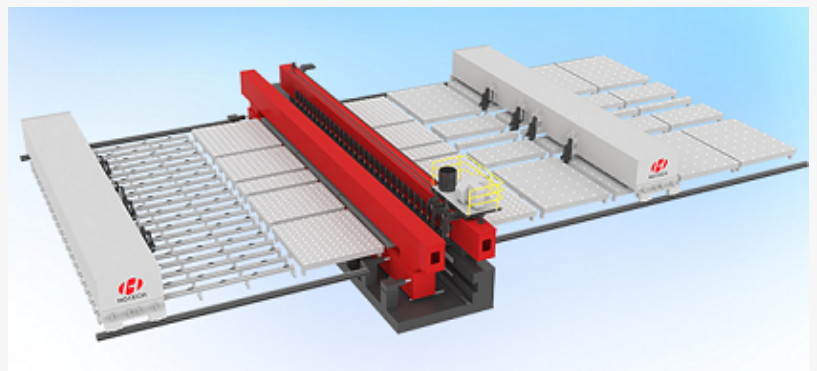
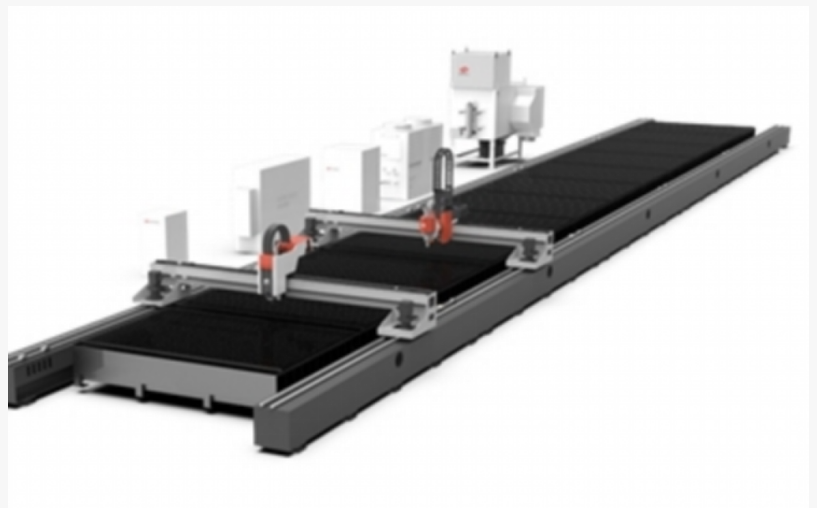


Smart Shipbuilding: Integrated Laser Cutting and Welding Technologies by HGTECH

WUHAN, HUBEI, CHINA, August 26, 2026 /EINPresswire.com/ -- The Digital Tide in Global Shipbuilding

The global shipbuilding industry is currently experiencing a powerful period of cyclical recovery. This resurgence coincides with a critical demand for digital, intelligent, and green transformations as shipyards strive to meet carbon neutrality goals. Within this landscape, China has emerged as a dominant force, securing the world's largest share of new orders for thirteen consecutive years. At the forefront of this industrial shift stands [HGTECH](#), a pioneer born from the prestigious Huazhong University of Science and Technology. Recognized as "China's first laser stock," HGTECH leverages national-level R&D platforms, including the National Key Laboratory of Laser Technology, to push the boundaries of maritime engineering. By offering a comprehensive [shipbuilding industry solution](#), HGTECH is effectively redefining the manufacturing workflow for modern vessels, moving away from labor-intensive methods toward a highly precise, automated "smart" ecosystem.



Efficiency in shipbuilding begins at the material preparation stage. Traditional marking and cutting methods often create bottlenecks, but HGTECH's integrated solutions streamline these processes through high-level automation. The company's printing and marking machines utilize 3D vision for precise positioning, achieving an assembly line accuracy of ± 1 mm. These systems support the simultaneous printing of hull numbers, part numbers, QR codes, and processing symbols at speeds up to 100m/min. This rapid preprocessing ensures that every steel plate carries a digital identity from the very start, facilitating seamless tracking throughout the production cycle.

Transitioning from marking to cutting, the WALC series (Wide-area Laser Cutting Machine) offers a definitive technological leap over traditional plasma systems. While plasma cutting often results in wider kerfs, the WALC series cuts 2-3 times faster on plates under 25mm. Designed specifically for large-format ship plates, these WALC systems feature five-axis linkage to execute complex bevels in a single pass, eliminating the need for secondary processing. Beyond performance, the economic advantage is significant; an analysis of five-year total costs reveals that laser systems are more cost-effective than plasma when accounting for electricity and consumables. Furthermore, HGTECH provides fully automated intelligent cutting production lines for bulb flats and deck plates, enabling complete automation from loading to finished profile cutting.

Mastering the Joint: Laser Hybrid Welding and Flexible Assembly

Once materials are cut to precision, the challenge shifts to structural integrity. Welding remains one of the most complex tasks in a shipyard, particularly when dealing with thin-plate deformation. HGTECH addresses this through advanced laser-MIG hybrid welding technology. By combining the deep penetration of a laser with the gap-bridging capabilities of MIG welding, this process minimizes total heat input. The result is a high-strength weld with a significantly smaller heat-affected zone, which effectively controls deformation in thin-plate sections. This technology is robust enough to support single-pass welding of steel plates over 25mm and multi-pass welding for thicknesses exceeding 60mm.

A core component of HGTECH's strategy is the automation of intermediate and small group assembly. The Small Group Assembly Welding Line utilizes high-power laser hybrid welding combined with vision sensors and embedded software to achieve precise seam tracking and trajectory correction. For more complex structures, the Intermediate Group Assembly Line integrates multi-robot collaborative systems and intelligent central control to handle the high-precision welding of transverse and longitudinal girders. These lines ensure consistent quality while significantly shortening the production cycle for vessel sub-blocks.

A Multitude of Automated Production Line Solutions

Beyond individual workstations, HGTECH has deployed a diverse array of automated production line solutions tailored for every stage of hull construction. The Thin Plate Flat Section Intelligent Production Line represents a breakthrough in digital manufacturing, integrating industrial IoT and intelligent scheduling to manage the flexible assembly of large-scale sections. For structural components, the T-beam Automatic Welding and Assembly Line automates the entire

sequence—from pre-assembly and positioning to automatic welding and correction. Furthermore, HGTECH offers specialized curved outer plate cutting lines and deck part production systems, ensuring that even the most geometrically complex parts of a ship are manufactured with digital precision. These interconnected systems form a cohesive "smart factory" framework that maximizes efficiency across the entire shipyard.

Beyond the Beam: AI-Driven "No-Teaching" Robots and Smart Logistics

The integration of Artificial Intelligence (AI) marks the latest evolution in HGTECH's portfolio. One of the most significant breakthroughs is the "no-teaching" welding and cutting robot system. Traditional robots require time-consuming manual programming or 3D model imports. In contrast, HGTECH's adaptive logic programming allows robots to automatically identify welding structures and match parameters without human intervention. This flexibility is ideal for the varied and complex geometries found in ship sections, such as longitudinals and ribs. Complementing this robotic precision is the "HG Nest" super-nesting software. This proprietary tool directly parses .gen files from major design software like Tribon and AM, optimizing material utilization to over 85%. When cutting is complete, AI-powered vision sorting systems take over. By utilizing machine vision and dot-matrix magnetic grippers, these systems achieve a sorting success rate of over 90% and improve overall efficiency by 21%. These digital tools ensure that the flow of parts from the cutting table to the assembly area is optimized for both speed and material economy.

Collaborating for a Smart Future

HGTECH continues to pursue its mission of "Innovation Fuels a Better World" through a comprehensive industrial layout known as "One Core, Two Tools, Three Equipments, and Four Intelligences". This strategy focuses on building an interconnected world where laser technology serves as the foundation for intelligent manufacturing. With a global service network spanning North America, Europe, Australia, and Southeast Asia, the company provides localized support and system solutions to international partners. As shipyards worldwide look toward a future of higher efficiency and lower environmental impact, HGTECH offers a proven path toward the realization of truly smart maritime manufacturing.

For more information and technical consultation, please visit: <https://www.hglaserglobal.com/>

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