



JENvelt – JENOPTIK vision-enhanced laser tool

Smart optical system for laser material processing

We are a globally operating photonics group which is present in more than 80 countries; the Light & Optics division, for example with production and assembly sites in the USA and China. Additionally, the division is represented abroad by shareholdings in India, Israel, Japan, South Korea and Singapore.

It is our policy to constantly improve the design and specifications. Accordingly, the details represented herein cannot be regarded as final and binding.

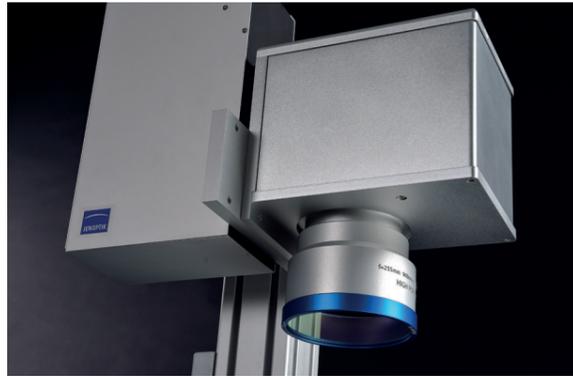
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With the new vision-enhanced laser tool, Jenoptik provides an optical system for integration into laser production systems for material processing. As a compact "plug-and-play" system, it is easy to integrate and takes into account the process-related requirements of laser production.

The system combines a 2D galvo scanner, F-Theta lens and camera with integrated image processing and intelligent software. System integrators benefit from shorter development times and a smart software solution that ensures the user fast deployment.

Features & Benefits

- Smart plug-and-play system solution
- All in one software
- Object recognition
- Automatic positioning of the laser relative to the recognized features
- High precision
- Increased first part yield
- Increased productivity
- Reduced production costs
- Faster time-to-market
- Flexibility from a single source



JENvelt makes cumbersome clamping fixtures obsolete or, if the process requires them to be used, makes them easier to implement. The process is particularly beneficial when processing workpieces that are manufactured with comparatively high tolerances, such as injection-molded plastic parts. Increased production yield from the first component onwards improves the production result as well as productivity. Calibration at the push of a button ensures machinery can be converted flexibly and quickly, e.g. in the case of varying production orders. Consistently high levels of precision and reproducible results make production more efficient.

The software solution

The centerpiece of the system is the “all-in-one” software, which combines scanner and laser control and image recognition with artificial intelligence. The software maps production projects, and monitors the ongoing process while ensuring that the data obtained is evaluated and fed back into the control system:

When a production order is set up, optical markers are defined to ensure the laser spot is accurately positioned, enabling the device to “check” and “compare” the position of the workpiece in relation to the laser spot and then to reposition it if necessary. This is done with a positioning and repeat accuracy of up to 10 micrometer. The laser spot is positioned precisely at the pre-defined location regardless of the component’s geometric and position tolerances.

At a glance

- Combines galvo control, laser control and vision features in one software
- Combines „classical“ laser control software with vision channel
- All in one software solution
- Modular software design for flexible system setup
- Pattern recognition features and object recognition
- Coaxial vision channel enables high accuracy through high resolution
- High accuracy of up to 10 µm
- Large field of view
- Referencing of scanning pattern relatively to objects recognized
- Enables jig-less processing
- Drift free setup
- Calibrated & ready to use

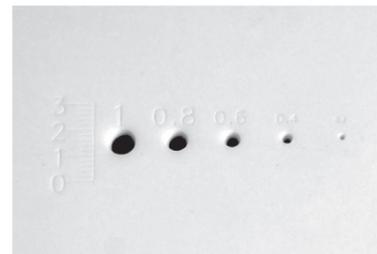
Application Examples



Laser plastic welding



Laser scribing

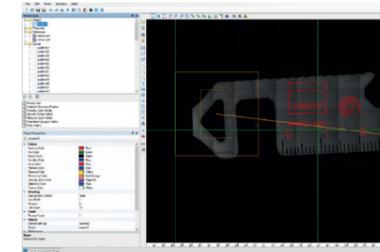


Laser drilling

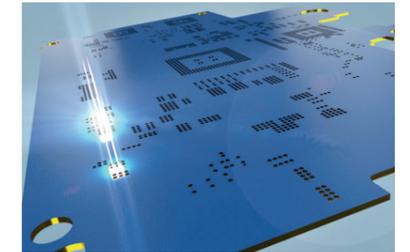
The package



Scanner Module + Camera / Further Sensors



+ Software



+ Process know-how

- The integrated vision channel is perfectly aligned and calibrated to the galvo scanner. In combination with our software solution we ensure the positioning of the laser spot independent from positional and shape tolerances of the part to be processed.
- Our software solution is combining laser related programming tasks (settings like laser power, pulse rep. rates, modulation of laser energy, etc.), galvo scanner related programming tasks (settings like speed, jumps, number of cycles, etc.) and vision related programming tasks (settings like illumination, gain, pattern recognition, etc.) in one software for easy and fast process setup, intuitive handling and fast setup cycles
- The capability of surely recognizing the part position or contour position enables you to re-think the overall machine concept – processing different variants, for some processes even no fixture is needed, less laser power is needed as you always hit your target or even weakened part tolerances are possible as the system always follows the real path or recognizes the real position. Reduce your fixture costs, reduce your part costs
- Setting up laser processes is time consuming and not easy. Our vision channel helps you to reduce the setting-up times significantly. In particular this is important for customers that work on different and frequently changing tasks. Our software is helping to find the right parameters in an intelligent way

Other Jenoptik products for integration into your laser machine



Motorized Beam Expander 1x-8x simplifies production steps in laser material processing.



Silverline™ F-Theta lenses and variable Beam Expanders are ideal for high-power and short-pulse applications.



JENar™ F-Theta lenses can be used for the high-precision micro structuring, marking and labeling of a wide range of materials.