



"All for one and one for all"

Using Hybrid Manufacturing Technologies patented docking approach process tools can be interchanged without any manual intervention in a seamless automatic process. The system can be fitted to a wide range of machine tool, robotic or gantry platforms.

Platforms

Mikron Mill P800 U DED Machine

Developed during OpenHybrid, combines additive and subtractive manufacturing (milling) and direct metal deposition (cladding) on a same machine without any loss of performance or working volume.

Travel X, Y, Z	800 x 800 x 550	[mm]
Swivelling axis / tilting axis	+91/-121 / n x 360	[°]
Rapid traverse X, Y, Z	45	[m / min]
Rapid traverse (swivelling / rotating)	25 / 35	[rpm]
Tool holder interface	HSK-A63	
Tool magazine (positions)	30, 60, 120, 170	
Control unit Siemens	840D sl	
Integrated laser	CW laser 2kW	





- Large scale rigid gantry system with Integrated C-A axes and spindle
- High speed milling head enabling milling or grinding operation as well as high rate wire feed deposition head.

Travel X, Y, Z	2749 x 2555 x 1800 [mm]
C-Axes	Cytec - CML/S8C/1/000-0244
A-Axes	Cytec - CLM/SaA/1/000-0222
Spindle	Cytec S18-135-S 18,000 RPM /18KW/ HSK A63
Tool holder interface	HSK-A63
Control unit Siemens	840D sl
Integrated laser	2kw (upgradable to 6kw)
Cladding head	HMT wire feed S8 Head
Wire feed rate	500-2500 [mm/min]



Extended Capabilities



Wire Cladding Head

HMT Wire feed head with AMBIT™ S8 docking system.

- Changeover in seconds
- Integral local shielding and cooling
- Multi-kW laser processing

Adaptive CAM Software



Smart Powder Cladding Head

Smart laser processing head together with AMBIT[™] docking system live monitoring of key process variables



Easy to use hybrid AM software including path generation for milling and (DED)

- Milling, cladding and inspection in one application



Simulation Tools

ESI AM suite of tools was extended to support DED and repair processed including:

- Assessment of shielding efficiency
- Analysis of melt pool and local thermal history
- Distortion and residual stress analysis
- Distortion compensation
- Analysis of crack susceptibility



Scanning Head

- Tool-changeable and dock-able scanning head for S7 dock
- Laser line scanner integrated
- Connected to the Siemens 840D controlle

Case Studies



Before

After

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WEIR Pilot Tube

Cavitation causes damage to the tip of the pitot tube. Using the OpenHybrid approach the damaged section can be automatically removed and replaced with new material which can be tailored to improve the durability.



Siemens Blade

Wear occurs on the trailing edge of the blade which can be automatically repaired, including the potential to deposit materials which offer improved performance without the need for post heat treatment, thus simplifying the repair process.



CRF Stamping Tools

The tool edge becomes worn and damaged and needs to be repaired after typically 30,000 cycles. Replacing the current manual repair method with the automated OpenHybrid approach will help to reduce repair time and improve the consistency of the repair.



