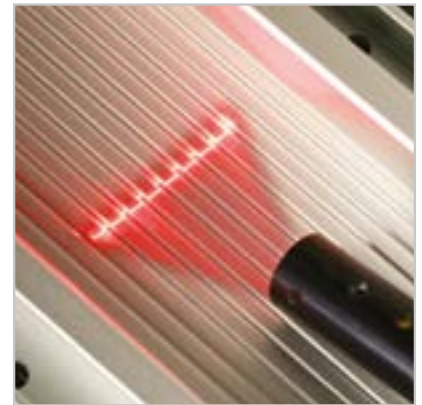


Laser Modules for Industrial Image Processing

Key Characteristics of Laser Modules Explained

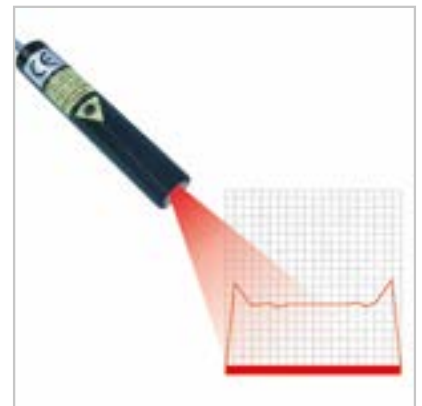
Quality management and quality control are increasingly becoming the focus of production processes. Products produced must undergo a (final) check. Here, industrial image processing becomes an increasingly popular tool which guarantees fast processing and high reliability.

The light-cutting process is a key technique for measuring profiles, height differences and geometries. The technique is based on the principle of laser triangulation. A complete measuring system consists of a lighting source, a camera, and evaluation software. LASER COMPONENTS specializes in the production of the lighting source, in this case, the line laser, under the brand name FLEXPOINT®.



Resolution

The quality of the projected laser line has a great influence on the resolution of the entire measuring system. The finer the laser line can be focussed at a given working distance, the smaller the structures that can be measured. The physics and the quality of the optics used set the natural limits. Line widths in the range of 20 µm or smaller are possible. The length of the line is defined by the fan angle of the lens. Line optics with fan angles of 5 ° - 90 ° are available.



Depth of Field

Another important option is the depth of field. This is the range in which the line width has increased by the factor $\sqrt{2}$. Line width and depth are inversely related: the finer the line, the smaller the depth of field. You can find a graphic of the possible line widths and related depths of field in the data sheets for FLEXPOINT® MV lasers on our website.

Perfect Line

In addition to the line width, the straightness of the line also plays an important role. With lines that show a banana or S-shape, a correct measurement cannot be carried out. Each of our laser systems is therefore subjected to intensive testing before delivery.

Quality Features

All FLEXPOINT® laser modules are designed for professional industrial applications and have polarity reversal protection and protection against overvoltage and voltage spikes to eliminate the risks of incorrect handling. For the simple integration into the customer system, the lasers have a potential-free housing and are available with various voltage ranges.

Laser Speckle

An obstacle to effective laser-based measuring systems is laser speckle – an interference phenomenon caused by the coherent properties of the laser. These patterns can deteriorate the edge sharpness and homogeneity of the line mainly in the transverse direction. Speckles cannot be completely avoided, but LASER COMPONENTS offers line generators with super luminescence diodes, which have a broader emission spectrum and thus generate less speckle.

Pattern Generators

For certain measurement tasks, the projection of a single line is not sufficient. Rather, crosses, lattices and multiple lines, circles or point matrices are needed. These patterns are simply produced by diffractive optical elements (DOEs), which are mass produced by copying a master optics. The DOEs can either be integrated into a FLEXPOINT® laser module or plugged into a plastic cap, which can be easily removed from the laser.



Modulation and Power Adjustment

For optimum measurement, the laser should be synchronized with the camera; That is, the laser is turned on exactly when the camera takes an image. With the FLEXPOINT®, this can be realized via the optional input modulation. The maximum modulation frequency is 1 MHz. Different dark and light objects require more or less laser power. By means of a control wire, this can be externally controlled or fixed. Adjusting the power setting via a potentiometer is also possible.



Your Laser Specialist

LASER COMPONENTS manufactures a variety of laser modules for image processing and is, therefore, the right contact for developers in the image processing industry. In addition to standard products, customer-specific lasers are also manufactured in small batches. With more than 20 years of experience in the field of laser modules, LASER COMPONENTS is an absolute specialist in this field.