

Welding Torch and Tip Changing Robotic Station Market: Current Analysis and Forecast (2024-2032)

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Abstracts

The Welding Torch and Tip Changing Robotic Station Market is witnessing a steady growth rate of 8.50% within the forecast period. The major factors boosting the growth of the market include the burgeoning adoption of automation in welding across several end-use industries. Due to the requirement of consistent and high-quality welds with increasing labor costs along with a boost in operational efficiency, the demand for robotic welding stations is increasing rapidly. Robotic welding stations for torch and tip change automate and reduce downtime, improve safety, and increase accuracy in very high-temperature, high-heat environments. Integrating advanced sensors and artificial intelligence into these robotic systems leads to better flexibility, performance, and further expansion in the marketplace. The entire world is completely shifting toward the establishment of Industry 4.0 and additional advantages of digitalization among various industries concerning practices in manufacturing, hence paving the way to adopt these solutions for better process and workflow optimization. For example, a welding robot was demonstrated, termed CRX-25iA cobot, along with another, called CRX-10iA/L cobot, by FANUC America in August 2023 since FANUC is a top leader in CNCs, robotics, and ROBOMACHINEs. Available from its latest advanced robotic technologies integrating cutting-edge new features such as ARC Mate 100iD robot as shown above with iRVision--for the accuracy of the application. According to FANUC, automated painting routines will be machines that will include robots for all spray coating processes across industries.

Based on torch models, the welding torch and tip-changing robotic station market is segmented into gas-cooled and water-cooled. In 2023, the gas-cooled segment was the largest in the market and would remain the same even in the forthcoming forecast period. Cost-efficient, user-friendly, and low-maintenance, gas-cooled torches have become popular with different industries, specifically

automotive and manufacturing. Gas-cooled torches offer a low-cost alternative for welding in situations where water cooling is more difficult due to special and operational constraints. With improvements in robotic technology, the efficiency and accuracy of gas-cooled systems have done much to keep them in demand. The emergence of automated and robotic welding systems has fostered interest among manufacturers in gas-cooled welding stations, which reduce downtime and promote productivity. The surge in demand for modular and flexible robotic systems is also a factor in the preference for gas-cooled torches due to their easy integration into an existing workflow. Due to advances in AI-driven welding systems as well as the development of energy-efficient solutions, the future looks bright for gas-cooled torches, which, in turn, will further speed up growth in the sector.

Based on torch type, the welding torch and tip-changing robotic station market is segmented into Arc welding, MIG welding, TIG welding, SMAW, laser welding, and plasma welding. The MIG welding segment dominated the market in 2023 and is expected to retain its dominance throughout the forecast period. This increased demand results from the usage of MIG welding, widely acceptable by industries like automotive, manufacturing, and construction, for the speed, ease, and capability to produce strong, clean welds on a great variety of materials. Such features make MIG welding a preferred technology for robotic systems since it can take advantage of multiple metals' capability of operation, including stainless steel and aluminum. Also, further adoption was seen in mass production because of their efficiency, specifically in automotive areas with high demands for welding operations in the facilities. The pairing of MIG welding and advanced robotics minimizes downtime while maximizing productivity, thereby making it great for mass production operations. On the other hand, TIG welding and laser welding also stand to gain on the growth scale because both could be used in their precision welding applications in various industries, such as aerospace and medical devices. These special types of welding are further being bolstered due to the trend towards smarter and automated welding solutions, with many of them being robotic with AI and IoT integration.

Based on automation type, the welding torch and tip-changing robotic station market is segmented into semi-automated and fully automated. Among them, the fully automated segment dominated the market in 2023 and is expected to continue leading during the forecast period. The need for precision, efficiency, and cost in welding operations for several industries, especially automotive, aerospace, and heavy manufacturing. Fully automated systems bring the high

potential of continuous high-speed production at very minimal human intervention-maximized outputs to provide consistently great quality welds. Such fully automated systems are exceedingly valuable to high-volume factories, where the repeated nature of the tasks demands their efficient and reliable implementation. Various advanced technologies, such as AI, machine learning, and real-time monitoring, are employed to ensure uninterrupted operation and to easily investigate and modify the necessary welding parameters for the respective task. Therefore, automation greatly reduces downtime, increases safety by keeping workers away from hazardous working environments, and lowers labor costs.

Based on end-use, the welding torch and tip-changing robotic station market is segmented into general engineering, automotive, construction, aerospace, and others. The automotive segment dominated in 2023 and is projected to maintain its leadership during the forecast period. In the automotive manufacturing sector, the need for accuracy is hovering over the growth prospects offered by robotic welding stations, which are often regarded as the better quality, mass production alternative toward speed and cost efficiency. As the automotive industry focuses on cost-cutting and accelerating throughput, working with a robotic welding station for torch or tip changes has become slightly more familiar. Robotic welding is an integral part of the automotive industry for applications such as chassis assembly and body welding, as well as producing structural components. Automation in these areas, in turn, offers shorter cycles, less human error, and greater precision essentials in meeting the industry's high levels of demand for vehicle production, particularly high-volume, high-quality output. The additional driving force behind welding torches and tip-changing robots is the increasing transition towards electric vehicles (EVs), which require precise welding processes for their battery assemblies and lightweight materials. The concurrent implementation of these systems will stream automotive manufacturers toward their efficiency capability. Therefore, it becomes the general principle to cut operational costs and comply with regulations on safety and environmental standards.

For a better understanding of the market of the welding torch and tip-changing robotic station market, the market is analyzed based on its worldwide presence in countries such as North America (The US, Canada, and Rest of North America), Europe (Germany, The UK, France, Italy, Spain, Rest of Europe), Asia-Pacific (China, Japan, India, Rest of Asia-Pacific), Rest of World. The North America region dominated the market and is expected to dominate in the

forecast period. The fast-increasing investment in the construction of various commercial and residential complexes is attributed to the growth of the market. The North America region, especially in the United States, is home to major bulk and broad-scale manufacturing sectors, such as automobiles, aerospace, and general engineering, which are the major users of these machines. This area places great importance on innovation and advanced manufacturing techniques, creating favorable conditions that cause a higher level of integration of robotics in production lines. Lincoln Electric and FANUC America are leading companies in the development of advanced robotic systems for welding and automation. Major OEMs and Tier 1 suppliers in North America are considered early adopters of robotic welding technologies. Automated welding technology can be used by these OEMs in several processes, from body-in-white assembly, to ensure consistency and scalability. The U.S. is also one of the mature markets where installed solar panels and windmills for power generation are under various sustainable energy initiatives by the U.S. government. Installation and fittings, as well as maintenance of such structures, need the welding torch at a great height, where the advanced tip-changing robotic station proves to be of great use.

Some of the major players operating in the market include FANUC CORPORATION, Panasonic Corporation, ABICOR BINZEL, Pemamek, KYOKUTOH Europe GmbH, Fronius International GmbH, IGM Robotersysteme AG, Nasarc Technologies, Inc., G.E. Schmidt, and Tokin Corporation.

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