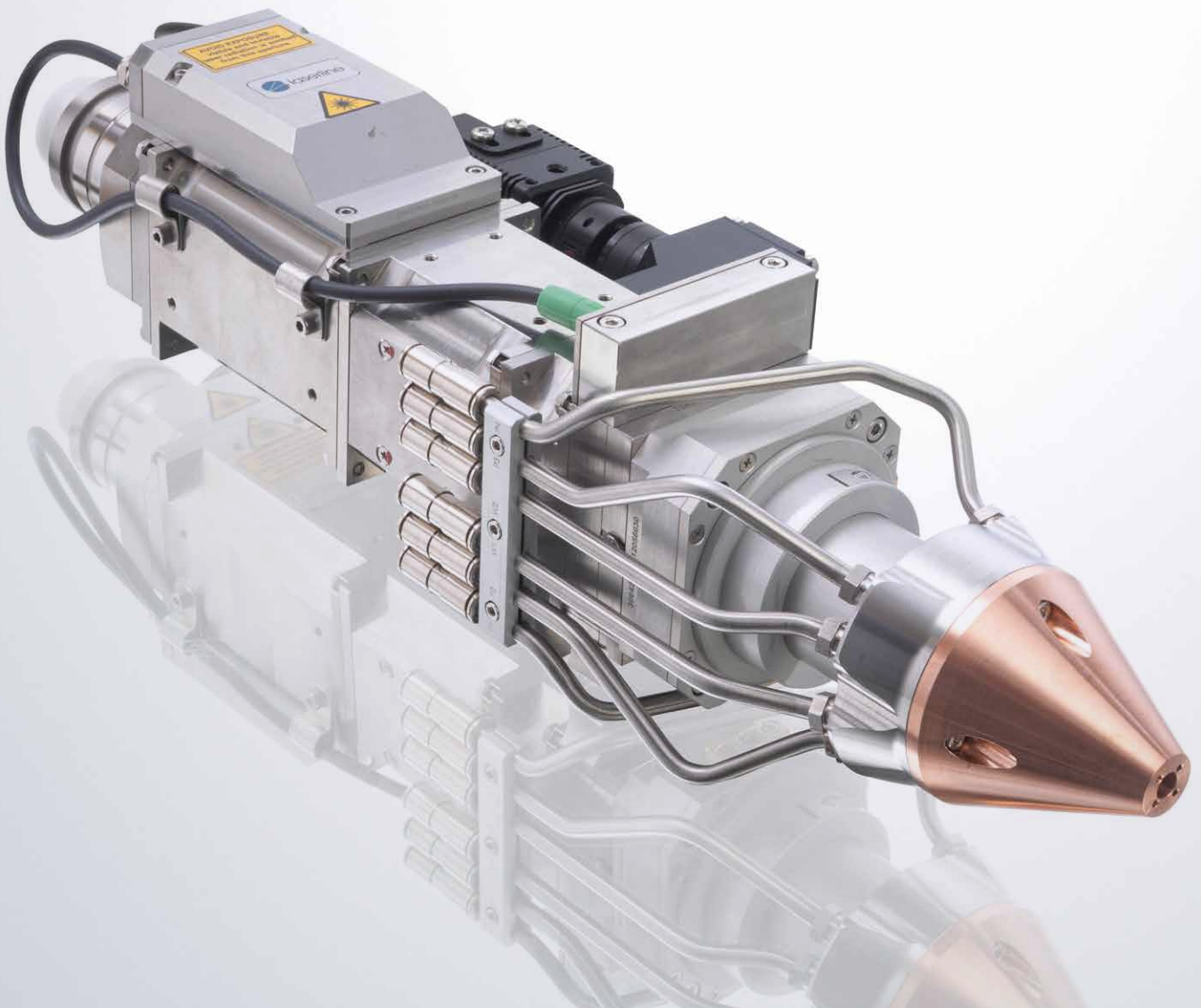


OTS Optics

Performance on Point



Modular tools
for materials
processing

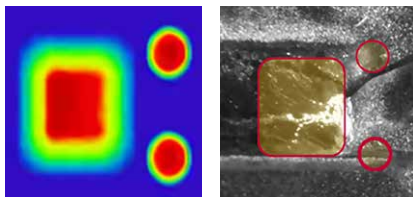


Modular, Robust, Versatile

Versatile in use

Laserline modular OTS processing optics boast a wide range of applications, from welding and brazing to surface treatment and the production of fiber composite components, as well as laser assisted bonding and the fabrication of components in additive/subtractive manufacturing. This diversity of applications is enabled by a modular and highly flexible design. Each optic can be adapted to a wide variety of application specific requirements in order to realize efficient processing with high-quality results. The key to success lies above all in 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. Line- 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.



Triple spot brazing creates virtually perfect seams

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 25,000 W even under difficult processing conditions. With the additionally available optics monitoring the condition of the optics can be monitored at any time. All sensor data is transmitted directly to the laser control and can be centrally evaluated and visualized.

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



Multi-Spot Module

Processing Optics OTS-5 with Multi-Spot Module

As your development partner, Laserline works closely with you to design the ideal processing optic for your specific requirements. Based on our broadly diversified modular system, our experienced engineers effectively develop and qualify new optical beam shaping modules or complete processing optics for your special tasks and for integration into your system environment.



Individually designed

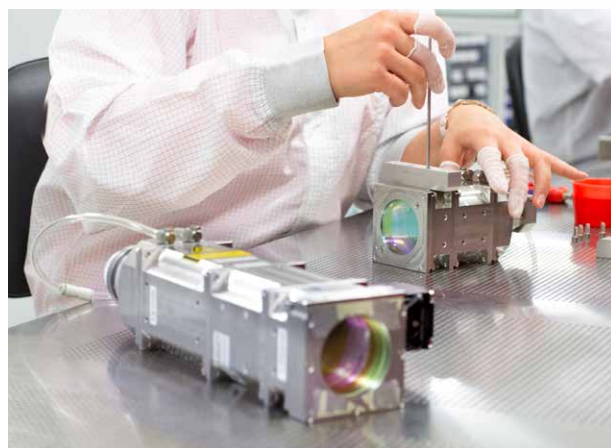
Depending on the task, items of the modular OTS processing optics can be recombined, other components can be integrated or completely new systems can be developed. These are perfectly customized for the particular application and are seamlessly adaptable to Laserline standard products.

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





Processing Optics OTS-3



Processing optics for large area spots

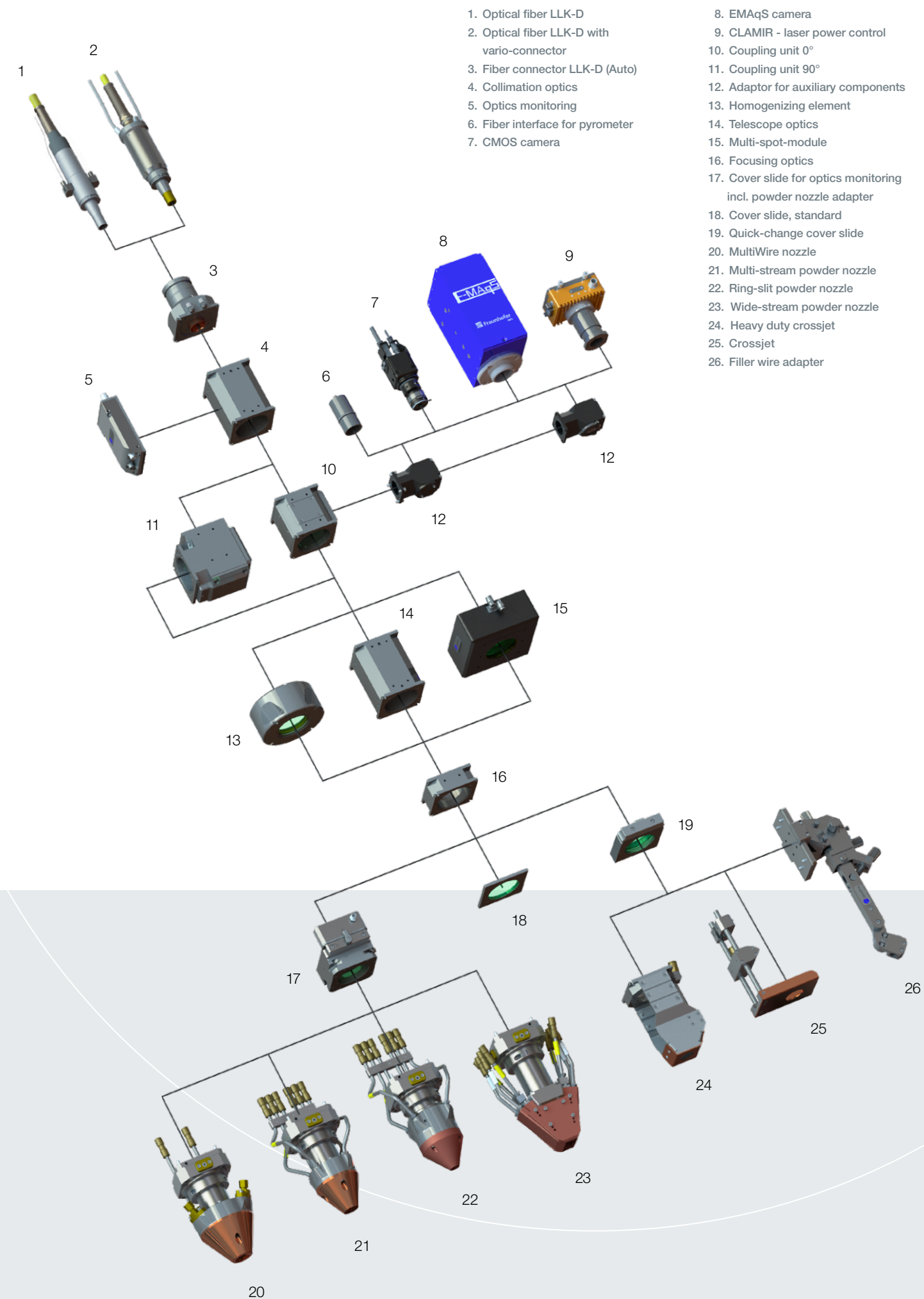


The Laserline typical consistently modular system ensures investments and guarantees adaptability to new tasks and process parameters.

Modular design

The basic design of our processing optics consists of a standardized optical fiber connector LLK-D (item 3), a collimating and a focusing lens (items 4 and 16). Thanks to a wide range of lens systems and equipment options, the Laserline modular system 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 13) or into almost any possible focus geometry via the multi-spot module (item 15).

These optics can be supplemented by additional components, such as coating nozzles (items 20 to 24) or wire feed units. Numerous extensions are available to meet the requirements for a safe production process. The integration of coupling units (item 10 and 11) allows a utilization of pyrometers (item 6) to measure temperature radiation or CMOS cameras (item 7) for process monitoring. A quick-change cover slide (item 19) allows the rapid exchange of contaminated cover slides, even in inaccessible parts of the system. By means of cover slide monitoring, it is also possible to monitor and visualize the degree of contamination.



Optics Series OTS

Mechanical specifications

Optics	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

Optics	OTS-3	OTS-5
Max. laser power* ²	12,000 W	25,000 W
Numerical aperture	NA 0.1 - 0.2	
Focal length collimation* ³	50 - 140 mm	70 - 200 mm
Focal length focusing* ³	100 - 500 mm	80 - 600 mm
Wavelength range	IR: 900 - 1,100 nm Blue: 445 nm ± 20 nm	
Fiber plug connector* ⁴	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	With and without 90° deflection of the laser beam
Interfaces	C-Mount, SM1, M40 x 1.5, 4 x M4
Options	Homogenizing elements, multi spot module, crossjet, 90° beam deflection unit, cladding nozzle, ring-/telescope optics zoom, quick-change cover slide, cover slide monitoring, optics monitoring





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

*2 higher power upon request

*3 other focal lengths available upon request

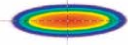
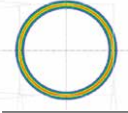



*4 other types upon request

Standard spot geometries

Geometry	Type	min. [mm]	max. [mm]
	Circular	0.2	30
	Line	0.2 x 4.0	1.0 x 135
	Square	2 x 2	135 x 135
	Rectangular 1:1 up to 1:18	3 x 5	9 x 135

Spot size depending on beam quality

Customized spot geometries

Geometry	Type	Specification
	Ellipse	Size and aspect ratio
	Ring	Inner and outer diameter
	Triple spot	Adjustable power distribution and exact geometry
	Spot-in-Spot	Adjustable power distribution and spot size
	Square or rectangular	Large area spot

More configurations upon request

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