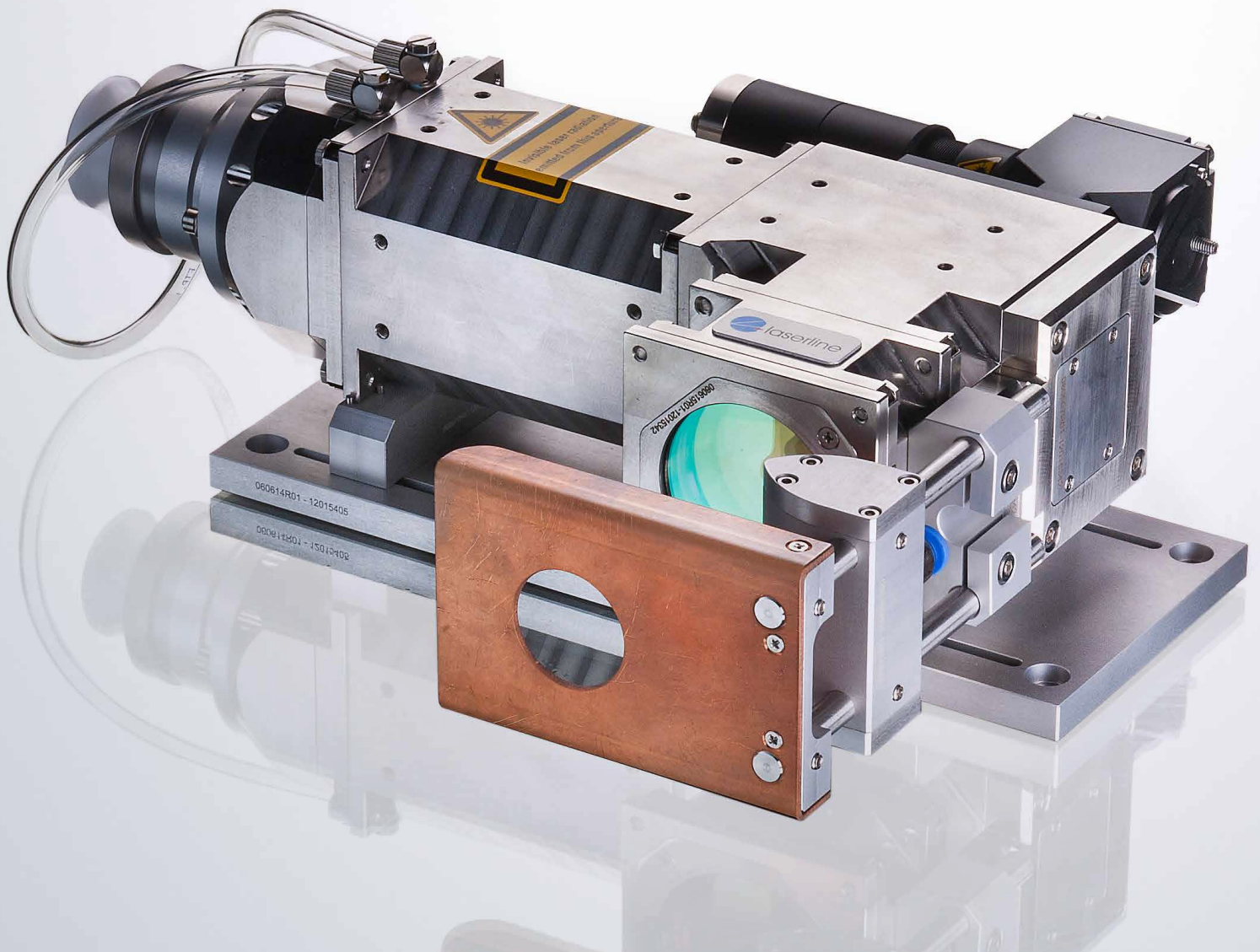
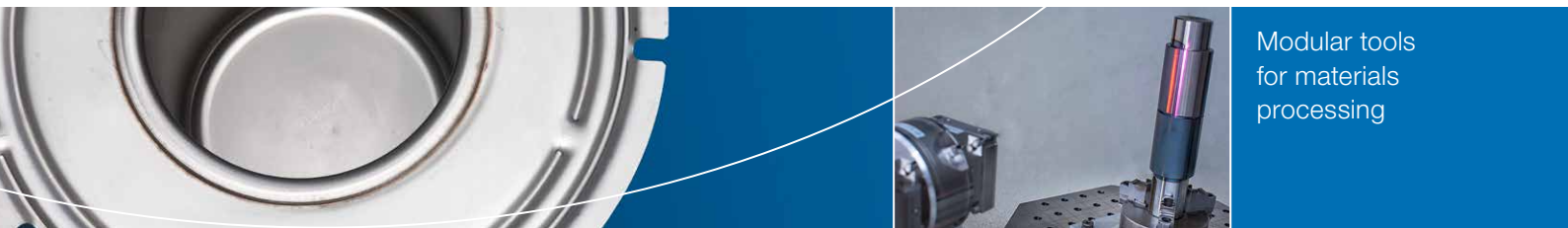


OTS Optics

Power on the Spot



Modular, Robust, Variable

Variable in use

Laserline modular OTS processing optics boasts a wide range of applications, from welding and brazing to surface treatment and the production of fiber composite components, including the fabrication of components in additive/subtractive manufacturing. This diversity of applications is enabled by a modular and highly flexible design. Every optic can be adapted to most different application specific requirements to realize an efficient processing with high-quality results. Thereby, the key to success often is the choice of a suitable focus geometry.

A circular focus with homogeneous intensity distribution can be achieved through imaging of the fiber end and is typically used in applications such as metal and plastic welding, brazing or cladding.

Lines and rectangular spots are obtained using homogenizing elements and may significantly increase the production throughput especially for the treatment of large workpieces. Therefore, these focus geometries are often applied in the field of heat treatment or cladding.

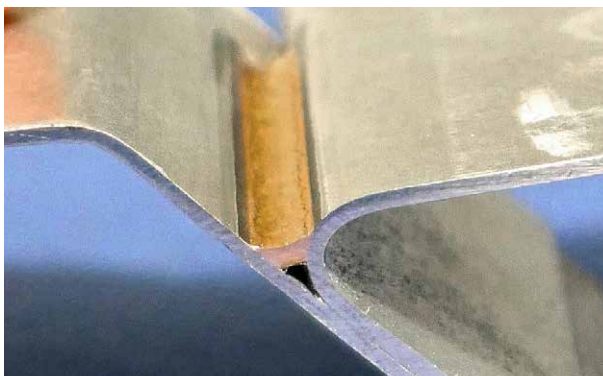
Further focus geometries such as ring shapes, double or triple spots can be created with beam shaping elements or the Laserline multi-spot module. These spots are used for example for simultaneous welding or brazing of hot dip galvanized sheets.

Beside the flexible focus geometry, different additional components such as cameras or sensors provide various possibilities to match the processing head to a certain process. Furthermore, beam deflection systems with total field sizes up to 400 x 400 mm² can be integrated.

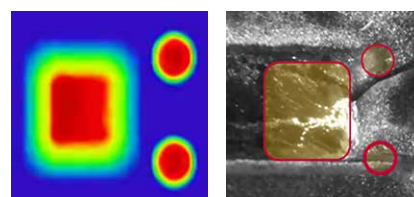
Robust in continuous operation

Laserline optics are designed for industrial manufacturing processes. The fully internal cooling system and corrosion-resistant stainless steel housing in compliance with protection class IP54 allow continuous operation at high power up to 20,000 W even under difficult processing conditions. Standard interfaces ensure easy integration into production lines.

- > Modular versatility, flexible combination
- > Robust construction for maximum loads
- > Simple solutions for complex tasks
- > Customer-specific focus shapes for all applications
- > For welding, laser hardening and deposition welding
- > Compatible with standard interfaces



Triple-spot brazing creates virtually perfect seams



Laserline as your development partner works closely with you to design the optimal processing optics for your special requirements. Based on our broadly diversified construction kit our experienced engineers develop and qualify new optical beam shaping modules or complete optics for your special tasks and for integration in your system environment.

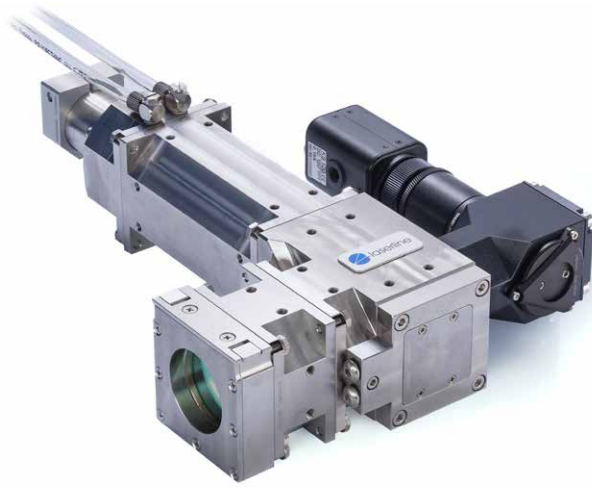


Individually designed

Due to the particular task, items of the modular OTS processing optics can be recombined, other components can be integrated or completely new systems can be developed. These are perfectly customized for the particular application and are seamlessly adaptable to Laserline standard products.

When Laserline delivers a customer specific solution, it is assured this solution will meet all requirements also in field operation. Every new designed customer solution is thoroughly examined in the Laserline application lab and undergoes intensive endurance tests. All investigations take place in close cooperation with our customers. This allows a precise and practice-related understanding of the requirements.



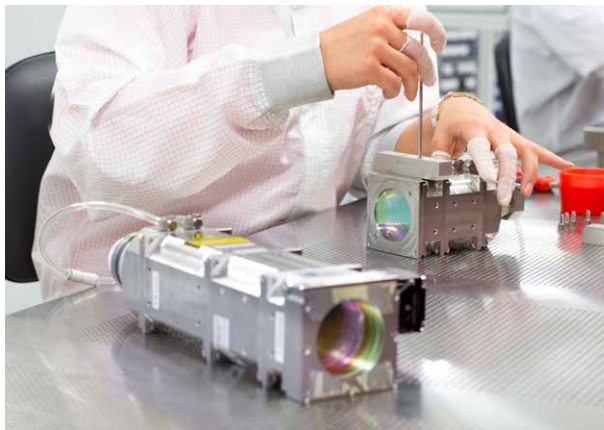


Processing Optics OTS-3

The consistently modular Laserline system secures investments and guarantees the ability to adapt to new tasks and process parameters.

Modular design

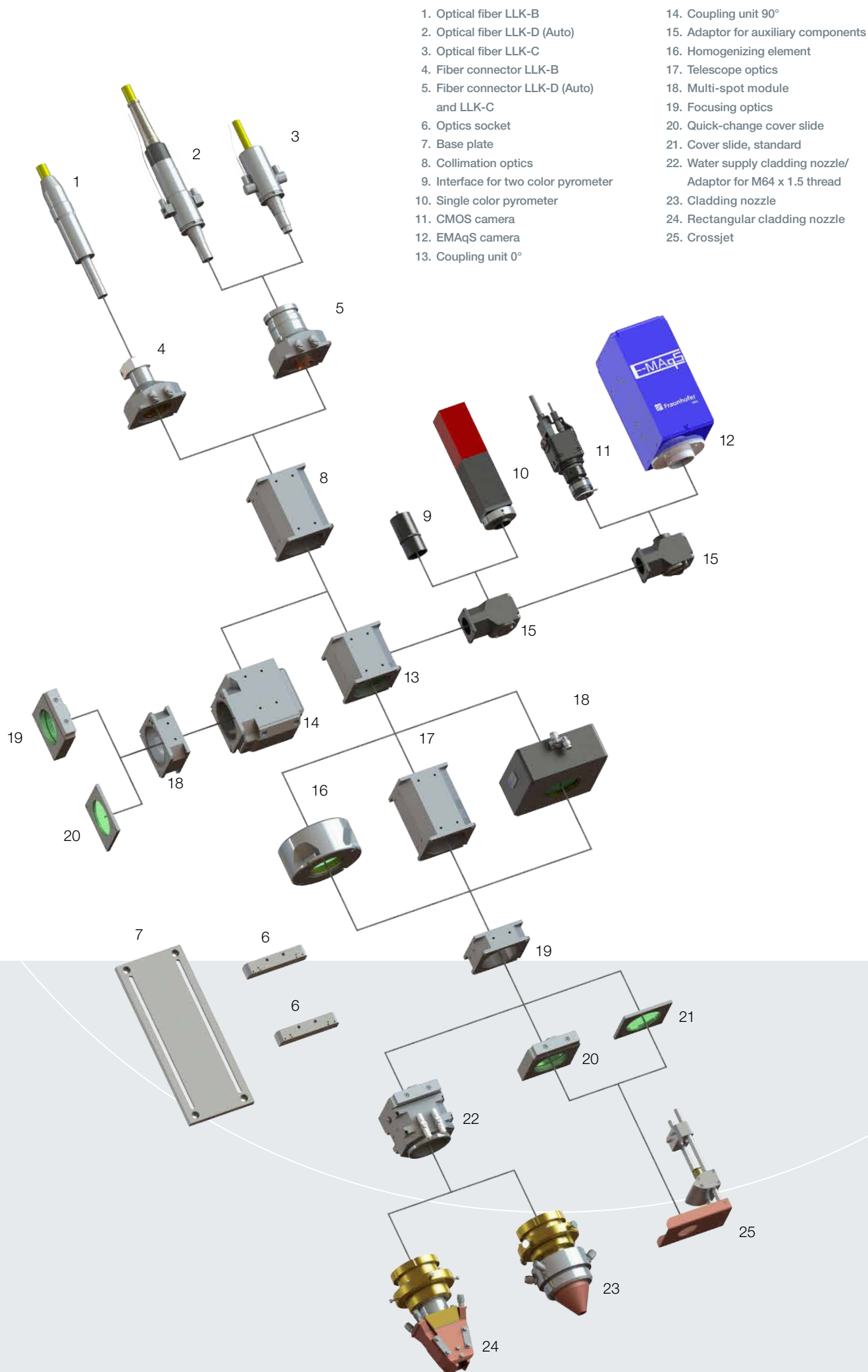
The basic design of our processing optics consists of a standardized optical fiber-coupling unit LLK-B/-D or -C (items 1-3), a collimating and a focusing lens (items 8 and 19, respectively). Thanks to a wide range of lens systems and equipment options, the Laserline system modules can be transformed into a tool optimally adapted to the particular application. The laser beam can be shaped into a focus with almost perfect homogeneity in energy distribution via a homogenizing element with special lens system (item 16) or into almost any possible focus geometry via the multi-spot module (item 18).



Processing Optics OTS-5

These optics can be supplemented by additional components, such as powder nozzles (items 22 + 23) or wire feed units. Manifold extensions are available to meet the requirements for a safe production process. The integration of coupling units (item 13 or 14) allows a utilization of pyrometers (items 9 + 10) to measure temperature radiation or CMOS cameras (item 11) for process monitoring. A quick-change cover slide (item 20) allows the rapid exchange of contaminated cover slides, even in inaccessible parts of the system.





Optics Serie OTS

Mechanical specifications

Optic	OTS-3	OTS-5
Optics dimensions, outside	56 x 56 mm ²	74 x 74 mm ²
Weight of standard processing optics* ¹	< 2.7 kg	< 4.7 kg

Optical specifications

Optic	OTS-3	OTS-5
Max. laser power* ²	12,000 W	20,000 W
Numerical aperture	NA 0.1 - 0.2	
Focal length collimation* ³	50 - 140 mm	70 - 200 mm
Focal length focusing* ³	40 - 500 mm	80 - 600 mm
Wavelength range	900 - 1,100 nm	
Fiber plug connector	LLK-B, LLK-D/Auto	

Operating conditions

Ambient temperature	10 - 45 °C
Operating temperature	Max. 50 °C
Humidity	Non condensing
Active water cooling	Recommended above 500 W cw

Auxiliary Components





Coupling unit	Single, 0°/90°	Single, double, 0°/90°
Interfaces	C-Mount, SM1, M40 x 1.5	
Options	Homogenizing elements, cross-jet, 90°-coupling cube, 19" rack mount optics chiller, cladding nozzle, ring-/twin-/telescope optics zoom, quick-change cover slide	

*1 fiber connector, collimating and focusing optics, cover slide

*2 higher power upon request





*3 other focal lengths available upon request

Standard spot geometries

Pic	Type	min. [mm]	max. [mm]
	Single spot	0.2	30
	Line	0.2 x 4.0	1.0 x 135
	Square	2 x 2	135 x 135
	aspect ratio 1:1 up to 1:18	3 x 5	9 x 135

Spot size depending on beam quality

Special spot geometries

Pic	Type	min. [mm]
	Twin spot	Spot sizes and distance
	Ellipse	Size and aspect ratio
	Ring	Inner and outer diameter
	Triple-Spot	Exact spot geometry and power distribution

More configurations upon request

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