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Fab Automation Market By Automated Material Handling Systems, Robotics & Handling Equipment, Equipment Control Software, Advanced Process Control, 200 mm, 300 mm, Integrated Device Manufacturers (IDMs), Foundries, and OSATs - Global Forecast to 2032

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Abstracts

The fab automation market is projected to reach USD 25.24 billion in 2025 and USD 41.44 billion by 2032, registering a CAGR of 7.3% between 2025 and 2032. The market is projected to witness substantial growth during the forecast period, driven by the increasing complexity of semiconductor manufacturing and the global push toward higher yields, faster cycle times, and greater operational consistency. Expanding 300 mm capacity, advanced-node production, and heterogeneous integration are accelerating the adoption of automated material handling systems (AMHS), robotics, manufacturing execution systems (MES), advanced process control (APC), yield management software (YMS), and AI-enabled analytics. These solutions enable fabs to achieve precision handling, real-time process optimization, and predictive maintenance, ensuring compliance with ultra-clean manufacturing standards. Growth is further supported by large-scale investments in new greenfield fabs, government semiconductor incentives, and the rising demand for chips powering AI, 5G, automotive electronics, and high-performance computing. However, high implementation costs, integration complexity, and the need for skilled technical resources may present operational challenges. Strengthening interoperability, modular deployments, and partnerships across the automation ecosystem will be essential to sustaining long-term market expansion.

“By end user, the outsourced semiconductor assembly & test (OSAT) providers

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segment is expected to register the highest CAGR between 2025 and 2032."

The outsourced semiconductor assembly and test (OSAT) providers segment is expected to register the highest CAGR in the fab automation market between 2025 and 2032, driven by the rapid growth of advanced packaging, heterogeneous integration, and chiplet-based architectures. OSAT facilities are experiencing rising demand for high-precision, contamination-free, and high-throughput automation solutions to support complex processes such as wafer-level packaging (WLP), fan-out technologies, 2.5D/3D stacking, and advanced test operations. To manage increasing device complexity and shrinking tolerances, OSATs are deploying Automated Material Handling Systems (AMHS), robotics, smart inspection systems, Manufacturing Execution Systems (MES), Advanced Process Control (APC), and AI-enabled analytics to enhance yield, reduce operational variability, and maintain traceability across packaging and test workflows. The expansion of AI, HPC, automotive electronics, and 5G applications is further driving OSAT customers to demand faster cycle times, scalable production, and higher reliability. As packaging becomes a critical differentiator in semiconductor performance, OSATs are accelerating investments in digital transformation, automation upgrades, and cleanroom optimization. The combination of rising outsourcing trends, advanced packaging demand, and the need for cost-efficient, high-volume production positions OSAT providers as a pivotal and fast-growing end-user segment in the global fab automation market.

"Based on offering, the hardware segment is projected to account for the largest market share in 2032."

The hardware segment is projected to account for the largest share of the fab automation market by 2032, driven by the rapid expansion of semiconductor manufacturing capacity and the increasing demand for high-throughput, contamination-controlled production environments. As fabs scale advanced-node and 300mm lines, demand for robust hardware, including automated material handling systems (AMHS), robotics, wafer-handling equipment, environmental control systems, power and utility automation systems, and communication and networking hardware, continues to rise. These systems form the physical backbone of automated fabs, enabling precise wafer transport, maintaining stable cleanroom conditions, ensuring uninterrupted utility management, and ensuring reliable equipment connectivity. The surge in logic, memory, and advanced packaging production driven by AI, HPC, automotive electronics, and 5G applications is further accelerating investments in automation hardware. Greenfield fabs in the Asia Pacific, the US, and Europe are increasingly prioritizing end-to-end automated infrastructure to ensure yield consistency, reduce

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cycle time, and enhance operational resilience. Additionally, the modernization of brownfield facilities is boosting the adoption of next-generation robotics, AMHS upgrades, and advanced contamination control systems. As semiconductor processes become more complex and throughput requirements rise, hardware will remain the foundational and most heavily invested offering within the global fab automation landscape.

“The Americas region is projected to exhibit the highest CAGR from 2025 to 2032.”

The Americas region is projected to exhibit the highest CAGR in the fab automation market from 2025 to 2032, driven by substantial investments in advanced semiconductor manufacturing, modernization of existing fabs, and renewed government focus on strengthening domestic chip production. The region, comprising the US and the Rest of the Americas, is advancing multiple greenfield and brownfield projects aimed at supporting leading-edge logic, memory, and heterogeneous integration technologies. As new fabs emphasize high-throughput, contamination-free, and energy-efficient operations, demand is rising for automated material handling systems (AMHS), robotics, environmental control systems, advanced metrology hardware, and factory communication infrastructure. The US leads regional growth, fueled by substantial capital expenditure from IDMs, foundries, and OSATs, alongside incentives under national semiconductor policies that prioritize automation, digital transformation, and workforce optimization. Increasing adoption of sub-10 nm and EUV-enabled processes is further accelerating the need for precision handling equipment and intelligent automation platforms. Meanwhile, countries in the Rest of the Americas are expanding backend assembly, test, and packaging capabilities, creating additional demand for scalable, cost-efficient automation solutions. Collectively, strong policy support, rising semiconductor consumption, and large-scale capacity expansion position the Americas as a high-growth hub for next-generation fab automation.

The break-up of the profile of primary participants in the fab automation market-

By Company Type: Tier 1 – 35%, Tier 2 – 45%, Tier 3 – 20%

By Designation: C-level Executives – 40%, Directors – 30%, Others – 30%

By Region: Americas – 40%, EMEA – 25%, Asia Pacific – 35%

Note: Other designations include sales, marketing, and product managers.

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The three tiers of the companies are based on their total revenues as of 2024: Tier 1: >USD 1 billion, Tier 2: USD 500 million–1 billion, and Tier 3: USD 500 million.

The major players in the fab automation market with a significant global presence include Daifuku (Japan), Murata Machinery (Japan), Atlas Copco (Sweden), Rorze Automation (Japan), and Ebara (Japan).

Research Coverage

The report segments the fab automation market and forecasts its size by offering, deployment type, wafer size, end user, and region. It also comprehensively reviews the drivers, restraints, opportunities, and challenges that influence market growth. The report encompasses both qualitative and quantitative aspects of the market.

Reasons to Buy the Report:

The report will help the market leaders/new entrants with information on the closest approximate revenues for the overall fab automation market and related segments. This report will help stakeholders understand the competitive landscape and gain valuable insights to strengthen their market position and develop effective go-to-market strategies. The report also helps stakeholders understand the pulse of the market, providing them with information on key market drivers, restraints, opportunities, and challenges.

The report provides insights into the following pointers:

Analysis of key drivers (expansion of advanced-node and EUV-enabled manufacturing requiring high-throughput automation; rapid growth in 300 mm fab capacity; rising process complexity across logic, memory, and advanced packaging; increasing adoption of AI/ML-driven predictive analytics and digital-twin platforms; government incentives accelerating greenfield fab construction), restraints (high capital expenditure for automation hardware and integration; limited interoperability between legacy and next-generation systems; shortages of skilled automation and software specialists; extended equipment lead times due to vendor concentration), opportunities (deployment of advanced automation for 2.5D/3D packaging and heterogeneous integration; emergence of autonomous, AI-enabled fabs; large-scale automation demand from new fabs in the US, Asia, and Europe; adoption of modular AMHS and collaborative

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robotics; sustainability-focused automation solutions for energy and cleanroom efficiency), and challenges (stringent ultra-clean manufacturing requirements increasing contamination and reliability risks; integration complexity across multi-vendor MES, APC, YMS, and AMHS ecosystems; maintaining automation performance at high wafer volumes and EUV process sensitivities; geopolitical disruptions affecting semiconductor equipment supply chains; high complexity and cost of modernizing brownfield fabs without production impact)

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and strategies such as new product launches, expansions, contracts, partnerships, and acquisitions in the fab automation market

Market Development: Comprehensive information about lucrative markets–the report analyses the fab automation market across varied regions

Market Diversification: Exhaustive information about new products, untapped geographies, recent developments, and investments in the fab automation market

Competitive Assessment: In-depth assessment of market shares, growth strategies, and product offerings of leading players, including Daifuku (Japan), Murata Machinery (Japan), Atlas Copco (Sweden), Rorze Automation (Japan), Ebara (Japan), FANUC (Japan), Kawasaki Heavy Industries (Japan), Hirata Corporation (Japan), Yaskawa (Japan), and KUKA AG (Germany).

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Contents

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6 TECHNOLOGICAL ADVANCEMENTS, AI-DRIVEN IMPACT, PATENTS, INNOVATIONS, AND FUTURE APPLICATIONS

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17 COMPETITIVE LANDSCAPE

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List Of Tables

LIST OF TABLES

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List Of Figures

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