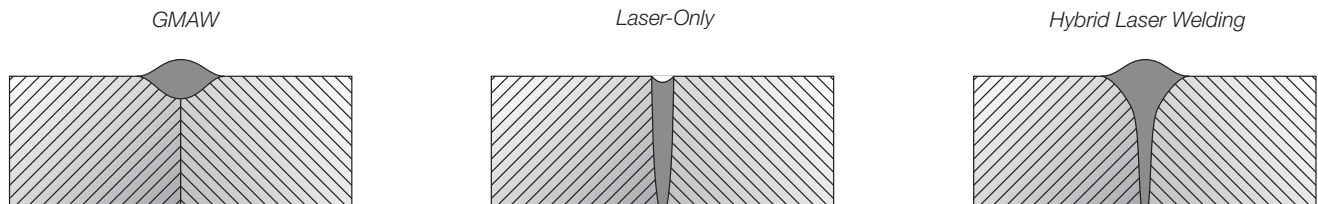
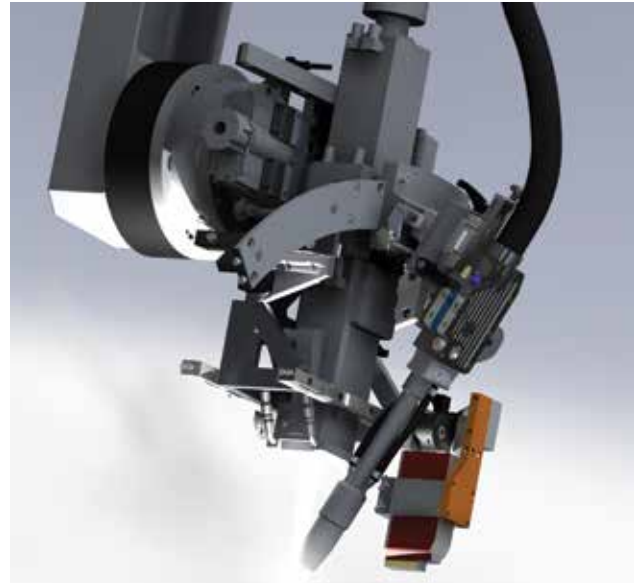


Hybrio™ - Hybrid Laser Welding

Laser and GMAW Welding Technology



- ESAB's Hybrid laser welding technology combines the deep weld penetration and low heat input associated with laser welding with the excellent weld properties and superior gap tolerance of gas metal arc welding (GMAW)
- A radically new welding alternative, it produces extremely narrow and deep welds at very high travel speeds
- In a single pass, the Hybrid process can often achieve what might require multiple weld passes using a conventional fusion welding process
- Heat input to the part is reduced, as is the associated weld shrinkage and distortion that can make post-welding geometry unpredictable and costly to repair
- Using GMAW in combination with a laser, the Hybrid process overcomes the limitations of laser-only welding with its ability to produce quality welds in joints with less-than-perfect fit-up between parts
- This enables a widened, more robust process envelope by a factor of three compared to a conventional laser-only process
- GMAW also allows users to add filler metal to adjust the weld's metallurgical properties and create beads and fillets, while the slower cooling rate reduces hardness
- These features are especially beneficial when joining high performance carbon and stainless steels
- ESAB's exclusive adaptive closed-loop control system detects joint fit-up conditions and changes the process parameters in real-time to achieve a constant weld profile; this broadens the process window by a further 5 times over non-adaptive control



Graphic illustrating differences between GMAW, Laser, and Hybrid Laser Welding weld profiles.

Ordering Information

For more information, please contact your nearest ESAB representative.

ESAB Welding and Cutting Products

USA: www.esabna.com / 1.800.ESAB.123 | Canada: www.esab.ca / 1.877.935.3226 | Mexico: www.esab.com.mx / (81) 8305-3700

Hybrio™ - Hybrid Laser Welding



Hybrio Flex

The Hybrio Flex flexible hybrid laser welding cell is based upon a modular, six-axis motion system platform that can be scaled to cover a large range of working envelopes up to 4 m x 20 m (13 ft. x 67 ft.) and longer. Additionally, this system can be configured to cover a range of z-axis depths from 1 m to 3 m (3 ft. to 10 ft.). This gives the user the flexibility to use the Hybrio Flex system for a large variety of product geometries and weld joint configurations.



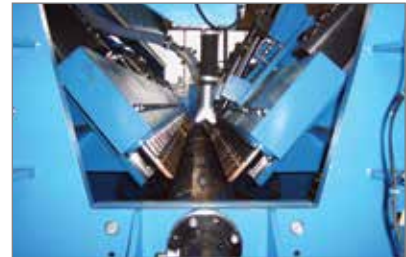
Hybrio Beam

The Hybrio Beam hybrid laser beam welding system is based upon ESAB's robust submerged arc beam welding systems that can be found in plants around the world. These systems come in horizontal and vertical configurations and are designed to center and feed web and flange parts through a fixed welding station. Components are aligned and pressed together ensuring excellent joint conditions at the point of welding. Equipped with the Hybrio process, these systems can out-produce traditional beam welding equipment by a factor of three to ten times, depending on the web thickness.



Hybrio Seam

Hybrio Seam hybrid laser seam welding systems cover a range of raw sheet and plate thicknesses and sizes from small sheet and coil joining systems to large panel line plate welding machines. These systems are designed to press and clamp sheet or plate joints into position as the Hybrio process moves along the joint, performing the weld. These systems can achieve single-side, full-penetration butt welds up to 12.5 mm (1/2 in.) in thickness in a single pass, and thicker, with subsequent passes.



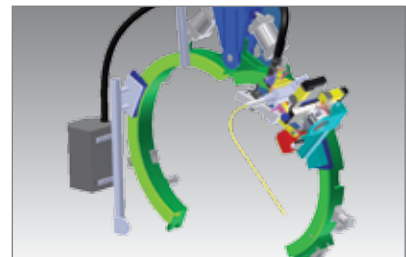
Hybrio Tube

Hybrio Tube hybrid laser tube and pipe systems are longitudinal seam welding systems designed to press the material together at the weld joint to achieve the fit-up needed for HLAW welding. The part is then drawn through the machine to perform the weld. These systems can produce straight or tapered tubes and pipes up to 1 m (3 ft.) in diameter and with wall thicknesses up to 12.5 mm (1/2 in.).



Hybrio Orbit

The Hybrio Orbit hybrid laser pipe girth welding system is specially designed for welding full pipe girths as well as for rapidly producing high-quality root passes for subsequent processing with traditional high-deposition processes. These are fully orbital welding systems, capable of 360 degree continuous welds around cylindrical products with very low clearances. The Hybrio Orbit system was specifically developed for the oil and gas industry, but has applications in many other industry segments.



Hybrio Process Package for Integrators

ESAB's Hybrio hybrid laser arc welding process technology leads the industry in ease of use and process robustness. ESAB has developed a fifth-generation welding system that is capable of sensing its environment, the joint location and fit-up, and then adapting the process in real-time to maintain high weld quality over a wide range of fit-up conditions. ESAB has built this technology into a complete process package that is available not only as part of our turnkey hybrid welding systems, but also to machine tool OEM and system integrators. ESAB provides the hybrid welding expertise along with the support of our Laser Process Centers in North America and Europe, to minimize the technical risk to our OEM and integration partners worldwide.