



## LENS<sup>®</sup> 860 HYBRID CONTROLLED ATMOSPHERE SYSTEM

Larger Work Envelope & Higher Power Bring More Capabilities for Affordable, High Quality Metal Hybrid Manufacturing.



LENS 860 HY CA System. An additive only controlled atmosphere model. LENS 860 AM CA is also available.

The LENS 860 is the newest model in the affordable Optomec Hybrid system line-up. With an 860x600x610 mm work envelope the system enables additive and subtractive manufacturing of mid-size and large parts. The LENS 860 comes standard with a hermetically sealed build chamber and closed loop atmosphere controls for producing parts with superior metal quality. The LENS 860 can be configured with a high power 3 kW fiber laser reducing manufacturing time for building, repairing or coating parts.

Built on a rugged CNC platform, the system features a 16 tool ATC and an 8,000 or optional 10,000 RPM spindle for machining operations. The base LENS 860 system is equipped with a 3-linear axis motion system, but optionally can be delivered with a user interchangeable rotary table and/or tilt-rotate trunnion for 4 and 5 axis for additive and subtractive metal processing. Additive manufacturing is enabled with the industry proven LENS Print Engine technology including integrated Steadyflow™ powder feeders, water-cooled LENS deposition head, and SmartAM™ closed loop process controls.

A Siemens controller manages the system's additive and subtractive functions through an easy to use HMI. Powerful Optomec software enables multi-axis build strategies that combine additive and subtractive operations in a single tool path program. Optional material starter recipes and unparalleled customer service and support round out the LENS 860 Hybrid Controlled Atmosphere System.

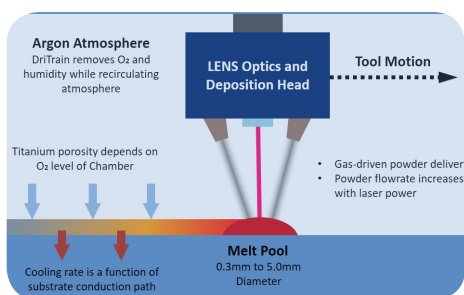
### LENS 860 HY CA FEATURES

- ▶ Full Atmosphere Control – superior metal quality
- ▶ Large Build Volume – process larger parts
- ▶ Rugged CNC Base – affordable system platform
- ▶ Full CNC Machining Capability – finished parts in one set-up
- ▶ Full LENS Additive Capability – industry proven technology
- ▶ Up to 5 Axis Motion – for complex parts/repairs
- ▶ High Power Laser – faster processing
- ▶ Closed Loop Controls – part to part consistency
- ▶ Common materials: Inconel Alloys, Stainless Steels, Titanium alloys

### LENS APPLICATIONS

- ▶ Hybrid Manufacturing
- ▶ Finished Functional Prototypes
- ▶ Repair damaged/worn parts
- ▶ Restore mis-machined components
- ▶ Remanufacturing of legacy parts

## Laser Engineered Net Shaping



### How the LENS Process works:

The LENS process is housed in a chamber which is purged with argon such that oxygen and moisture levels stay below 40 parts per million for LENS Hybrid CA Systems and 10 parts per million for LENS Additive CA Systems. This ensures there is no impurity pickup during deposition.

The LENS Deposition head delivers the laser and powder to the deposition zone. Metal powder is conveyed through nozzles to the focal point of the laser creating a melt pool. Argon gas is used to deliver the powder and protect the melt pool from contamination.

Toolpaths are generated from a CAD model and instruct the LENS system to build or machine the part using standard G & M commands. Material starter recipes provide pre-qualified LENS processing parameters to print a variety of commonly used powders including Titanium, Inconel, and Steels. The part is built layer by layer under the control of software that monitors a variety of parameters to ensure geometric and mechanical integrity. When complete, the part is removed and can be heat-treated, Hot-Iso-static Pressed, machined or finished in any other manner.

## LENS 860 HYBRID CONTROLLED ATMOSPHERE SYSTEM

SPECIFICATIONS		LENS 860 HYBRID CA SYSTEM	LENS 860 AM CA SYSTEM
AUTOMATION PLATFORM	Additive Mode XYZ Travel (mm)	598x600x610	860x600x610
	Subtractive Mode XYZ Travel (mm)	860x600x610	NA
	Table Size XY (mm) / Payload (kg)	1000x600 / 600	1000x600 / 600
	Positional Accuracy (mm)	± 0.005	± 0.005
	Positional Repeatability (mm)	± 0.003	± 0.003
	Rotary Table A Axis (Optional)	<b>Removable</b>	<b>Removable</b>
	Additive Mode XYZ Travel (mm)	598x600x610	860x600x610
	Subtractive Mode XYZ Travel (mm)	860x600x610	NA
	Table Ø (mm)	170	170
	Trunnion 170 (Optional)	<b>Removable</b>	<b>Removable</b>
	Additive Mode XYZ Travel (mm)	598x600x350	860x600x460
	Subtractive Mode XYZ Travel (mm)	860x600x350	NA
	Table Size Ø (mm)	170	170
	Maximum Workpiece Size Ø, H (mm)	260 x 350	260 x 460
	Maximum Workpiece Weight Horz/Vert (kg)	100 / 50	100 / 50
	Rotary Axis "C" (degrees)	360	360
	Tilt Range "A" axis (± degrees)	-15 / +115	-15 / +115
	Trunnion 250 (Optional)	<b>Permanent</b>	<b>Permanent</b>
	Additive Mode XYZ Travel (mm)	598x600x360	860x600x480
	Subtractive Mode XYZ Travel (mm)	860x600x360	NA
	Table Size Ø (mm)	250	250
	Maximum Workpiece Size Ø, H (mm)	335x360	335x480
	Maximum Workpiece Weight Horz/Vert (kg)	100 / 75	100 / 75
	Rotary Axis "C" (degrees)	360	360
	Tilt Range "A" axis (degrees)	-30 / +120	-30 / +120
	CNC Controller	Siemens 840D	Siemens 840D
	Touch Probe	Option	Option
	System Approx weight (kg)	5960	5960
	System Dimensions (mm)	4068x2735x2660	4068x2735x2660
LENS DEPOSITION	CDRH Class 1 Airtight Enclosure	Standard	Standard
	Antechamber Ø (mm)	375	375
	Pneuma Seal Door with Glove Access	Standard/3 Glove Ports	Standard/3 Glove Ports
	Oxygen/Moisture Level (ppm)	< 40	< 10
	Standard Powder Feeders	Up to 4	Up to 4
	Laser Power Standard (W)	500 - 3000	500 - 3000
	Closed Loop Process control	Option	Option
	2.5D Tool Path Software	Option	Option
	5 Axis Tool Path Software	Option	Option
MACHINING	Tool Changer	16 Tool Carousel	NA
	Tool Taper	CAT 40	NA
	Spindle (rpm)	8,000	NA
	Spindle Center Distance to Column Surface (mm)	700	NA
	Spindle Nose to Table Surface (mm)	120-730	NA
	Spindle Motor Peak (W)	7000	NA
	Spindle Torque (Nm)	95	NA

## ABOUT OPTOMECH

Optomec® is a privately-held, rapidly growing supplier of Additive Manufacturing systems. Optomec's patented Aerosol Jet Systems for printed electronics and LENS 3D Printers for metal components are used by industry to reduce product cost and improve performance. Together, these unique printing solutions work with the broadest spectrum of functional materials, ranging from electronic inks to structural metals and even biological matter. Optomec has more than 300 marquee customers around the world, targeting production applications in the Electronics, Energy, Life Sciences and Aerospace industries. For more information about Optomec, visit <http://www.optomec.com>.