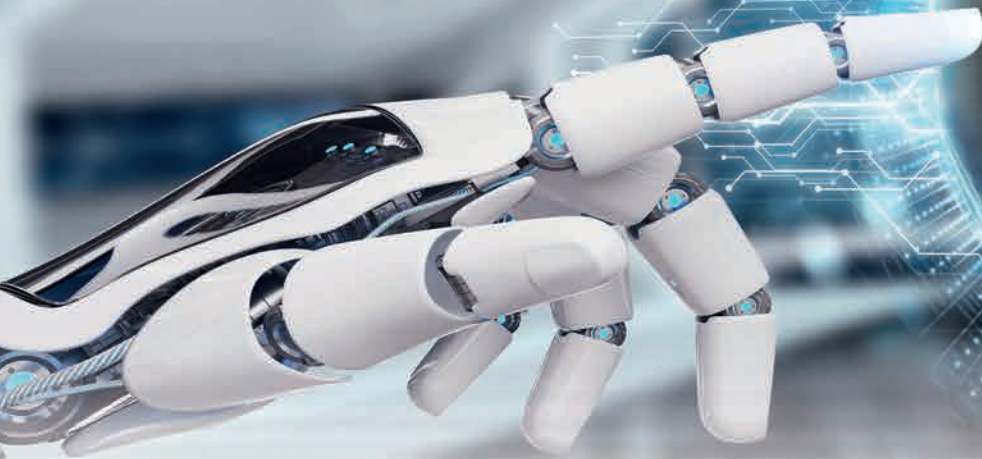


New machine concept

**ALL
IN
ONE**



ADDITIVE MANUFACTURING SYSTEMS

A cooperation of two highly specialised companies



Lead through competence

Frank Heimbert Kulke founded 3D-MECTRONIC in 1998 with the aim of opening up new applications for 3D printing and of developing printing systems for the AM industry.

Today 3D-MECTRONIC produce and market innovative AM systems for the laser sintering technologies LM and LS (Laser Melting and Laser Sintering), customized to the respective applications and requirements of the industry. The comprehensive know-ledge we have acquired in over 30 years in all areas of additive manufacturing technologies by developing electro-technical, mechanical and special software solutions for AM, engineering, maintenance, conversions and upgrades, is incorporated into all our developments with respect to the AM machine printing systems 3DM-AMS. These synergy effects place us in a position to offer an open platform for LM and LS laser sintering systems.

Our 3D printing systems and special solutions increase our customers' efficiency and productivity in the printing process. As a highly specialized company, we are a competent partner in all matters relating to the AM printing technology. Apart from the development and manufacture of AMD printing systems, our portfolio also includes customer-specific conversions, complete overhauls, upgrades of existing printing systems, the Materialise Control Platform, material developments, trials for LM and LS systems and training plus support.

Frank Heimbert Kulke, Managing Director – CEO

The 3DM-AMS additive manufacturing system developed by our company is a 3-component system that can process plastics, metals and ceramics at the same time. The customizable 3DM-AMS series is flexible in terms of customer requirements regarding the size of the building area, the wavelength or post processes. This innovative 3D printing system combines all manufacturing processes in a fully automated process sequence.

The integrated powder preparation and inert gas system (nitrogen N2) places great emphasis on sustainability and safety. The handling of the components takes place outside the building area and the transfer between the machining processes is fully automatic. The aim was to create an open system where it is possible to configure the equipment for various CAD/CAM interfaces and machine control versions. Thus, the customer decides which R&D project he wants to carry out.



Trendsetting innovations

Over the last seven decades, REICHENBACHER HAMUEL has become synonymous with trendsetting innovations in the development of high-quality CNC machining centers. As our customers' success is based on the first-class quality of their products, they very much rely on our technology to guarantee it permanently.

All systems have the highest safety standards and perfect operations such as milling, sawing and drilling from the point of view of a customized „best-fit solution“. They convince with sophisticated technical details, a high level of operating comfort and impressive work results. It is not without reason that manufacturers all over the world successfully use these machines in aircraft and automotive construction, shipbuilding and rail vehicle construction, to name just a few.

As a renowned plant manufacturer, we attach great importance to efficiently minimizing risks for our customers. In doing so, we not only focus on reliable after-sales service, but also on preventive measures.

Within the SCHERDELGroup, we also make targeted use of a wide range of process technologies and resources. These synergy effects provide our customers with essential advantages in terms of cost and process optimization.

Mechanical engineering has a longstanding tradition in the company as a whole, which makes a decisive contribution to the continuity and successful implementation of our corporate goals.

Dr. Alexander Kawalla-Nam, Head of Additive Manufacturing Technology

The powder bed process and further processing based on LM and LS (Laser Melting and Laser Sintering) allows many processes to become considerably more efficient. We have set ourselves the goal of offering innovative machine and technology solutions on an industrial scale. In cooperation with our partner, we have developed the AMS 800 primarily intended for manufacturing large-volume workpieces made of metal. The handling of the components takes place outside the building area and the transfer between the individual machining processes is fully automatic.

This trendsetting technology opens the doors to completely new manufacturing and design concepts, as many of the processes currently available are still too expensive or too slow for the industry and thus not feasible. The goal must be to produce large quantities in a short time at competitive costs. Our systems are the decisive key to achieve this.



Control system

Siemens make
Open system for various CAD/CAM
interfaces and machine control versions.
The customer decides which R&D project he wants to carry out.

Process monitoring

- Infrared camera
- Surveillance camera



Loading & cleaning

In the cleaning cabin, the operator can remove
the remaining loose powder by suction.

The build-plate can be loaded into the machine
using a crane.

Recovery

Up to 70% of the powder is de-powdered
automatically in the process chamber and
can thus be recovered and reprocessed.

Building area

The printing volume permits the manufacture
of workpieces with a base area of up to
800 x 800 millimeters and a maximum height
of 500 millimeters.

3D printing is performed using 4 fiber lasers
(laser wavelength 450 - 1,070 nm) with a
maximum power of 1 kW, each.

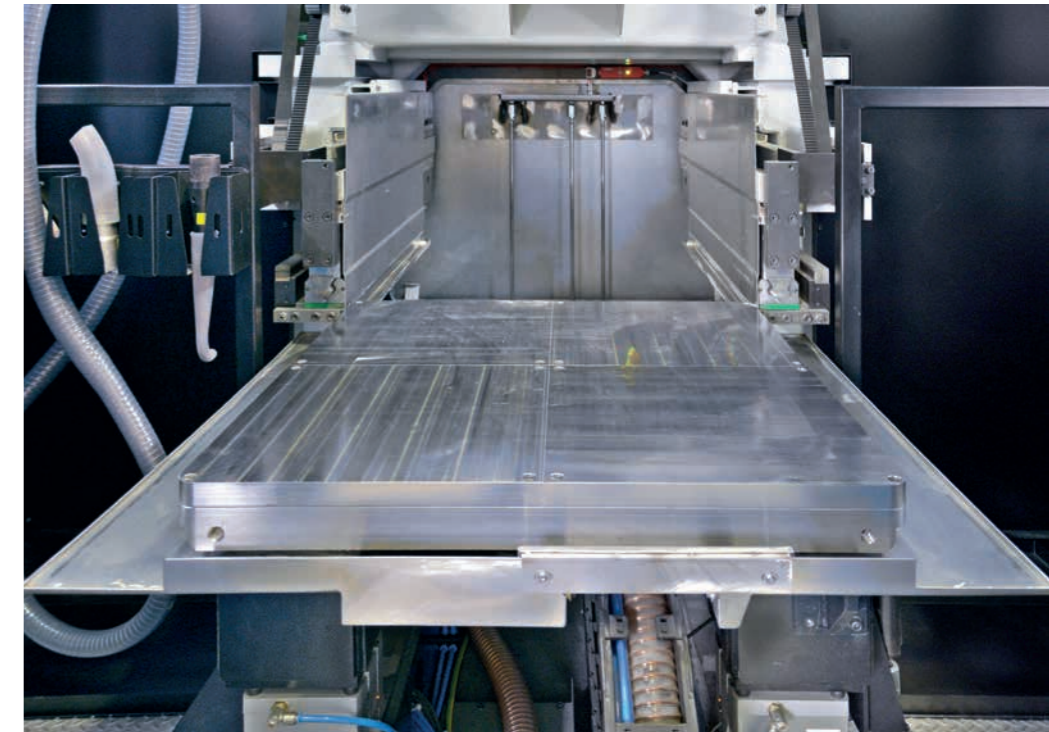
During the printing process, the build-plate
can be heated up to 150 °C.

Closed circuit

The AMS 800 is a closed circuit system
to exclude a contamination of the
environment.

The related periphery consists of:

- Fume extraction system
- Nitrogen generator
- Powder preparation system



Handling
An innovative handling system automatically transfers the build-plate from the discharge station into the process chamber.



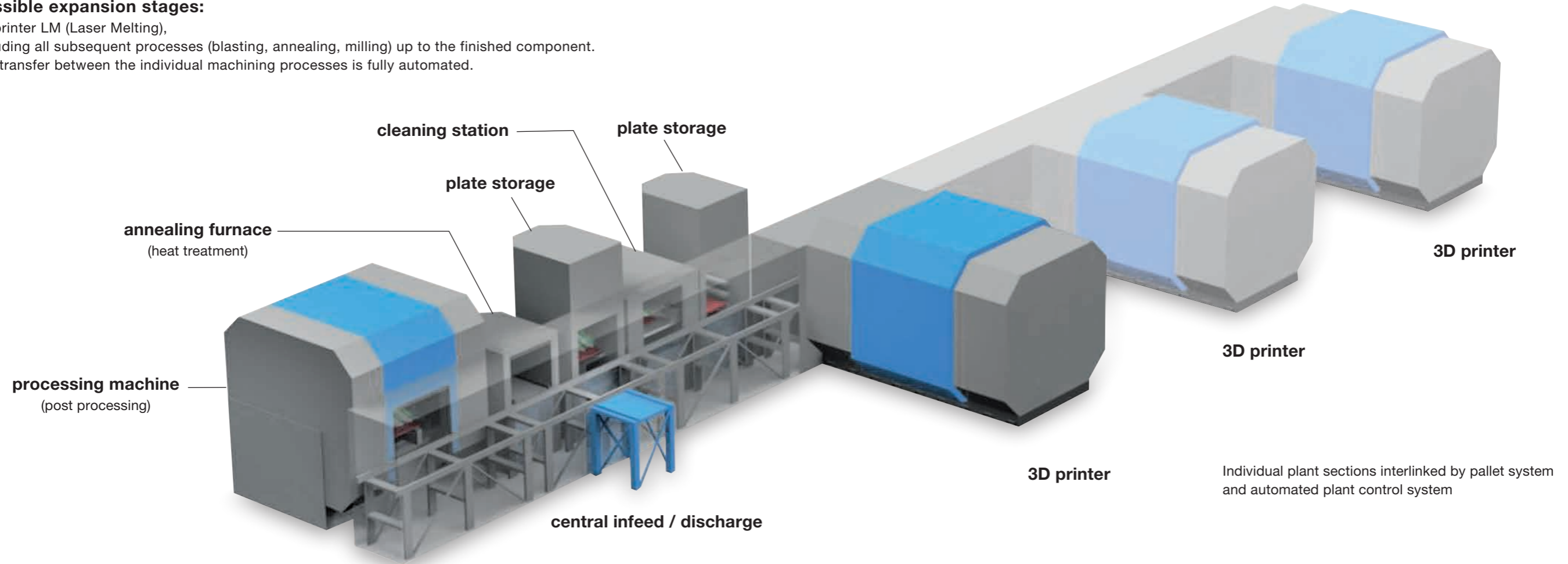
Extraction system
Fume extraction system (filtration) with a sinter-plate filter in combination with safe passivation and integration into the inert gas circulation system.



Nitrogen generator
The nitrogen generator permits the creation of the inert gas atmosphere with a nitrogen purity of up to 99.9%.

Possible expansion stages:

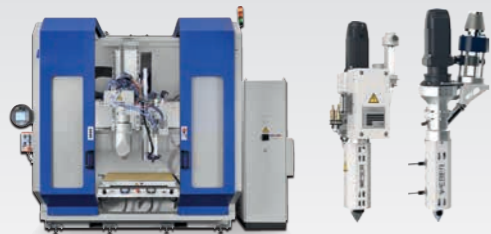
3D printer LM (Laser Melting), including all subsequent processes (blasting, annealing, milling) up to the finished component. The transfer between the individual machining processes is fully automated.



HYBRID MANUFACTURING

THERMOPLASTICS

ECO-LT Hybrid



Machining + Additive direct extrusion based on Fused Granular Fabrication (FGF)

METALS

HSTM 1000 HD Hybrid



High speed milling + Laser cladding based on Laser Metal Deposition (LMD)

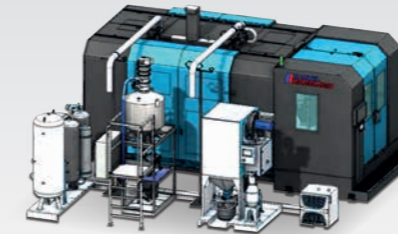
HSTM 150 HD Hybrid



SCALABLE ACCORDING TO CUSTOMER REQUIREMENTS

THERMOPLASTICS, CERAMICS & METALS

AMS 800



Powder bed process + further processing based on

- Laser Melting (LM)
- Laser Sintering (LS)

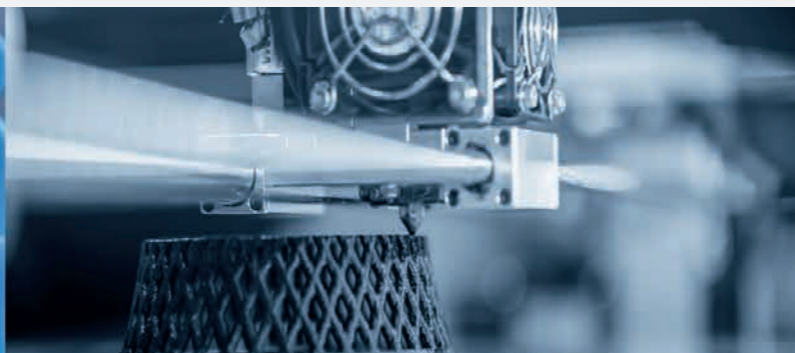
Advantages:

- Building area up to 800 x 800 x 500 mm
- 4x 1 kW laser
- Integrated powder preparation
- Integrated inert gas system (nitrogen N2)
- Component handling outside the building area
- Compact design
- Crane hook machine for quick installation
- Fully automated process sequence
- Open system for various CAD/CAM interfaces

Hybrid manufacturing				
SPECIFICATIONS	ECO-LT Hybrid	SPECIFICATIONS	HSTM 1000 HD Hybrid	HSTM 150 HD Hybrid
Milling unit	5-axis milling unit with cardanic spindle	Milling spindle speed	16,000 rpm	16,000 rpm
Milling spindle speed	60,000 rpm	Milling spindle power	54 kW	54 kW
Milling spindle power	4.6 kW – 14 kW	Torque	136 Nm	136 Nm
Additive extruder	AE15 / AE20 / AE30	Laser power / type	1 kW / fiber laser	1 kW / fiber laser
Maximum material output	2 kg/h – 20 kg/h	Focus diameter	100 µm	100 µm
Nozzle diameter	1 mm – 16 mm	Building volume	up to 650 x 1,200 mm	up to 650 x 1,200 mm
Building volume	700 x 700 x 800 mm (optionally adaptable)	SPACE REQUIREMENTS		
SPACE REQUIREMENTS		Dimensions (W x L x H)	8,000 x 3,000 x 3,200 mm	8,000 x 3,000 x 3,200 mm
Dimensions (W x L x H)	2,700 x 2,450 x 2,700 mm	Weight	approx. 18,000 kg	approx. 18,000 kg
Weight	approx. 2,500 kg	ACCESSORIES / PERIPHERALS		
ACCESSORIES / PERIPHERALS		Material	Fe-, Ni-, Co-based alloys	Fe-, Ni-, Co-based alloys
Material	thermoplastics, also filled GF/CF possible	Measuring system	fully automated	fully automated
Tool changer	automated	Tool changer	automated (double gripper system)	automated (double gripper system)
Component clamping technology	vacuum clamp, pneumatic clamp	Inert gas	argon	argon
Temperature of the printing table	150 °C	Filtering unit	air-fresh filter	air-fresh filter
		Multi-material handling	GTV	GTV

Powder process printer				
SPECIFICATIONS	AMS 800	AMS 400	AMS 300	AMS 200
Building area (X / Y / Z)	800 x 800 x 500 mm	400 x 400 x 500 mm	300 x 300 x 500 mm	200 x 200 x 500 mm
Laser power / type	4 x 1 kW / fiber laser	up to 1 kW / fiber laser	up to 1 kW / fiber laser	up to 1 kW / fiber laser
Laser wavelength	450 – 1,070 nm (optionally selectable)	450 – 1,070 nm (optionally selectable)	450 – 1,070 nm (optionally selectable)	450 – 1,070 nm (optionally selectable)
Layer thickness	10 µm to 120 µm	10 µm to 120 µm	10 µm to 120 µm	10 µm to 120 µm
Scanning speed	up to 30 m/s	up to 30 m/s	up to 30 m/s	up to 30 m/s
Focus diameter	70 – 500 µm variable	70 – 500 µm variable	70 – 500 µm variable	70 – 500 µm variable
SPACE REQUIREMENTS				
Dimensions (W x L x H)	2,840 x 6,100 x 3,411 mm	1,523 x 3,352 x 3,046 mm	depending on the machine equipment	depending on the machine equipment
Weight	approx. 12,000 kg	approx. 6,000 kg	depending on the machine equipment	depending on the machine equipment
ACCESSORIES / PERIPHERALS				
Material	Fe-based alloys	metal / ceramics / thermoplastics	metal / ceramics / thermoplastics	metal / ceramics / thermoplastics
Material feed	semi-automated	manual or semi-automated	manual	manual
Handling	automated	manual or semi-automated	manual	manual
Inert gas supply	external N2-generator	external N2-generator	external N2-generator	external N2-generator
Powder supply	powder preparation system	manual	manual	manual
		powder preparation system as an option	powder preparation system as an option	powder preparation system as an option
Filter system	fume extraction system	fume filtering unit	fume filtering unit	fume filtering unit
Connection / power consumption	400 volt 3NPE, 63 A, 50/60 Hz, 7 – 10 kW	depending on the machine equipment	depending on the machine equipment	depending on the machine equipment

Subject to change in the interest of technical progress.



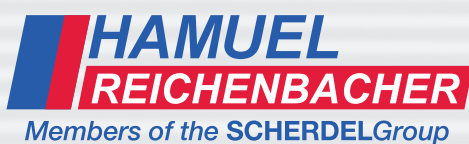
ADDITIVE MANUFACTURING APPLICATIONS

- *Automotive industry and suppliers*
- *Aviation industry*
- *Consumer goods industry*
- *Toy industry*
- *Art and art history*
- *Mold making (rapid tooling)*
- *Medical technology, architecture and landscape design*
- *Various other applications*



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