PHOTONICS NEWS

Company Newspaper of the LASER COMPONENTS Nordic AB

lasercomponents.se
#08 ▪ 04|18

Round about it ...

Dear Reader,

in this issue of Photonics News Nordic, we will continue what we started in the previous one. In a series of articles, you will get a couple of new glimpses from inside our operations. First, we offer some insight into our work on Quality Assurance for Laser Optics. What metrics do we use to ensure an outstanding product? Are the spectral characteristics ok? What about the homogeneity? Next, we give some examples of what we offer in Fiber Technologies. LASER COMPONENTS have more than twenty years of experience in this field and can provide a wide range of fiber optical assemblies, state-of-the-art test equipment, coatings on fiber end faces and more. Page 6–9 will give you the full picture. On page 10 you can read about our in-house services, notably the calibration service that we offer.

For a technology driven company like LASER COMPONENTS, there is always a need for technically skilled employees. In this time of a shortage of skilled workers and rapid company growth, we are therefore pleased and proud to have found numerous additional international sales staff in recent months. Moreover, generational change in two important management positions was also successfully completed, once again by drawing on employees from our own ranks. You can get more information about this on page 11.

In the Product News segment, we are particularly happy to announce our QuickSwitch® Pulsed Laser Diodes for precise measurements at short distances. In one second, the QuickSwitch® PLD generates up to 200,000 laser pulses with a typical duration of 2.5 ns! Another exciting addition to the portfolio is the linear APD arrays, now in a new version optimally suited for time-of-flight measurements.

Before I leave you to the content of this issue, I would like to invite you to our upcoming shows. End of April, we exhibit at the Scandinavian Electronics Event 2018 at Kistamässan, Stockholm (Sweden) and in September we will be in Lund at the conference Northern Optics & Photonics. See you there!

Yours,

Mikael Winters

Measurement Technology in Production

Services and Company News

Product News

LASER COMPONENTS

Imprint

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SERVICE FIBER TECHNOLOGIES

When it comes to fiber optic data networks, you can rely on LASER COMPONENTS: Our services include the installation of monitoring systems and the calibration and repair of your measuring instruments. Optical fibers are not only used in communication; they can also be found in many other areas (e.g., in high-power lasers in medicine and industry). We are also a competent partner for these applications: We accompany you from product development to assembly under cleanroom conditions. If you would like to purchase high-tech measuring systems for laboratories or production, we support you with our leasing offers. You will benefit from the knowledge we have gained in production, sales, and service at practical training courses and informative symposia at LASER COMPONENTS' facilities. ➔

High-Level Fiber Assemblies

Standards are Defined with Customers thanks to Cross-Disciplinary Measuring Technology

Optical fiber assemblies are used in different areas: The demands placed on multimode assemblies for sensor technology, medical technology, and industrial laser power transmission are different but just as high as those placed on single-mode patch cables for communication technologies.

The greater the coupled power density, the more important product properties such as resilience, centricity between connector and fiber, and the reduction of back reflections become in **multimode assemblies**. Elaborate assemblies require not only an experienced team but also state-of-the-art measurement technology to manufacture fiber optic cables for demanding tasks.
Many measurement methods are standardized in **single-mode technology**: this is how the power level (dB) of fiber assemblies and cables is checked. The end face geometry is measured interferometrically in order to check the apex offset, for example. Finally, the cleanliness is tested according to the IEC standard. When it comes to the packaging of multimode fibers, standards are not set, or they only come into play when the undercuts of the fibers are measured.

At LASER COMPONENTS, important parameters such as the centricity from ferrule to fiber core and cleanliness are precisely checked, measured and, if required, documented individually. For FSMA connectors, which are mainly used for laser applications in medicine and industry, the connection dimension is also checked.

Multi-mode Assemblies

Among other things, Laser Components specializes in the assembly of optical fibers for the transmission of high laser power: a classic field of multimode fibers with core diameters from 100 µm to 1 mm, which are suitable for wavelengths from UV to the far IR in a wide variety of forms. The following fibers are generally processed: primarily step-index fibers but gradient index fibers with a quartz glass core as well, hollow-core fibers for the transmission of CO_2 wavelengths (10.6 µm), and doped fibers for the ultraviolet range.

Processing of Single-mode Fibers for Diode Laser Modules

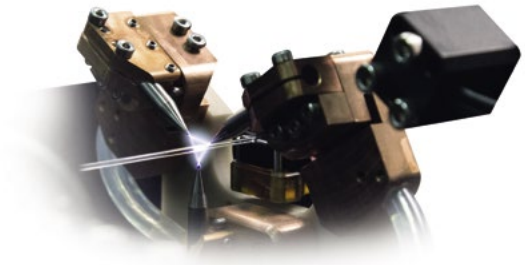
Depending on the application (e.g., pumping, spectroscopy, or biotech applications) with fiber-coupled laser diode modules, either multimode or single-mode fibers are coupled to the module.

The challenge in processing single-mode fibers for short wavelengths (e.g., 480 nm) lies in the very small dimensions of the fiber cores. With diameters of only 4 to 5 µm, they are about twenty times thinner than a hair. Power in the mW range causes high power densities at the transition surfaces of the plug connections. Precise core adjustment and high cleanliness are an absolute prerequisite for excellent transmission characteristics. In order to ensure the safe operation of the modules, special techniques that require a high level of expertise must be used in the manufacture of the fibers:

Over the years, LASER COMPONENTS and its experienced team have developed their own assembly technologies and connectors. This has led to a high connector assembly quality and thus guarantees the desired operational reliability. One example mentioned here includes connectors with mode-strip capability.

Endcaps for High-Power Output Coupling from the Fiber

So-called endcaps are one possible solution for high power densities at connector ends: These are cylindrical pure quartz rods that are spliced onto the optical fiber and, if required, can also be integrated into standard connectors such as FC/PC. The diameter of the end cap is larger than that of the fiber core. The light leaves the core according to its numerical aperture; its power density is reduced by the end cap. This prevents burning of the fiber or performance-related damage to the end faces. There are different types of endcaps that are used for both single-mode and multimode fibers. The insertion of the end cap at a defined length into the ferrule of a single-mode connector is a special technology.



More than Twenty Years of Experience in Production

In order to achieve the greatest transmission efficiency from the assembled fibers, it is necessary to understand, apply, and optimize the material properties, bonding technologies, connector assemblies, and assembly technologies. Our measuring and processing equipment is always state of the art. New technologies are constantly being added, such as fiber processing using the ring-of-fire technology. In this way, we can also offer customized solutions for demanding projects.

State-of-the-Art Testing Equipment for Reliable Products

LASER COMPONENTS unites different production facilities under one roof. The cross-disciplinary R&D team has access to all available technologies and measuring equipment.

Determining the Quality of Multi-mode Optical Fibers

Optical fibers are subject to the same physical laws as glass. There are hardly any standards for determining the quality of step-index multimode fibers. Therefore, we derive our knowledge from the production of laser optics and develop standards with our customers.

AQL Recommendation

In cooperation with customers, we have thus derived the existing optical standard to the small surfaces of the fiber facets and are able to document the defect density and make recommendations. These are recorded in the acceptance quality limit (AQL). This is how we manage to reduce the incoming goods inspection at the customer's premises to 10%.

Parameters for High-Quality Connectors

The distribution of laser power in the fiber core, cladding, or coating can be one reason that the fiber facet or the assembled connector is heated up. Even imperfect end faces, irregular gluing, the wrong choice of adhesive, and poor connector design have an influence on the power transmission, cause "hot spots," or in a worst case scenario damage the end face.

The surface roughness of glass surfaces (RMS value) can be determined with a white light interferometer. We mainly use this measurement technique to determine the surface quality of laser optics. However, it can also be used to test critical fiber end faces and to evaluate and document their quality. In precision optics, the roughness of the surface can be influenced by the polish. We also apply this knowledge to fibers and fiber coatings.

We use interferometric methods to measure fiber displacement or define the limits for undercutting or protrusion.

AR Coatings on Fiber End Faces

Power losses occur at every air/glass interface. The derivation of the Fresnel equations results in a reflection loss of 4% for each transition with vertical light irradiation. This can be minimized by so-called anti-reflection coatings.

We coat preassembled fiber end faces to minimize the power losses during input and output coupling of light and to avoid back reflections, which can lead to the destruction of pigtailed laser diodes.

Centricity

The centricity of the assembled multi-mode fiber optic cable in the free-standing connector plays a decisive role. In order to couple light as loss-free as possible and to prevent the destruction of the connector, the fiber must be located as close as possible to the center of the ferrule.
Trained specialists can precisely position the cores: Currently, centricities below 5 µm are possible. A measurement log displays the exact values. In practice, exactly centered fibers mean less adjustment effort and therefore a more efficient installation of the applications. ■

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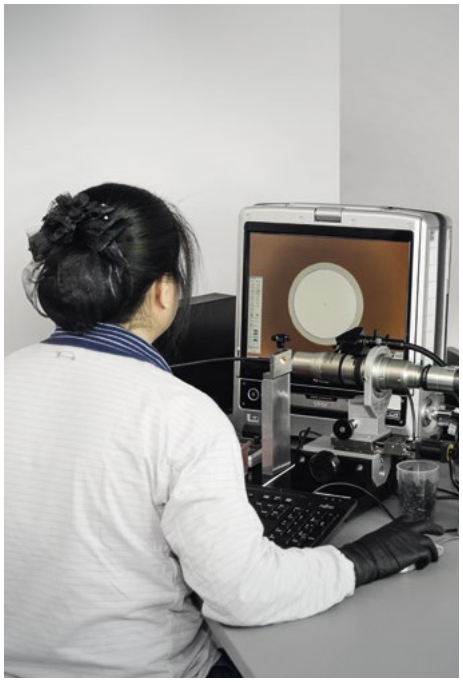


Thinly Applied

Of Layer Thicknesses, Scratches and Damage Thresholds

Anyone who has ever painted a wall as a do-it-yourself handyman is all too familiar with the following scenario: The paint is on the wall, and somehow everything is colorful. Upon closer inspection, however, it appears that the result did not turn out quite as intended. Too much paint in some spots, not enough in other spots: the whole wall is more like a patchwork carpet than a uniform, colored surface.

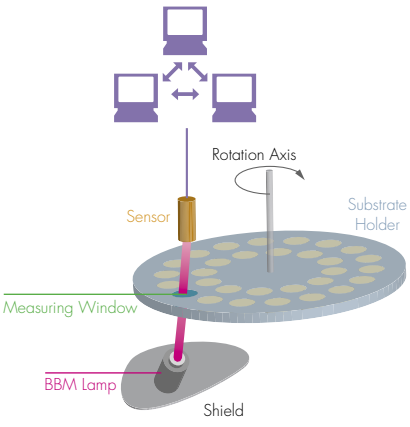
Uniform coating is also important for laser optics. But unlike painting your home, irregularities cannot simply be masked by hanging up a picture to cover it up. If the dielectric layers are not homogeneous, this has an effect on the beam shape and the imaging properties of the optics. The coating is then useless and must be disposed of. But nobody can afford this because a dielectric coating system is much more expensive than a bucket of paint. Precise control of the coating thickness is therefore essential in our industry.

A further complicating factor is the fact that experts do not speak of "thin layers" for no reason: While a layer of wall paint measures approximately 100 µm on average, the layer thicknesses of laser optics typically range between 100 nm and 6 µm for the visual spectral range. A layer design can consist of 20 or more layers. A standard coating of paint is therefore around a thousand times thicker than the individual coating thicknesses. That's about the difference in height between a man and a flea. ➔

Layer Thickness Measurement in the Manufacturing Process

Such thin layers cannot of course be measured with a caliper gauge. Being able to assess the quality of laser optics requires the kind of specialist knowledge that is only acquired with a university degree. Our experts not only check the layer thicknesses but also other important criteria such as transmission behavior, layer homogeneity, and the laser damage threshold. This starts during the coating process: In optical broadband monitoring (BBM), the transmission behavior of a so-called BBM test glass is continuously monitored directly in the high-vacuum coating chamber. A high-resolution spectrometer detects a wide wavelength range that extends into the near IR range.

From the measurement results, it can be deduced whether the layer thicknesses produced correspond to the specified design. The measurements are performed reproducibly at an accuracy of ±0.4%. In this way, layer increases of less than 0.1 nm can be measured in one second. With the correct knowledge of the material constants, the measurement results can also be extrapolated to wavelengths outside the in-situ measured spectrum. Deviations from the desired optical behavior can thus be compensated during the manufacturing process.



Schematic Diagram of Broadband Monitoring

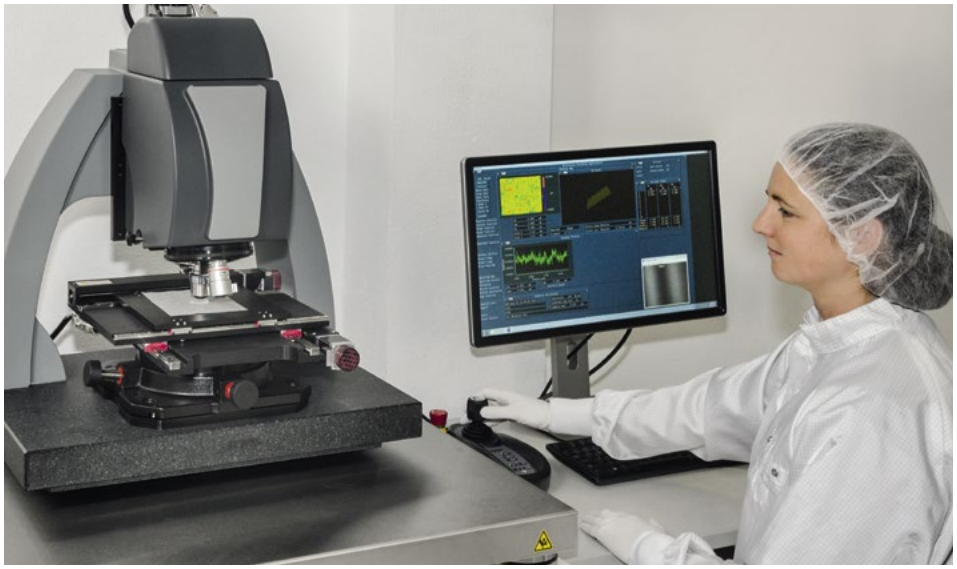
Is the Wavelength Okay? – Checking the Spectral Characteristics

Of course, the customer's specifications not only concern the layer thickness. The spectral behavior of the coated optics is also tested. For standard optics with diameters up to 120 mm, we use a spectrometer that covers a wavelength range from the deep UV to mid-IR range.

Transmission and reflection of an optic are determined at different angles of incidence and polarizations at the same measuring point. In this way, we can draw conclusions about absorption and scattering from the measurement results. If it is not possible to measure directly on the part, we use a witness sample which is produced with each batch and stored at our premises.

And on the Edge? – Homogeneity Measurement

In order for an optical system to have the same effect on the laser beam regardless of the point of impact, the dielectric coating must be evenly distributed across the entire surface. Spectrometers are also used for measurement – mostly as complete systems. This leads to problems in the evaluation of large substrates, such as those required for terawatt lasers in research centers. With diameters of up to 380 mm they are simply too large, too thick, and too heavy for commercial spectrometers. Especially for these products, however, the demands on layer homogeneity are particularly high. Therefore, a spectrometer is used for control purposes, in which a movable measuring head can measure different positions on the optics.

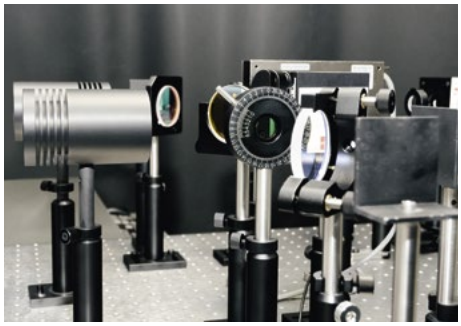


Detecting the Smallest Defects

In addition to thickness and homogeneity, the cleanliness of the layers is a decisive quality feature. The most common defects include scratches, holes, or smears. In reflected scattered light or in transmission, experienced precision opticians can detect damage up to a size of 10 µm. This visual inspection is one of the fastest and most reliable procedures to date. Nevertheless, it remains dependent on the personal judgment of the examiner. There are now machines available that can also carry out objective measurements on these optics and, if desired, document the quality by means of appropriate pass/fail test reports. Special dome illumination ensures that the test object is uniformly illuminated and that the extremely high-resolution cameras can also detect damage at a size of 5 µm – in some cases even up to 1 µm.

Indestructible?

The higher the energy of the laser, the more important the subject of laser-induced damage threshold (LiDT) becomes. Anyone who, similar to LASER COMPONENTS, manufactures optics for industrial and high-energy lasers will inevitably have to deal with LIDT. In order to determine the damage threshold, the optics are "bombarded" with a pulsed laser: ten positions are exposed 200 times each to a pulse with a defined, constant pulse energy. The coating can be damaged at some of the test points and remains intact at others. From the ratio of damaged and undamaged positions, the probability of damage for the set energy density (J/cm2) is calculated. The procedure is then repeated with a higher energy density. At the end of the measurement process, a curve is obtained from which the damage threshold of the entire optics can be read. LASER COMPONENTS has its own damage threshold measuring station for the wavelengths 532 nm and 1064 nm for investigations in the production process and quality assurance. The typical pulse length is about 10 ns and angles of incidence between 8° and 57°.



Documenting Everything Accurately

BBM, spectroscopy, surface assessment, and damage threshold measurement are just four examples from the arsenal of possibilities we can use to ensure the quality of our optics. Inspection and verification are carried out according to documented procedures in accordance with ISO 9001, and the measurement protocols for spectrometric examinations are enclosed with the delivery upon request. In this way, we not only ensure that our customers' lasers work exactly according to specifications. We also save you the effort of extensive incoming and quality control. ■

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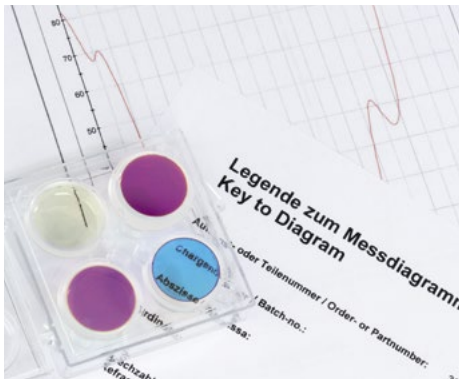

Measuring for Innovations

State-of-the-art measuring techniques not only help us with quality assurance. We also use them to expand the possibilities of our technologies and find new solutions. As we manufacture our optics according to the specifications of our customers, we are confronted with requirements which result in joint development projects. For example, many oxides are not suitable as coating materials for UV radiation below 350 nm due to their high absorption. In this case, new layer designs must be developed. However, this is only possible because we can use spectrometers that cover a wavelength range from UVC to the mid-IR. We also use modern measurement technology for our own innovations; for example, when it comes to optimizing the production processes of our optics production facilities. ■

Who Tests the Testing Equipment?

Regular Calibration to ensure Stable Production and Inspection Quality

If a company is certified according to ISO 9001, the testing equipment used must be monitored at a fixed time interval. The downtimes for calibration must be kept to a minimum. If calibration of the testing equipment is carried out in an external laboratory, a reliable partner from the region is required who can offer fast service. We have therefore set up calibration laboratories at our headquarters in Olching, Germany.

Regular calibration of measuring instruments is necessary because such instruments are subject to drift over time due to the aging process and environmental influences. With precisely calibrated measuring instruments, a company can increase the quality of its own products. Less rejects and less reworking create satisfied customers.

During calibration, our experts compare the measuring instrument with standards that can be traced back to national standards using a predefined procedure. Deviations are documented and, if necessary, corrected by adjusting the system. ■

Laser Power Detectors and Energy Measuring Heads

The central European calibration laboratory for Gentec-EO's laser power and energy measuring devices is located at LASER COMPONENTS. The measurement setup is identical to that of the manufacturer and is regularly validated by comparative calibrations.

We always calibrate using a gold standard and only use standardized references calibrated by NIST or PTB. The results are documented on a detailed calibration certificate. ■

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Display Units

The Gentec-EO display units can also be calibrated in Germany. Standardized measuring instruments ensure that the electrical signals received by the monitor are correctly converted and that the displays correspond to the actual measurement results.

Our calibration laboratory tests display units of the following series: MAESTRO, UNO, P-Link USB/RS-232, Solo PE/Solo2, DUO, and TPM300-CE. ■

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Fiber Optic Attenuation Measurement Systems

We calibrate fiber optic attenuation measurement systems from AFL, Greenlee, Optotest, and VIAVI Solutions. Based on documented calibration procedures, the instruments are compared with standard systems or standard measuring devices.

The calibration certificate confirms that these references correspond to the national standards of the German Calibration Service (DKD) and PTB. All calibrations meet the requirements of DIN ISO 9001. ■

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Generational Change at LASER COMPONENTS Pyro Group

Lance Feldman is the New Managing Director in Florida

WEB N08-032

Lance Feldman has been the new managing director at LASER COMPONENTS Pyro Group in Stuart, Florida, since the beginning of the year. He has been responsible for the production of pyroelectric detectors since the founding of the Pyro Group in July of 2014. He is not only familiar with all individual operations from design to mass production from the inside out, but he was also primarily responsible for the development of the new production facility and developed all organizational structures and operational procedures at the facility. He contributed significantly to making the pyroelectric detectors ready for market entry.

The Pyro Group belongs to the exclusive circle of manufacturers of DLaTGS-based pyroelectric detectors.

In addition to the production facility in Florida, LASER COMPONENTS also has an inventive R&D team that is brave enough to go off the beaten track. This has led to the development of the LD-2100 series pyroelectric detectors, in which an integrated differential amplifier provides for an unprecedented signal-to-noise ratio. ■

Passing the Baton in Optics Production

Christian Grunert Takes over Management of the Production Department

WEB N08-001

With Christian Grunert as the new production manager, a generational change is taking place in laser optics production. The 37-year-old engineer will succeed the "thin-film veteran" Uwe Schallenberg, who has been responsible for coating optics since 2014.

Grunert is not new to the world of dielectric coatings, beam splitters, and mirrors: In his studies, he focused on lasers and optotechnology. After that, he continued this focus in his professional career. All in all, he can draw on more than ten years of experience in the field of optical thin-film technologies – four of them in the R&D department at LASER COMPONENTS. During this time, he has worked closely with his colleagues from production. Uwe Schallenberg will remain faithful to the company even after retirement and advise his successor during a transition phase.

This internal succession plan is a stroke of luck for our customers. At the same time, it is the best proof that the close integration of research and practice pays off: As a development engineer, Christian Grunert worked on coating designs for special customer requirements. As a production manager, he therefore knows what challenges await him and is already familiar with the production facilities and their possibilities. ■

New Products

Repair of Thermal Power Detectors

European-wide Service for Measurement Devices from Gentec-EO

WEB N08-RMA

The more often a device is used, the more wear and tear it sustains. However, maintenance and repairs to a system are often postponed because they involve downtime as soon as the product is sent to the workshop.

In order to keep the time required for maintenance or repairs as short as possible, LASER COMPONENTS offers its customers a quick solution. LASER COMPONENTS is now an authorized repair shop for defective power detector measuring heads manufactured by the Canadian company Gentec-EO.

From cable breakage to the replacement of a detector disk, many things can be repaired directly in Germany:

This not only saves you expensive postage costs, but your device is fully operational again in a very short amount of time because our spare parts warehouse is extensive. ■

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gentec-eo

Long Range Laser Module

Exact Positioning Even on Long Paths with a Long-Range Line Module

WEB N08-074

The light from laser modules rarely has to extend to the horizon; however, a few tricks are required if you want to see it at 50 m.

Previously only FLEXPOINT® long-range laser modules were able to project a dot, but now a long-range line laser has been added, which opens up new application possibilities.

The FLEXPOINT® FP-LR-L projects a line that is only 4 m long even at a distance of 50 m and can be focused to a line thickness of a few millimeters.

The long-range line laser is available with a red (660 nm) or green (520 nm) line and an output power of up to 30 mW. This makes it the ideal positioning tool for extended machines or aiming device for objects located far away from each other.

The laser module can also be operated on a mobile basis: two battery packs are available to put the laser into operation when a power supply is not in the vicinity. ■

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Robust Line Laser with a M18 Thread

The FLEXPOINT® MV18 is Perfectly Suited for Permanent Installation in Industrial Facilities

WEB N08-174

FLEXPOINT® modules with an integrated external thread can be easily integrated in standardized systems. The MV18 is the latest in the range of line lasers for industrial image processing: it not only guarantees a homogeneous power distribution along the projected line but can also be easily screwed into existing internal threads with its M18 thread.

The power supply is provided by an M12 connection at the rear.
This robust line laser is available in many wavelengths between 405 nm and 850 nm. With an output power of up to 200 mW, the 450 nm version is the most powerful of the current MV series.

A precise mechanism allows the MV18 to focus quickly. The mechanics ensure high beam stability and low line drift.

To obtain the right combination of line thickness and depth of field for your application, you can choose from five different optical variants.

In addition to the standard version with adjustable focus, the FLEXPOINT® MV18 is also available in a low-cost version with a factory-fixed focus. ■

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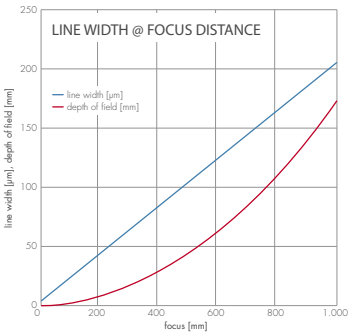
Online Simulation Line Thickness

Would you like to know how the line width changes depending on the focus setting and what effect this has on the depth of focus?

Then use the line thickness generator available on our website by scanning the QR code below or using the web-code N08-174. Different optics versions can be selected for online simulation. ■



Powerful LEDs Make the Invisible Visible

UVB LEDs with Power Levels of up to 300 mW

WEB N08-042

UV radiation excites fluorescence, forming the basis for many analysis methods in fluorescence microscopy.

UV LEDs are replacing mercury vapor lamps as radiation sources more and more. With continually increasing power levels, UV LEDs are becoming attractive for more and more application fields.

With the UVB wavelength of 305 nm, LG Innotek now offers LEDs with a power level of 110 mW from a single emitter.

In addition to the 6060 series, the 6868 series is now also available. The 6868 series has four diodes integrated into one housing.

Together they offer power levels of 300 mW and more. In addition to standard LEDs at 305 nm, other UVB wavelengths are also possible.

The advantages of this technology are obvious: LEDs are small and long-lasting, do not require long warm-up phases, function without complex electrical ballast, and do not have to be integrated into an explosion-proof housing. ■

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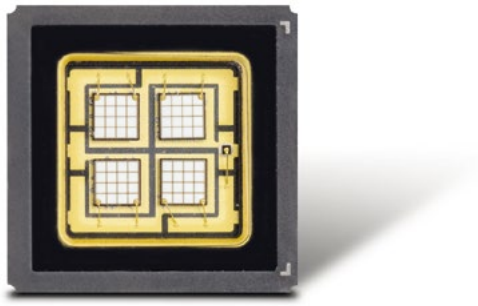

Diffractive Optical Element for Clean, Regular Soldering

Homogenizer for Efficient Laser Hard Soldering

WEB N08-002

During laser soldering, the soldering wire is melted with the laser in order to join two metallic components together. The advantage of soldering is its minimum heat input compared to welding processes. In the case of hot-dip galvanized sheets, this means that the zinc layer evaporates in a very limited area, and the sheets only slightly deform during processing. For this reason, the laser soldering process has become widely accepted in car body construction in order to achieve connections with high mechanical stability without impairing the corrosion protection. However, it often happens that oxides and impurities in the zinc layer of the soldered seam cause irregularities such as splashes, pores, and uneven surfaces.

To avoid this, our partner Holo/OR has now developed a diffractive optical element (DOE): It forms three beams with different diameters and power levels. Two smaller guide beams, which preheat and clean the material and thus pre-condition the zinc coating for the soldering process, are crucial for the quality of the soldered joint. The large medium beam then takes over the actual soldering process. The homogeneous energy distribution ensures that the soldering wire is melted evenly. In this way, better melting performance and cleaner edges can be achieved with a single DOE. Several lasers or complex optomechanical elements were previously required to achieve this.

The new diffractive optical element made of UV quartz glass has an efficiency of 90 percent and significantly accelerates the soldering process. ■

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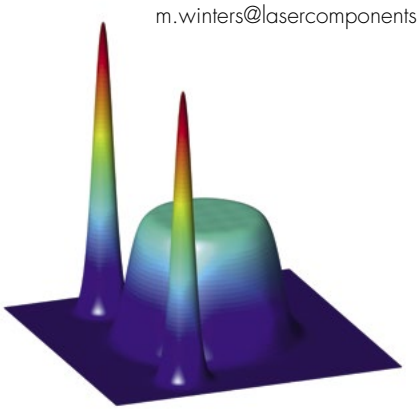

Notch Filters for Industrial CO_2-Lasers

Process Monitoring – Getting Your Thermal Imaging Camera to See What You Want it to See

WEB N08-085

Driven by applications from the automobile industry, the prices for thermal imaging cameras have fallen dramatically in recent years. The technology has now reached the mass market, for example as a thermal imaging add-on for smartphones. The industry also benefits from this development in the monitoring of welding processes with CO_2 lasers. The advantage is obvious: errors such as welding spatter or hairline cracks are detected more quickly.

Today's thermal imaging cameras are based on bolometer arrays that detect radiation in the range of 8–12 µm. CO_2 lasers emit at 10.6 µm. Their wavelength is therefore perfectly seen by these cameras, and the intense laser light overshadows the processes actually observed. The infrared eye is blinded.

A so-called notch filter that "hides" specific wavelengths, provides a remedy. To date, such filters have been widespread in the Vis and NIR range and are mainly used in Raman laser spectroscopy or confocal microscopy. For wavelengths in the medium and long infrared range only a very small product range has been available thus far. However, a notch filter is currently being developed that is precisely tailored to the radiation of CO_2 lasers. At 10.6 µm, the design provides for selective attenuation by a factor of 1000, while the entire thermal image is only approx. 20% darker. Approximately one-third of this darkening is due to the fact that the 250-nm-wide band elimination filter also almost completely suppresses a very small part of the useful signal around the notch.

The filter is designed as an accessory for professional thermal imaging cameras. If you are interested in this new product, please contact us in advance. ■

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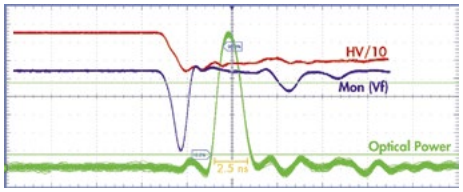
Hybrid PLDs with the Shortest Pulse Duration

QuickSwitch® Pulsed Laser Diodes - Precise Measurements at Short Distances

WEB N08-041

The following applies to distance measurement: The shorter the laser pulse, the more accurate the measurement. Laser Components Canada has developed a hybrid pulsed laser diode with the currently shortest pulse duration in the world. In one second, the QuickSwitch® PLD generates up to 200,000 laser pulses with a typical duration of 2.5 ns. Depending on the operating voltage, it achieves an optical peak power of up to 89 watts.



The laser chip and switching electronics are integrated in a compact TO-56 housing. The hybrid design enables the shortest bond wires: a current path with low inductance can be achieved which is necessary for pulse lengths of less than 3 ns.

An additional ground pin that is independent of the signal and supply return, turns the entire housing into an effective Faraday cage that protects the QuickSwitch® PLD and its environment against electromagnetic interference. ■

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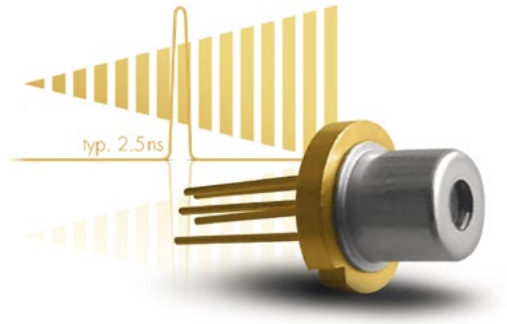

Linear APD Arrays - New Standard Versions

Optimally Suited for Time-of-Flight Measurements

WEB N08-035

In addition to the linear Si APD arrays with twelve elements, the Laser Components Detector Group has now also included arrays with eight and sixteen elements in its standard range.

The LCC44 housing of these new models makes it possible, on the one hand, to mount the components as SMDs on circuit boards. On the other hand, it offers enough space for the integrated multi-channel amplifier circuit. For operation, only one voltage is required for the array, whereas 5 V are required for the electronics.

The components are based on fast, low-noise avalanche diodes arranged in a monolithic array. Our arrays are characterized by a very narrow gap between the elements. This gap is just 40 µm. Furthermore, they have a very low temperature coefficient. Their sensitivity is optimized for the NIR range between 800 nm and 900 nm.

Upon request, we also build linear arrays according to your specifications. You determine the number and size of the individual elements; they can be arranged along one or two axes. ■

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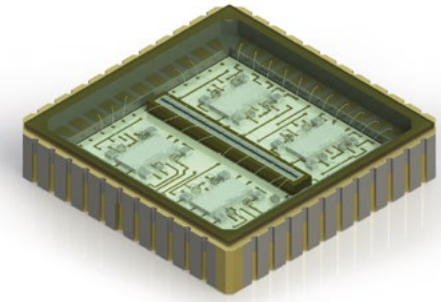

Low-Cost Avalanche Photodiode in an SMD Package

APDs Used in Rangefinding Applications Even Smaller Than Before

WEB N08-135

The SAH series avalanche photodiodes have been optimized for the wavelengths 850 nm and 905 nm. They are also available, effective immediately, in an M1 package: at dimensions of just 2 mm x 1.4 mm, the M1 package is the smallest of our SMD housings.

This inexpensive component is specially designed for distance measurements in which, due to lack of space, larger detectors cannot be installed. Consumer products are commonly fitted with this version.

Depending on the version, the diameter of the detector area is 230 µm or 500 µm. Similar to the components in the M2 and M2F package, the noise is lower and the response time particularly high. The SAH series APDs can be operated at temperatures between -40 °C and +85 °C. ■

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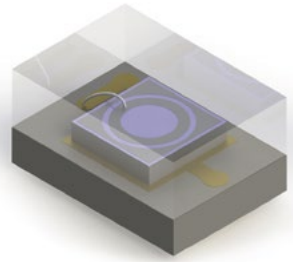

IR WORKshop

ir-workshop.info

5th WORKshop on Infrared Technologies

12 and 13 November 2018

- Call for Paper: 9 April
- Paper / Poster Submission: 30 June
- Paper / Poster Acceptance: 12 August
- Registration Acceptance: 17 August
- WORKshop Start: 12 November

WEB N08-IR

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TRADE SHOWS

Scandinavian Electronics Event
24–26 April 2018
Kistamässan
(Stockholm, Sweden)
Booth #C08:49

Northern Optics & Photonics
12–14 September 2018
Lund University
(Lund, Sweden)