

## Integrable Solutions for the Growth Market of Digital Laser Material Processing

Laser light can drill, join, cut, ablate, or even refine surfaces - and it can do all that to virtually any material with unparalleled precision. The potential applications of laser light are seemingly endless. Because of this, laser material processing has become an all-rounder in production processes worldwide and continues to boast impressive growth figures year after year.

The market for laser material processing, which has been growing steadily for years, is leading to a continuously rising demand for Jenoptik's optical systems. These beam-shaping optical assemblies are the key element in laser production systems, directing the efficient light with extreme precision and accuracy.

With a focus on trends and future applications, Jenoptik is your expert partner for optical systems for laser beam shaping and guidance. One priority area is the digitization of optical systems for production and machine data capture during material processing. These new systems are able to use this data and apply the results intelligently, enabling both automation and error correction.

In order to create its innovative products, Jenoptik combines technology from the optics, electronics, sensor, and software industries, facilitating industry-compatible, cost-effective, and user-friendly solutions – for smart integrable systems within a new group called "Connected Optics".

### Optical Solutions Enabling Digital Services

As an established OEM partner in the photonics sector, Jenoptik digitizes and integrates customer-specific optical systems. And with the market launch of a motorized beam expander, the company is also broadening its focus to include the digitization of standard products for laser production systems. The motorized expander is based on

beam expanders that are traditionally produced in-house and are primarily responsible for critical industry parameters in standard integrated systems: time, quality, and ease of handling.

The motorized beam expander 1–8x is an example of efficient digitized laser material processing. When integrated in a laser system, the motorized beam expander can - in contrast to its manually adjustable counterparts - adapt the beam to achieve the optimal laser spot size at the press of a button and can be adjusted even during ongoing production processes using the machine controls. The collimation of the laser can also be adapted in the same way in a targeted manner – this is necessary if thermal effects caused by laser power lead to tolerance deviations.

Another advantage is that the production data can be utilized for future processing jobs. Different configurations can be saved and assigned to products that have already been produced. It's possible to achieve a constant, reproducible processing result every time without incurring high costs, which is a huge advantage when different products are manufactured on the same system. This provides users with additional flexibility.



**Motorized Beam Expander 1x – 8x**



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Integration via a web server is of particular interest to providers that offer their customers remote maintenance services. Machine data, such as temperature, can be monitored from any location, thus enabling predictive maintenance. If a fault occurs, the user can intervene in the production process promptly and avoid costly production errors.

Digital features like this - automated magnification and focusing of the laser beam, storage of configuration data, use of sensors, and integration into the network - help achieve quicker setup times, increased efficiency, greater flexibility, and, of course, reproducible production results.

The motorized beam expander 1–8x has been specifically designed to work with Jenoptik's own F-theta lenses but can also be used in other beam guidance systems. Among other applications, the expander has been integrated in machines used to produce microstructures, equipment to cut, mark, and label different materials, and systems for 3D sintering as well as welding. Thanks to field bus interfaces such as EtherCAT and Profibus, it can be integrated into practically any control system.

**High-Precision Optical Solutions  
 Made by Jenoptik**

The Jenoptik Group is globally operating in three photonics-based divisions: Light & Optics, Light & Production, and Light & Safety.

Jenoptik provides a broad portfolio of technologies combined with deep experience of more than 25 years in the fields of optics, laser technology, digital imaging, opto-electronics and sensors. Our customers are leading machine and equipment suppliers working in areas such as semiconductor equipment, laser material processing,



**Application picture BEX-M 1x-8x at prozessfabrik BERGER,**  
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healthcare & life science, industrial automation, automotive & mobility and safety, as well as in research institutes.

Jenoptik's Light & Optics division is a global OEM supplier of solutions and products based on photonics technologies. The division is a development and production partner, focuses on advancing cutting-edge technologies to improve our customers' system performance and ultimately realize product outcomes that reach new heights enabled by our highly-integrated photonic solutions. The systems, modules and components based on photonics technologies help our customers overcome their future challenges.

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