

# ADDITIVE MANUFACTURING

SYSTEMS & SOLUTIONS



Full AM System  
Portfolio









# SERIES

## An office-friendly Metal 3D Printer for Precision Components

With an impressive and contemporary design, the **CREATOR** is a contained hardware system. In combination with the sophisticated CAM software **APP SUITE** and a smart interface the **CREATOR** is a fully working 3D metal printing system with no need for third party components or software.

The high-end system offers all the advantages of additive manufacturing. Components and constructions in almost every geometric shape that cannot be manufactured using traditional manufacturing techniques can be created easily and quickly.

The building chamber contains an innovative coating concept that makes an accelerated and smooth operation possible – and hence a manufacturing speed that is 30 % quicker than comparable systems on the market.

At the heart of the system is a 250 W fiber laser that ensures a consistent process conditions and a fine resolution, high component density and surface quality due to its beam quality and performance stability.

The handling and processing of the printing data is realized digitally via the CAD file – with the help of the 3D printing module integrated into the **APP SUITE CAM** software.

	CREATOR	CREATOR RA
Laser Power Type	Yb: Fiber 250 W	
Laser Wavelength	1070 nm	
Building Platform	100 mm x 110 mm	
Reservoir Volume	110 mm x 200 mm	
Material Deposition	Scraper	
Repeatability	x=15 µm, y= 15 µm, z= 15 µm	
Min. Feature Size	x= 80 µm, y= 80 µm, z= 20 µm	
Typical Accuray	40 µm	
Dimensions	717 mm x 858 mm x 1794 mm	
Extraction Unit	Non-Reactive Materials	Reactive and Non-Reactive Materials
Weight	350 Kg	360 Kg
Item Number	1210024	1210020





## 3D Metal Printing & Milling in One Machine

The **CREATOR hybrid** enables 3D printing and milling in one machine and is therefore the subsequent further development of the 3D metal printer **CREATOR**.

The **CREATOR hybrid** is capable of performing 3D metal printing in direct combination with the precision of a computer controlled industrial milling process. Thus, the system conjunct the high-quality surface and the perfect accuracy of the milling process with the immeasurable potential of 3D printing.

In contrast to traditional milling machines, even complex components and structures can be milled which would otherwise be inaccessible: e.g. inside contours, undercuts or hidden cooling channels.

The possibilities are almost limitless and the potential is immense. Thereby the **CREATOR hybrid** offers all outstanding benefits of its elder brother: full laser power of 250 W at a spotsize of 40  $\mu\text{m}$ , laser processing speeds of 3500 mm/s, a construction platform of 110 mm diameter with a max building height of 100mm.



CREATOR hybrid	
Laser Power Type	Yb: Fiber 250 W
Laser Wavelength	1070 nm
Building Platform	100 mm x 110 mm
Reservoir Volume	110 mm x 200 mm
Material Deposition	Scraper
Repeatability	x=15 $\mu\text{m}$ , y= 15 $\mu\text{m}$ , z= 15 $\mu\text{m}$
Min. Feature Size	x= 80 $\mu\text{m}$ , y= 80 $\mu\text{m}$ , z= 20 $\mu\text{m}$
Typical Accuray	40 $\mu\text{m}$
Dimensions	717 mm x 858 mm x 1794 mm
Extraction Unit	Non-Reactive Materials
Weight	400Kg
Item Number	005589



# QUALIFIED MATERIALS

CREATOR® & CREATOR® HYBRID					CREATOR® RA	
	Tool Steel and Stainless Steel	Co-Alloys	Ni-Alloys	Cu-Alloys	Al-Alloys	Ti-Alloys
MATERIAL PROPERTIES	<ul style="list-style-type: none"> <li>✓ High hardness and toughness</li> <li>✓ High corrosion resistance</li> <li>✓ Good machinability</li> </ul>	<ul style="list-style-type: none"> <li>✓ High strength</li> <li>✓ High toughness</li> <li>✓ Good corrosion resistance</li> <li>✓ Good bio compatibility</li> </ul>	<ul style="list-style-type: none"> <li>✓ High corrosion resistance</li> <li>✓ Increased strength</li> <li>✓ Good anti-friction</li> <li>✓ Excellent mechanical strength</li> </ul>	<ul style="list-style-type: none"> <li>✓ High corrosion resistance</li> <li>✓ Good machinability</li> <li>✓ High strength, low weight</li> <li>✓ Good bio compatibility</li> <li>✓ Low thermal expansion</li> </ul>	<ul style="list-style-type: none"> <li>✓ Good processability</li> <li>✓ Good electrical conductivity</li> <li>✓ Good alloying properties</li> <li>✓ Light weight</li> </ul>	<ul style="list-style-type: none"> <li>✓ High corrosion resistance</li> <li>✓ Good machinability</li> <li>✓ High strength, low weight</li> <li>✓ Good bio compatibility</li> <li>✓ Low thermal expansion</li> </ul>
APPLICATION FIELDS	<ul style="list-style-type: none"> <li>✓ Medical implants</li> <li>✓ Spindles and screws</li> <li>✓ Pressure die casting moulds</li> <li>✓ Maritime</li> <li>✓ Aerospace</li> </ul>	<ul style="list-style-type: none"> <li>✓ Dental</li> <li>✓ Medical implants</li> <li>✓ High Temperature</li> </ul>	<ul style="list-style-type: none"> <li>✓ Aerospace</li> <li>✓ Rocket Motors</li> <li>✓ Pumps</li> <li>✓ Tooling</li> <li>✓ Gas turbines</li> <li>✓ Reactors</li> </ul>	<ul style="list-style-type: none"> <li>✓ Aerospace</li> <li>✓ Automotive</li> <li>✓ Jewellery and Watchmaking</li> <li>✓ Industries</li> <li>✓ Medical sector</li> </ul>	<ul style="list-style-type: none"> <li>✓ Automotive</li> <li>✓ Industrial applications</li> <li>✓ Aerospace</li> </ul>	<ul style="list-style-type: none"> <li>✓ Aerospace</li> <li>✓ Maritime applications</li> <li>✓ Motor sport</li> <li>✓ Bio materials for implants</li> </ul>
ALLOYS	<ul style="list-style-type: none"> <li>✓ MetcoAdd 17-4PH-A (Oerlikon)</li> <li>✓ MetcoAdd 316L-A (Oerlikon)</li> <li>✓ 1.4404 (Heraeus)</li> </ul>	<ul style="list-style-type: none"> <li>✓ MetcoAdd 75A (Oerlikon)</li> <li>✓ MetcoAdd 76A (Oerlikon)</li> <li>✓ MetcoAdd 78A (Oerlikon)</li> <li>✓ Wirobond C+ (BEGO)</li> </ul>	<ul style="list-style-type: none"> <li>✓ MetcoAdd 718A (Oerlikon)</li> <li>✓ MetcoAdd 718B (Oerlikon)</li> <li>✓ MetcoAdd 625A (Oerlikon)</li> <li>✓ MetcoAdd HX-A (Oerlikon)</li> </ul>	<ul style="list-style-type: none"> <li>✓ CuSn8 (Heraeus)</li> </ul>	<ul style="list-style-type: none"> <li>✓ AlSi10Mg (Heraeus)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ti48Al2Cr2Nb (Heraeus)</li> <li>✓ Ti6Al4V (Heraeus)</li> </ul>

This list does not contain all materials that can be printed with the CREATOR. In fact, nearly all reactive and non-reactive materials can be processed with this system; printing of magnesium is not supported. Currently, parameters are available for selected materials only.



# DIRECT METAL DEPOSITION

## Additive Manufacturing by Use of Laser Powder Cladding

Direct Metal Deposition (DMD) with a powder nozzle, also called laser powder cladding, is not only ideal for repairing and touching up workpieces.

By use of the CAM software APP SUITE, DMD can be leveraged to automatically produce a vast range of geometries. Material can be deposited in a single or multiple layers; even entirely new objects can be made and fused with existing components.

In addition to faster throughput, exceptional quality, DMD excels with minimal dimensional distortion thanks to low heat penetration. These benefits, coupled with smooth, minimally porous surfaces, help to largely eliminate subsequent finishing steps. DMD thus also delivers major time and cost savings.



### Almost free scalability

The workpiece size only depends on the limitations of the axis system used for the manufacturing process



### 3D printing of new components

Creation of 3D structures free of cracks and pores as well as enhancement and hardening of surfaces



### Compatible with APP SUITE

Strategy development and programming of complex geometries via CAD / CAM software solution



# CUBE

## The High Precision AM Allrounder

The **CUBE** is a highly flexible laser class 1 workstation that combines state-of-the-art laser technology and multiple high-quality laser processes in a single system. Thus the system can be integrated with Diodeline and CW laser sources and various processing heads.

The flexibility of the **CUBE** offers a multitude of application possibilities, which comes from the ability to utilize it as a welding or as a compact cutting system. In addition to laser welding, the **CUBE** can also be used for automated Direct Metal Deposition tasks. This is where the innovation behind the **CUBE** reveals its full potential for applications of laser cladding that require cost-effective and high-quality laser processing of small or medium-sized components.

The system incorporates a granite table, which affords excellent stability and can also withstand high loads. Moreover, the axis speed of this precise and high-quality system is 0.5-15 mm/s. Together, these features ensure that the **CUBE** can meet the greatest challenges and most demanding tasks with maximum precision and reliable results.



	CUBE 300	CUBE 450	CUBE 600	CUBE 900
Average Power	300 W	450 W	600 W	900 W
Peak Power	3 kW	4,5 kW	6 kW	9 kW
CW Power	300 W	450 W	600 W	900 W
Pulse Duration	0,5 – 50 ms			
Frequency	0,5 – 100 Hz			
Axis Pos. Range	x = 470 mm; y = 350 mm; z = 370 mm			
Axis Speed	0,5 mm – 15 mm/s			
Granite Table Size	600 mm x 600 mm			
Max Payload	1.000 kg			
Weight	400 kg			
Dimensions	1160 mm x 1200 mm			
Power Supply	230 V 1Ph 50 Hz			

# EVO MOBILE



The **EVO MOBILE** is a high-performing, flexible and mobile laser class 4 welding system that sets new standards for open laser work-stations. The system offers an easy to operate and practical solution through its integration of semi-automatic processing capabilities.

The productivity of the **EVO MOBILE** enhanced by the auto weld function which allows it to “learn” geometric figures and the further processing of these surfaces with pre-defined welding parameters. The **EVO MOBILE** also provides an option for rotating the coordinate system freely in space, enabling users to define an inclined plane in space as the processing surface, making welding significantly simpler.

The laser beam is directed to the welding position within the realm of milli-meter precision. The minimal setup and takedown time as well as the long axis traverse distances of the EVO Mobile mini-mizes the total amount of work when pro-cessing tools and dies.

DIODELINE	120 W	160 W	200 W	300 W	450 W	600 W	900 W
Laser type	diode-pumped						
Max. mean power	120 W	160 W	200 W	300 W	450 W	600 W	900 W
Pulse peak power	1,5 kW		3 kW		4,5 kW	6 kW	9 kW
Max. pulse energy	15 J		30 J		45 J	60 J	90 J
Pulse rate	0,1 – 100 Hz (100 Hz)						
Line voltage	230 V 1 Ph 50 Hz						

Nd:YAG	120 W	160 W	200 W	300 W
Max. mean power	120 W	160 W	200 W	300 W
Pulse peak power	6 kW	7,5 kW	9 kW	13 kW
Max. pulse energy	60 J	80 J	100 J	150 J
Pulse duration	0,4 – 20 ms	0,4 – 20 ms	0,4 – 20 ms	0,4 – 20 ms
Pulse frequency	1 – 20 Hz (100 Hz)	1 – 20 Hz (100 Hz)	1 – 20 Hz (100 Hz)	1 – 20 Hz (100 Hz)
Focus diameter	0,2 – 2,0 mm	0,2 – 2,0 mm	0,2 – 2,0 mm	0,2 – 2,0 mm
Line voltage	400 V 3 Ph 50 Hz	400 V 3 Ph 50 Hz	400 V 3 Ph 50 Hz	400 V 3 Ph 50 Hz



# POWDER NOZZLE

The research & development department collaborated with the Fraunhofer Institute to develop an efficient, easy-to-install **POWDER NOZZLE** for the DIODELINE product line. It is the first such system that allows both wire- and powder-fed cladding, resulting in 10 times the usual efficiency.

The coaxial configuration of the **POWDER NOZZLE** and laser lets material be deposited regardless of the substrate's direction of movement and ensures an extremely reliable process. It is therefore also suitable for 3D printing / Additive Manufacturing tasks.

The coaxial feeding of metal powder also enables a very flexible addition of volume to the workpiece: it can grow in any direction.



# POWDER FEEDER

Best powder-based laser cladding results depend on optimal feeding of the powder, i.e. controlled supply and metering.

With our **POWDER FEEDER**, we have made enormous strides toward attaining this ideal. The feed system is highly versatile and suited for all powder morphologies, including powders with poor or asent flowability. The metering unit is intelligently designed to keep the powder flowing steadily and prevent mixes from reseparating.

A number of parameters can be set—e.g. temperature, gas pressure, and powder flow rate—to optimize the system for virtually any application.







## One CAM Solution for all Applications

The APP SUITE is an integrated CAM environment, which supports industrial laser applications such as marking, engraving, welding, cutting, cladding and 3D printing.

The software is specifically developed for industrial laser applications and is actually able to read and process all proprietary file formats and control all existing laser systems. Geometric primitive included native objects such as line, box, circle, ellipse, and spline, as well as vector text, barcodes, and raster images.

APP SUITE makes it extremely easy to import and work with all object types, from simple bitmaps to complex nurbs. The machine operator also has full control of all relevant machine parameters ensuring flexible and strategic control.

During each processing session, parameters such as laser power, frequency, speed, gas, spot size, etc. can be monitored and changed with maximum freedom from one job to the next.

APP SUITE supports a sophisticated manufacturing framework that enables real time operation of virtually any CNC machine. While other CAD/CAM software solutions typically stop at creating the G-Code, the software supports a flexible machine driver architecture allowing the user to connect, and execute his job at the push of a button.

Functions for manual positioning, soft joystick, zero point set, advanced calibration, and axis flipping are also available to the user for easy operations.







# CLOUD MANUFACTURING

## Connectivity and Productivity for a 3D Metal Printing World

Our **CLOUD MANUFACTURING** solution brings greater productivity and efficiency to the **CREATOR** 3D printing range through the intelligent use of data. The complexity of big data vast, but essentially it comes down to capturing data, storing it, analyzing it and then using it appropriately to maximum benefit. Nearly all data has value and when collated, analysed and used together offers real opportunities to improve manufacturing workflows and efficiencies.

**CREATOR** users have unprecedented access to their machine(s), either locally or remotely, made possible by a dedicated tablet for real time control of the machine's parameters; enabled by a secure Cloud server and infrastructure. Moreover, the tablet and machine(s) can share build files and all essential process parameters through

the secure cloud and complex digital workflows can be created locally and distributed to remote production environments quickly and easily.

These levels of connectivity allow for unprecedented data collection as the Cloud Server can be used to gather essential data from every job running on any **CREATOR** platform, such as Machine Telemetry, Process Parameters, and even User Behavior. The advanced data option includes the ability to monitor and record the GCODE data for each layer as well as a picture of each layer.

Subsequent to any build, users can use their dedicated tablet to access any or all of these statistics to monitor and control quality of parts and to carry out preventative maintenance operations.





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