



# **SLM 500**

## **Selective Laser Melting Machine**



**High-Performance machine with  
patented multi-beam technology  
for use in the production environment**

# Selective Laser Melting Machine SLM 500

The Selective Laser Melting Machine SLM 500 provides a large build envelope of **500 x 280 x 365 mm<sup>3</sup>** and the **patented multi-beam technology**. In the high-performance machine, four fiber lasers (4x 400W or 4x 700W) are in action simultaneously, increasing the build-up rate by up to 90 % compared with the twin configuration (2x 400W or 2x 700W). The universally usable machine with **high productivity** is perfectly suited for **series production of complex build parts** and it is specifically designed for use in the production environment. An extremely comprehensive basic configuration and the large choice of options enable application-oriented machine configuration.

With three times higher gas flow, the robust SLM machine produces parts with the highest density and surface quality. Soot is removed from the process chamber efficiently and reliably, even for the longest duration builds.

The SLM 500 offers **fully automated powder management**. Metal powder is continuously and automatically sieved and fed to the build process using the PSV, and removal of the build parts is efficiently performed in the PRS. The next build can be started immediately using an additional build cylinder, reducing turnaround time.

## Technical Specifications

Build Envelope (L x W x H)	500 x 280 x 365 mm <sup>3</sup> reduced by substrate plate thickness
3D Optics Configuration	Twin (2x 400 W), Quad (4x 400 W) Twin (2x 700 W), Quad (4x 700 W) IPG fiber laser
Build Rate (Quad 700 W)	up to 171 cm <sup>3</sup> /h*
Variable Layer Thickness	20 µm - 75 µm
Min. Feature Size	150 µm
Beam Focus Diameter	80 - 115 µm
Max. Scan Speed	10 m/s
Average Inert Gas Consumption in Process	5 - 7 l/min (argon)
Average Inert Gas Consumption Purging	70 l/min (argon)
E-Connection / Power Input	400 Volt 3NPE, 64 A, 50/60 Hz, 8 - 10 kW
Compressed Air Requirement / Consumption	ISO 8573-1:2010 [1:4:1], 50 l/min @ 6 bar
Dimensions (L x W x H))	5200 mm x 2800 mm x 2700 mm (inkl. PSV, PRS)
Weight (without / incl. powder)	approx. 2400 kg / approx. 3100 kg

Machine configuration for all types of metal powders /  
Technical changes reserved

\*depending on material and build part geometry





# SLM 500



# Powder Supply Unit PSV

To ensure a **reliable powder supply** to the SLM 500 throughout the entire production process, a modular powder supply unit (PSV) is connected to the machine.

The PSV uses a 90-liter powder tank which is sufficient for any production process. Manual filling of powder via individual powder bottles is not necessary. An ultrasonic sieve, which is integrated in the PSV, sieves the available powder just before it is fed into the process so that no oversized particles or foreign objects can find their way into the SLM process. The transport of powder between the PSV, the SLM machine and the Part Removal Station (PRS) is **fully automatic** and carried out **via vacuum technology**.

The PSV uses **three independent conveying routes**. In addition to supplying the freshly

sieved metal powder to the SLM machine, a second conveying route returns the excess metal powder from the overflows back to the PSV. The third conveying route uses a manual suction device to remove the excess metal powder from the PRS which is then conveyed directly back to the PSV. During this step, a new production process can already be started using the SLM machine whereat the powder supply to the SLM machine is then prioritized. Fresh powder is either supplied through the direct connection of powder containers to the powder tank from the PSV or through the emptying of the powder container directly in the PRS via a suction device.

Powder transport, powder sieving and the storage of the powder take place in a **closed system with inert gas atmosphere**. **Contactless powder handling** ensures maximum safety at work.



## Part Removal Station PRS

The Part Removal Station PRS is a basic feature of the SLM 500. This **useful component of the machine** is optimally suited **for batch production**, and serves for removing the excess powder from the build cylinder and the build parts.

Based on the unloading position, the construction cylinder is removed with the handling device, which is also a basic feature, from the SLM 500 and transferred to the Part Removal Station PRS.

With the use of the PRS, the created build parts can be ergonomically released from excess powder **without any skin contact**. The build cylinder is extremely comfortable to reach, thanks to the **integrated, gas-tight gloves**, and the operator is not exposed to the metal powder.



## Quality assurance for the production process

A comprehensive monitoring and quality assurance system enables a **high degree of process control** in the machine.

**Melt Pool Monitoring (MPM)** is an optionally available on-axis tool for visualizing the melt pool in the SLM process. Data from MPM can be used as a resource for efficiently developing and evaluating the process parameters. It also provides important insights about **optimizing the process parameters** of individual component parts. In the production of safety-critical parts, the data collected serves as documentation for quality assurance in the production process. The recorded data enables conclusions to be drawn regarding irregularities during fusion, which can lead to anomalies in the components.

**Laser Power Monitoring (LPM)** is an optionally available on-axis monitoring system that continuously measures and documents TARGET and ACTUAL emitted laser output throughout the production process. On the one hand, the module can be used as an early warning system for preventing machine downtime with targeted measures when irregularities occur. On the other hand, it makes an important contribution to quality assurance thanks to its **process documentation**.

## About SLM Solutions

The Lübeck-based SLM Solutions Group AG is a leading provider of metal-based additive manufacturing technology. SLM Solutions focuses on the development, assembly and sale of machines and integrated system solutions in the field of selective laser melting (SLM).

SLM technology offers diverse options in the metal-based generative manufacturing of build parts, such as a new design and geometric freedom, lightweight construction through the reduction of build part weight, significant advantages in terms of production speed and the manufacturing of internal undercut build parts in low quantities.

Our products are utilized globally by customers from the most varied sectors, particularly in the aerospace, automotive, tooling, energy and healthcare industries, as well as in research and education.

They particularly value the following advantages of our technology partnership:

- Highest **productivity** using patented multi-laser technology
- Highest material density and **build part quality** through our innovative gas stream management
- Completely closed **powder management** in an inert gas atmosphere
- Cutting-edge process monitoring using various **quality control modules**
- Multilingual open **software architecture** with customer adaptability
- Ultracompact **modular design**
- Long-term and **confidential customer relationships**
- **A technological leader and pioneer** in metal-based additive manufacturing with decades of market experience

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