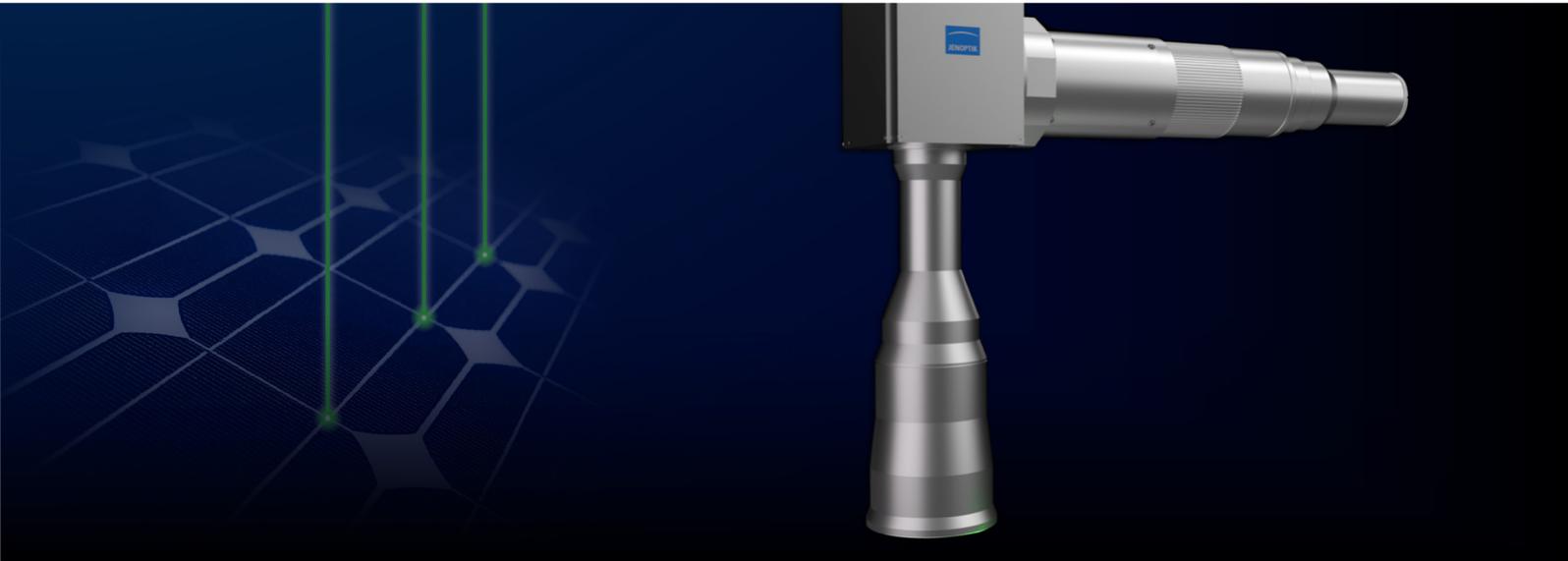




Modular Beam Splitting System MBSS



High-end Optical System for advanced Laser Scribing of Perovskite Solar Cells (PSC)

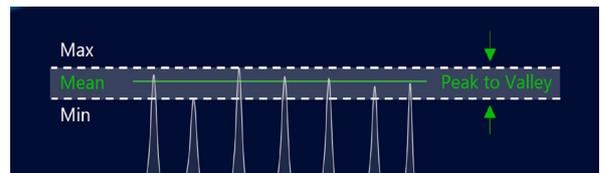
The new Modular Beam Splitting System MBSS from Jenoptik enables the efficient and flexible production of high-performance solar cells with a compact, high-precision optical solution that combines advanced optics and high quality microoptics. The high tele-central optical system is designed for high-precision laser scribing. It ensures very accurate scribe lines and sharp cutting walls without overheating or microcracking. As a complete, easy-to-integrate module, the MBSS enables solar cell manufacturers to simplify optical setup, remain flexible in changing parameters and improve laser process efficiency, while maintaining qualitatively outstanding results.

Benefits at a glance:

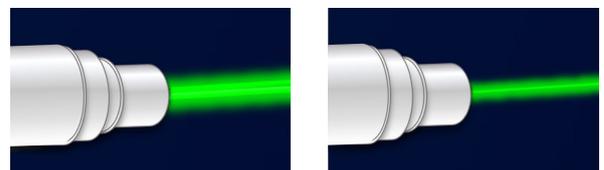
- **Compact and high-performance design for:**
 - Reduced complexity of the optical setup
 - Minimized integration and adjustment effort
- Optical system incorporating a state-of-the-art diffractive optical element (DOE) and specially designed, high-performance objective lens to create an advanced beam splitting system.
- **Excellent global spot homogeneity:**
 - High beam intensity homogeneity: of $< 3\%$ PV-error
 - Extremely accurate pitch and pitch uniformity ($< \pm 5\mu\text{m}$ for 5.0mm pitch)
 - Long-term stability of uniformity and pitch due to diffractive optical element (DOE)
- **Increased flexibility:**
 - Customized setup (wavelength, spot and pitch size)
 - Separate adjustment of spot and pitch size
 - Easy replacement or addition of components, e.g. DOE
- **Exceptional long depth of focus DOF $> \pm 1.0\text{mm}$:**
 - No need to integrate focus tracking function
 - Workable for both rigid and flexible PSC laser scribing



Spot distance easily changed by manual adjustment on unit



Beam intensity homogeneity $< 3\%$ PV



Spot size adjustable by setting via beam expander

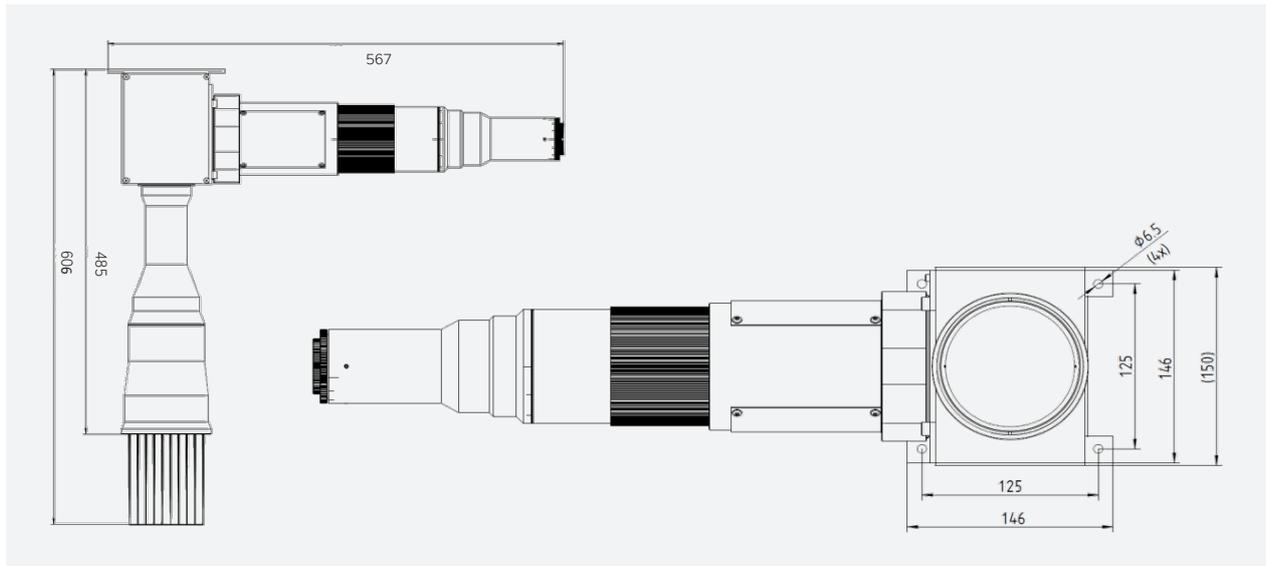
High-End Optical System for Advanced Laser Scribing

Modular Beam Splitting System MBSS-532-1x10

Parameters	Modular Beam Splitting System MBSS-532-1x10	
Wavelength	532 nm	
Beam diameter	≤ 7 mm at $1/e^2$	
Output properties	Number of spots:	1x10
	Spot distances:	(10 ± 0.01) mm; adjustable
	Nominal spot size:	34 μm, adjustable up to ≤60 μm
	Laser beam intensity homogeneity:	< 3 % (PV-error)
	Efficiency:	> 75 %
	Field size:	91.9 mm*
	Depth of focus (DOF)	> +/-1.0 mm
Weight:	< 10 kg	

* Maximum field size of module in case of customization for other spot number and distances.

Specifications



Compact light weight optical module

The MBSS is weighing less than 10kg! It can be conveniently installed in laser scribing system. The light weight makes it possible to drive the MBSS module and fly the laser beams to realise the laser scribing process. Flying laser beam is proven to be an effective solution for high speed, precise and reliable laser scribing in solar film laser scribing production. Due to the light weight, MBSS can be flexibly installed in the way of laser scribing from bottom to top for glass side input, or laser scribing from top to bottom for film side input.

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