior beam shaping capabilities in a self contained compact laser module for demanding industrial applications

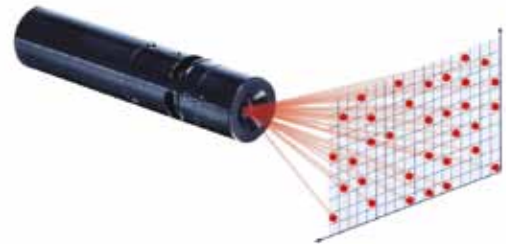
- Compact, 10 mm diameter
- Wavelengths 405 nm to 830 nm
- Externally focusable
- Superior beam shaping
- High pointing stability
- ESD & over temperature protected
- 6 different focusing options
- Up to 2 years warranty



Industrial Laser System – ILS

High power direct semiconductor pattern generator provides high reliability with superior beam shaping for high signal to noise industrial applications.

- High power in a compact size
- Up to 3 W diode power
- 12 W with Fireline version
- Superior beam shaping
- Externally focusable
- High pointing stability
- Integrated monitoring and modulation features
- Wavelengths 375 nm to 810 nm



Random Pattern Projector – RPP

Structured lighting laser depth sensing projector, in a self contained laser module for 3D machine vision applications.

- Industrial design
- Standard or eye safe version
- Etched in glass diffractive optic
- Externally focusable
- Wavelengths 405 nm to 850 nm
- Up to 2 years warranty

Laser Diodes

Blue Laser Diodes

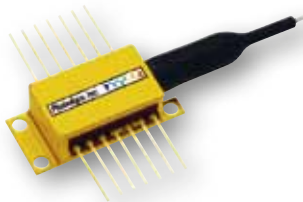


GaN laser diodes

SoraaLaser is commercializing a new generation of laser light sources for display, automotive and illumination. The technology incorporates an innovative semi-polar GaN laser, creating industry-leading performance. This novel approach results in dramatically increased design freedom and a 300 % increase in gain, enabling greater efficiency and reliability.

- Semi-polar GaN crystal plane
- Optical power of more than 4 W multimode
- Optical power of 1 W singlemode
- Perfect sources for pumping phosphor to create white light

DBR Laser Diodes

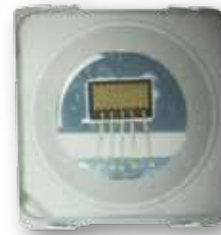


DBR Laser Diodes for spectroscopy

The DBR laser diodes deliver single frequency, single mode output in the near-IR from 760 nm to 1083 nm. With a narrow line-width of 1 MHz, DBR lasers are uniquely suited for applications in atom sensors, non-linear optics, difference frequency and laser spectroscopy.

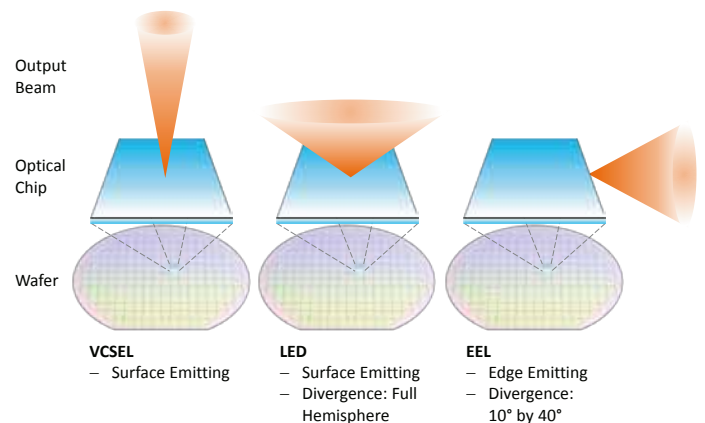
- AlGaAs QW active layer
- Wavelength slightly tunable by temperature
- High slope efficiency
- Epi designed for high reliability

VCSELs



Vertical-Cavity Surface-Emitting Laser

VCSELs are a type of semiconductor laser. They are similar to LEDs in that the light is emitted from the surface of the wafer or chip. Vixar offers several types of singlemode and multimode VCSEL laser diodes with wavelengths ranging from 680 nm to 905 nm. Powers range from 10's of milliwatts up to 10 W from power arrays. The devices can be provided in surface mount packages, as bare dies, or in standard TO can package like TO-46. Vixar has a track record of many years for providing super reliable and robust devices for industry grade applications.

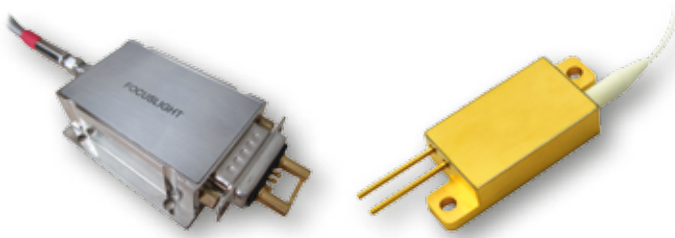


VCSEL benefits

- Low threshold currents for high efficiency and low power consumption
- Surface-normal emission, low divergence and circular output beam, ease of coupling and simple optics
- Easily scaleable to one- or two-dimensional arrays
- Very high speed, with rise and fall times of 100 picoseconds or less
- Controlled single transversal mode and polarization
- 4~5x better wavelength stability with temperature than conventional edge emitting lasers

Fiber Coupled Laser Diodes

Single Bars, Arrays and Stacks



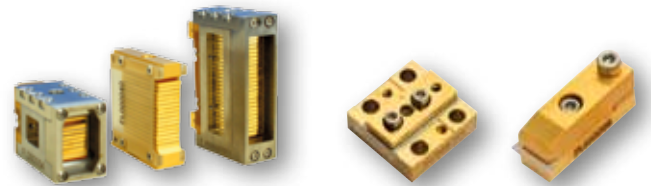
Fiber Coupled Laser Diodes with high power, high coupling efficiency provide high brightness and parallel seam sealing. The power is scaled through number and size of the laser light emitting diode type like single emitter, multiple single emitter or single bars.

Integrated features like red pilot laser, TEC, thermistor or monitor photo diode, removable fiber (with 'no-fiber-detection') are offered optionally with respective package types.

The available wavelengths range from 808 nm to 976 nm.

Power options and fiber core diameters

- Fiber Coupled Single Emitter FCSE:
 - Power: 2.5 - 10 W
 - Fiber core diameters: 105 - 200 μm
 - with optional feedback signal filter for fiber laser pumping applications
- Fiber Coupled Multiple Single Emitter FCMSE:
 - Power: 12 - 30 W
 - Fiber core diameters: 200 μm
- Fiber Coupled Single Bar FCSB:
 - Power: 30 - 50 W
 - Fiber core diameters: 200 - 800 μm



Single Bar CS-mount conduction cooled Laser Diode

Power CW: 20 - 80 W

Power QCW: 150 - 250 W

Wavelengths: 792 - 1,550 nm

Single Bar CS Series Macro/Micro Channel Cooled

Power CW: 60 - 120 W

Power QCW: 150 - 250 W

Wavelengths: 808, 915, 940, 976, 980 nm

G-Stack Laser Diode Bar

Power QCW: 150 - 250 W/Bar

Wavelengths: 808, 940 nm

Number of Bars: 2 - 12

Vertical Stack VS series Micro Channel Water Cooled

Power per Bar CW: 60 - 120 W

Power per Bar QCW: 150 - 250 W

Wavelengths: 808, 915, 940, 976, 980 nm

Number of Bars: 2 - 40

Bar-to-Bar Spacing: 1.8 mm

Horizontal Array MiHA series

Power per Bar CW: 60 - 120 W

Power per Bar QCW: 150 - 250 W/Bar

Wavelengths: 808, 915, 940, 976, 980 nm

Number of Bars: 2 - 25

Stack Arrays

Stack Arrays are made to customer specifications. They can either be a set of multiple Vertical Stacks or multiple G-stacks. The individual solutions may vary depending on the customer's requirements for cooling method, number of stacks, power, wavelength, structures or any other specifications. Please provide your detailed specifications with your inquiry which will allow us to respond to your questions.

Multicolor Lasers

Technical Guidance and Sales Support

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Multicolor Lasers



LBX-4C

Multicolor laser source for spectroscopy applications

The LBX-4C multiple wavelength laser authorizes a large choice of laser lines with free space beam output or delivery through single or multiple fibers. It is field upgradable for cost effective future extensions. The LBX-4C comes with a Windows User Interface and is compatible with μ Manager.

- Maximum 4 wavelengths between 375 nm and 1,064 nm
- High frequency modulation by direct access or via an integrated AOM
- Low noise
- Common laser output or multiple outputs
- USB or RS-232 interface with graphical user interface



Pulsed 3-Color Laser

Pulsed DPSS laser at 1,053 nm, 527 nm and 351/263 nm

The LCL series pulsed 3-color laser is a diode pumped, actively q-switched, solid state laser which emits simultaneous laser pulses at 1,053 nm, 527 nm and 351 nm or 263 nm in one beam with the same direction. The pulse repetition rate can be set between single pulse and 100 kHz.

- 50 μ J (351 nm and 527 nm) and 100 μ J (1,053 nm)
- High beam quality
- Low jitter
- Compact design
- RS232 interface



Nordic Combiner

Full spectrum multicolor laser source

Because of the largest wavelength selections in the industry, you can configure the Nordic Combiner virtually any way you require. Each laser can be operated independently or in conjunction with any number of other lasers. The compact form-factor allows an easy integration.

- Maximum 5 wavelengths between 375 nm and 1,550 nm
- High output power
- Excellent beam quality
- Common free space or fiber coupled output
- Analog and TTL modulation

LED and Broadband Sources

Technical Guidance and Sales Support

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LED and Broadband Sources



Light Engines for Bioanalysis

Novel optical excitation subsystems are designed for an array of instruments including fluorescence microscopes. Discrete outputs are available through the UV-Vis-NIR spectrum including white light from a proprietary mix of independently controllable sources.

- Powerful and intense light
- Spectral breadth and purity
- Fast switching speed
- Long lived, stable outputs
- Cool, clean, compact & easy-to-use box



Stable Controlled LED Source

The LED light source is controlled by a built-in colorimeter resulting in a very high stability of the light output. Combined with a colorimeter or a spectrometer the stabilized light offers the best measurement results where stable light is needed.

- Ultra stable light source thanks to internal regulation
- Ultra-fast stabilization
- Available in natural white and full spectrum
- USB & GPIB communication
- Suitable for use in vacuum environments



LED Illumination Systems

The Cool LED series offers a comprehensive range of LED illumination systems for bioscience and clinical microscopy. White light sources are available as well as multi wavelengths systems, covering the excitation bands of common fluorescent stains.

- Single LED wavelengths
- White light illumination
- Individual channel triggering
- Simple to operate
- TTL and USB control



Superluminescent Diode Light Source

The SLD-101S is a highly stable superluminescent light source designed for OCT, sensor and test applications. During operation, both the current and temperature are controlled for power and spectral stabilities. The modulation can be done either externally or internally with different waveforms.

- Center wavelengths 1,310 nm or 1,550 nm
- Output power 10 mW typical
- Stability: ± 0.05 dB over 8 hours
- External modulation DC to 100 kHz
- USB, Ethernet, RS-232 and GPIB

LED and Broadband Sources

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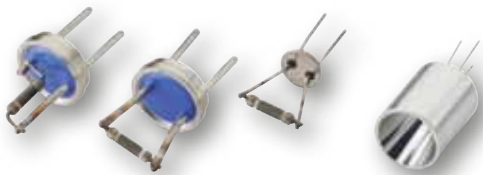
LED and Broadband Sources



Sub-Nanosecond LED Modules

The EPLED pulsed LED modules are a new excitation source for fluorescence lifetime measurements. The LED modules are pre-adjusted for an optimum pulse width, with particular attention paid to reducing a long tail in the temporal profile. They are robust, maintenance free and easy to operate.

- Wavelengths 250 - 610 nm
- Pulse duration 950 ps
- External trigger facility
- Spectrally purified output
- Optimised collimated beam



IR Thermal Emitters

The broadband steady state and electrically modulated IR thermal sources produce a broad spectrum of IR light from 1 to 20 μm depending upon the operating temperature of the device. A proprietary line of reflectors and windows are available to maximize the performance of the emitters.

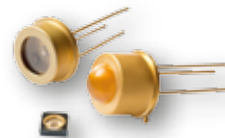
- Broad spectrum of IR light
- True blackbody radiation characteristics
- Low power consumption
- High emissivity
- Long lifetime



Fiber Coupled Miniature Light Sources

These portable light sources facilitate measurements in the UV, VIS, and NIR for various samples and application types using standard SMA-905 optical connectors. These low cost modular components are robust, reliable, and designed to last in portable and industrial environments.

- Tungsten Halogen light sources
- LED sources
- Mercury Argon calibration light sources
- Neon line calibration sources
- Deuterium Lamps



High Performance UVC LEDs

The UVC LEDs are used for disinfection in a variety of applications, including healthcare, industrial and point-of-use water purification. They are also used in scientific and industrial instruments to measure the quality of water, air, and biological samples.

- Pure UVC wavelengths from 250 nm - 280 nm
- Optical powers up to 30 mW
- Superior lifetime and light output consistency
- Robust package options with 100 % burn in and test
- Instant on/off

Laser Safety

Technical Guidance and Sales Support

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Safety Products for Laser Applications



Electronic Room Protection

Measures for the electronic safeguarding of a class 3B or 4 laser system according to EN 60825-1.

- Interlock control systems
- Laser shutters
- Conforms to EN 13849-1 (Cat4 PLe), EN 61508 (SIL3), EN 61010 and EN 60947-1
- Conforms to the machinery directive and the low voltage directive



Laser Shutter

A mechanical barrier consisting of tested and certified material for a wide range safeguard of a laser environment.

- Gravity operated for fail safe control
- Combined shutter and beam dump for high laser powers
- Low current requirement
- Compatible with interlock control systems



Warning Signs according to EN 60825-1

The operational status of a laser area has to be always indicated. The best way to do so is using illuminated warning signs which are also obligatory for class 4 lasers.

- One-way LED warning sign (white, yellow, red, green or blue)
- Two-way LED warning sign (red text/green text/off)
- 24 VDC and 230 VAC operation, available in different sizes
- Flexible choice of possible display texts



Separation of Laser Areas

A mechanical barrier consisting of tested and certified material for a wide range safeguard of a laser environment.

- Roller blinds (motorized or manual)
- Laser blocking curtains
- Screens (fixed or on wheels)
- Laser safety windows
- OptoBlok – Optical table guarding

Laser Safety

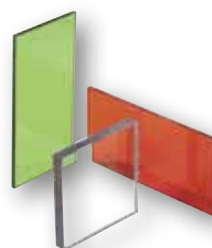
Safety Products for Laser Applications



Laser Safety Cabins and Enclosures

The best way to safeguard a laser environment according to EN 60825-1 is to enclose the whole area with a cabin.

- Modular and customizable for the application
- Flexible small enclosures for optical tables
- Accessible cabins
- Can be equipped with laser safety windows as well as interlock control systems



Laser Safety Windows

- Conforms to EN 207
- Suitable for many common laser wavelengths
- High transmission values
- Available in large sizes



Laser Safety Eyewear & Alignment Eyewear

Protection and alignment goggles for all common laser wavelengths and laser powers.

- Precise selection with our laser goggles finder
- Modern design and high wearing comfort
- Conforms to EN 207 and EN 208
- High variety of possible filters



Laser Safety Clothing

When working with open laser systems the skin also has to be protected properly. For this we offer appropriate laser safety clothing.

- Suitable for the wavelength range from 800 nm to 1,100 nm
- Available from glove to whole-body protection
- Certified according to DIN SPEC 91250 and protection against heat and flames
- High wearing comfort

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Software

We support you with user-friendly applications for the exact choice of laser safety goggles and interlock control systems as well as professional software for calculating all the relevant safety parameters of a laser.

- Interlock-Configurator – finding the right configuration for your laser environment
- Laser goggles finder – the proper laser safety goggles for your application
- LaserSafe PC – the professional tool for every laser safety officer



Academy

According to the optical beam protection ordinance an accredited training is mandatory for a laser safety officer.

- Accredited training for becoming a laser safety officer
- In Cooperation with experienced experts in laser safety
- Special seminar about laser classification according to EN 60825-1
- Practical training about laser safety



German Catalog "Laser Safety"

Find more information about "Laser Safety" in our German "Laserschutz" catalog.

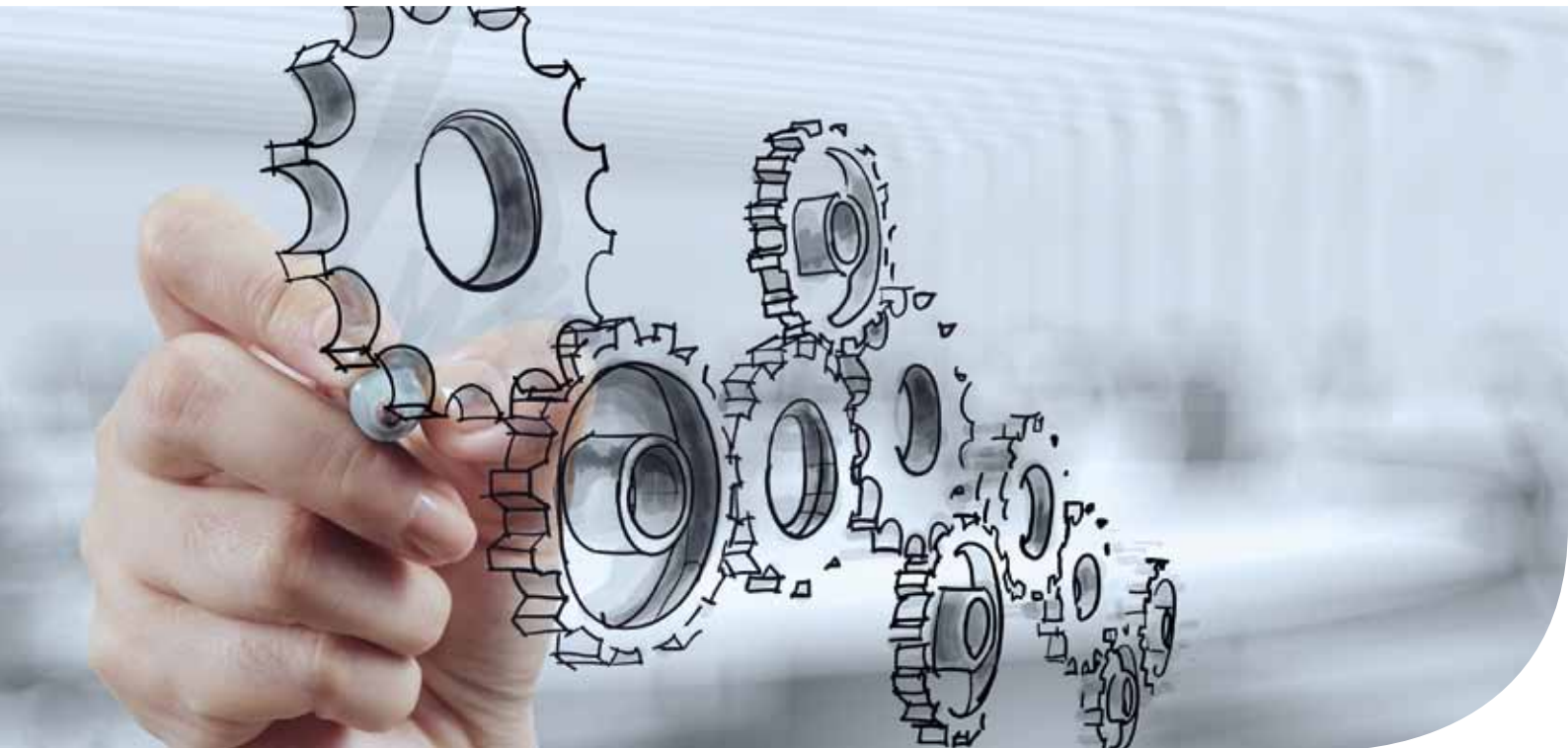
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- Fiber Preparation
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