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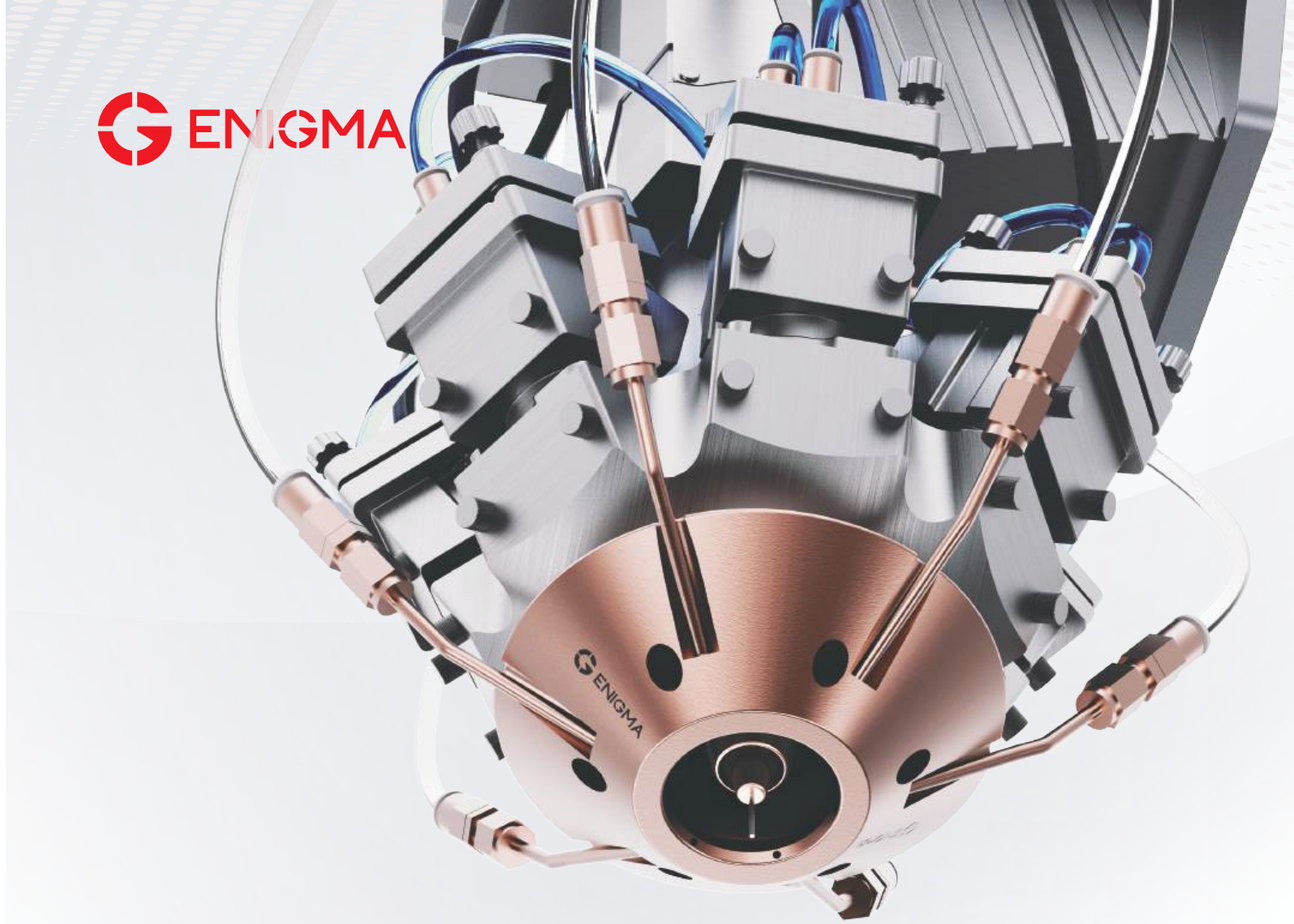

CML Hybrid

Coaxial Multi-Laser Hybrid Technology

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ENIGMA

CML-Hybrid-1500DF-ARC

多激光电弧同轴复合硬件系统

The coaxial multi-laser hybrid additive manufacturing system integrates six fully independent laser modules with an arc heat source, with six-channel powder/wire feeding systems. This achieves triple hybridization: multi-wavelength laser fusion, laser-arc synergy, and wire-powder combination.

The system enables cutting-edge DED applications including functionally graded materials, in-situ alloying additive manufacturing, high-throughput material development, and microstructure control. It simultaneously addresses industrial requirements by enhancing material compatibility, deposition efficiency, part accuracy, performance, and geometric complexity in DED engineering applications.

技术参数

Specifications

CML-Hybrid-1500DF-ARC			
Rated Power Output	1500W	Maximum wire heating current	undefined
Number of Lasers	6，individually controlled	Deposition efficiency	undefined
Powder Feed Channels	6，individually controlled	Deposition head dimensions	210 x 262 x 730 mm
AM Process	CML/CML-Hybrid	Deposition head weight	undefined
Laser Wavelengths	915 nm x 3 + 450 nm x 3	Wire diameter	0.8~2.0 mm
Spot Diameter	Φ 2 mm	Powder particle size	20~300 μm

01 Multi-Wavelength Coaxial Laser

- Fully independently controlled six laser modules enable multi-wavelength coaxial hybrid laser output.
- By combining typical wavelengths (e.g., red-blue hybrid), it broadens material compatibility, enhances absorption for reflective metals and remains cost-effective.

02 Laser-Arc Coaxial Hybrid

- Independently controlled laser-arc hybrid heat source enhances additive efficiency, component performance, and structural complexity.
- By alternating between the two processes, it combines laser precision with arc deposition efficiency, making it ideal for large-scale, geometrically complex metal additive manufacturing while ensuring high productivity and superior quality.

03 Wire-Powder Coaxial Hybrid

- The system combines wire feeding with six fully independent powder delivery channels to achieve independently controlled simultaneous wire-powder additive manufacturing.
- It enables highly flexible material ratio adjustment for rapid development of variable-composition gradient materials, nanoparticle-reinforced materials, and meets the high-throughput preparation requirements for new material development.