
INDUSTRY OVERVIEW

Certain information and statistics set out in this section and elsewhere in this document are derived from various government and other publicly available sources and from the market research report prepared by Frost & Sullivan. We believe that the sources of such information and statistics are appropriate for such information and statistics and have taken reasonable care in extracting and reproducing such information and statistics. We have no reason to believe that such information and statistics are false in any material respect or misleading or that any fact has been omitted that would render such information or statistics false in any material respect or misleading. None of our Company, the Sole Sponsor, the [REDACTED], the [REDACTED], the [REDACTED], the [REDACTED] and the [REDACTED], any of our or their respective directors, officers, employees, agents or advisers has verified the information and statistics from official government sources, thus makes no representation as to the accuracy, fairness and completeness of the information and statistics from official government sources. Accordingly, information and statistics from official government sources should not be unduly relied upon.

SOURCE OF INDUSTRY INFORMATION

We have engaged Frost & Sullivan, an independent market research consultant, to conduct a detailed analysis on Global and China’s industrial robot market, Global and China’s high-speed industrial robot market and prepare a report for use in this document, for which we have agreed to pay an engagement fee of RMB600,000, which we believe to be consistent with market rates.

In compiling and preparing the Frost & Sullivan Report, Frost & Sullivan adopted the following assumptions: (i) global social, economic and political environment is likely to remain stable in the period of 2024 to 2029 (the “forecast period”); (ii) purchasing power is expected to continue to rise moderately in emerging regions and to grow steadily in developed regions; and (iii) related industry key drivers are likely to drive the market in the forecast period.

Except as otherwise noted, all of the data and forecasts contained in this section are derived from the Frost & Sullivan Report. Frost & Sullivan has prepared the Frost & Sullivan Report based on detailed primary research which involved discussing the status of the Global and China’s industrial robot market and Global and China’s high-speed industrial robot market with certain leading industry participants and secondary research which involved reviewing company reports, independent research reports and data based on its own research database. Our Directors confirm that, after taking reasonable care, there has been no material adverse change in the overall market information since the date of the Frost & Sullivan Report that would materially qualify, contradict or have an impact on such information.

INDUSTRY OVERVIEW

OVERVIEW OF GLOBAL INDUSTRIAL ROBOT MARKET

Definition and Classification

Industrial Robot refers to automatically controlled, reprogrammable mechanical device with multi-degree-of-freedom manipulation capabilities, which can be either fixed in place or fixed to a mobile platform for use in automation applications in an industrial environment.

By mechanical structure, industrial robots can be primarily categorised into (i) articulated robots, (ii) SCARA robots, (iii) parallel robots, and (iv) collaborative robots.

- **Articulated Robot** is constructed with at least three rotary joints connected in series. With a structure that imitates a human arm, articulated robot can perform intricate trajectory motions in three-dimensional space.
- **SCARA Robot** (Selective Compliance Assembly Robot Arm) is characterised by two parallel rotary joints to achieve precise positioning in the horizontal plane and typically a linear joint in the vertical direction for Z-axis movement. Its mechanical structure features selective compliance in the horizontal plane, enabling adaptive compensation for minor positional errors in the XY-axis direction, while maintaining high rigidity in the vertical direction.
- **Parallel Robot** is based on parallel kinematic mechanisms, in which the end-effector is driven simultaneously by multiple independent kinematic chains forming closed-loop structures. This design achieves precise control of end-effector position and orientation through coordinated parallel motion, providing advantages including high stiffness and dynamic response.
- **Collaborative Robot**, commonly known as “Cobot”, is a type of industrial robot capable of working safely and in close proximity to humans within a shared workspace. Unlike traditional industrial robots, which are typically isolated behind safety fences and perform tasks independently, collaborative robots employ advanced safety technologies — such as force feedback, collision detection and speed limitation — to ensure safety during human interaction.

The rigid demands for motion cycle time in certain downstream industrial applications have led to the emergence of high-speed industrial robots. Classified by the core performance metric of motion cycle time, the domain of high-speed industrial robotics is primarily defined by two mechanical structures: parallel robots and SCARA robots. These two structures are particularly suitable for high-speed development due to their inherent kinematic and structural characteristics as following.

- **Parallel robots** feature multiple kinematic chains operating simultaneously to control the end effector. This design results in low moving mass, high stiffness, and an excellent dynamic response, making them exceptionally well-suited for ultra-high-speed pick-and-place and other demanding high-cycle rate applications.

INDUSTRY OVERVIEW

The parallel architecture is inherently designed for high-speed operation; therefore, all parallel robots are classified as high-speed industrial robots.

- **SCARA robots** employ a rigid vertical axis combined with compliant horizontal motion, enabling fast planar movement with high repeatability, which makes them highly effective in short-cycle assembly and handling tasks.

Importantly, not all SCARA robots are categorised as high-speed. In the context of high-speed applications, this classification generally applies to models specifically engineered to achieve a cycle time of 0.4 seconds or less.

At the current stage of industrial application, articulated robots and collaborative robots are not systematically classified within the high-speed robot category. This is primarily due to their underlying design architectures and application positioning, which do not prioritise extreme motion cycle rates as a core performance objective. Articulated robots are structurally optimised for payload capacity, multi-axis flexibility, and wide working envelopes, enabling complex spatial operations rather than ultra-high-frequency repetitive motion. Collaborative robots, place human-robot interaction safety as a fundamental requirement, with speed, force, and power constraints embedded into their control and safety systems. These structural and regulatory constraints objectively limit their ability to pursue high-speed operation as a dominant design target at the present stage, making their core value proposition fundamentally different from architectures that are purpose-built for extreme cycle time performance.

Looking forward, the speed performance of both articulated and collaborative robots is expected to improve as enabling technologies continue to evolve. Advances in high-precision motion control, real-time sensing, AI-based perception, adaptive safety systems, and control algorithms are gradually reducing the traditional trade-offs between speed, safety, and flexibility. As safety architectures become more intelligent and dynamic, and as control systems achieve higher responsiveness and stability, certain articulated and collaborative robot platforms will increasingly be capable of supporting higher operational speeds without compromising safety and functional reliability. As a result, high-speed capability is expected to become an emerging performance dimension within selected segments of these robot categories, reflecting a structural convergence between traditional flexible architectures and high-throughput industrial automation demands.

Value Chain Analysis of Industrial Robot Market

The industrial robot market is a highly interdisciplinary and technology-intensive sector, encompassing materials science, electrical engineering, mechanical engineering, control theory, computer science, AI and software engineering, all of which collectively support the full realisation of industrial robots from R&D and manufacturing to practical deployment.

The value chain of the industrial robot market can be systematically divided into three core segments.

INDUSTRY OVERVIEW

- ***Up-stream: Suppliers of Basic Materials & Core Components & Software***

The upstream of the industry chain forms the technological and resource base of the industrial robot industry. Its development directly shapes the performance limits and cost structure of robot hardware.

Raw materials include structural materials such as high-performance alloys and carbon fibre composites, and key functional and auxiliary materials such as rare-earth permanent magnets materials, semiconductor materials, electrical component materials, seals and coating materials, whose supply stability and technological progress are essential for industrial security.

Core components covering electronic hardware (chips, PCBs, etc), controllers, reducers, sensors, actuators and drive systems (motors, drives, encoders) form the physical basis for motion control, perception and interaction.

In terms of software and algorithms, upstream suppliers mainly provide foundational, generalised software platforms and technologies, including real-time operating system kernels, simulation tools, industrial communication frameworks, general human-machine interfaces (HMI), and various foundational libraries of motion control, perception and decision-making algorithms, constituting the technological substrate for secondary development and application integration.

- ***Mid-stream: Industrial Robot Manufacturers & System Integrators***

The midstream segment of the industrial robot value chain serves as the key link between upstream core components and downstream applications, and mainly comprises robot body manufacturers and system integrators.

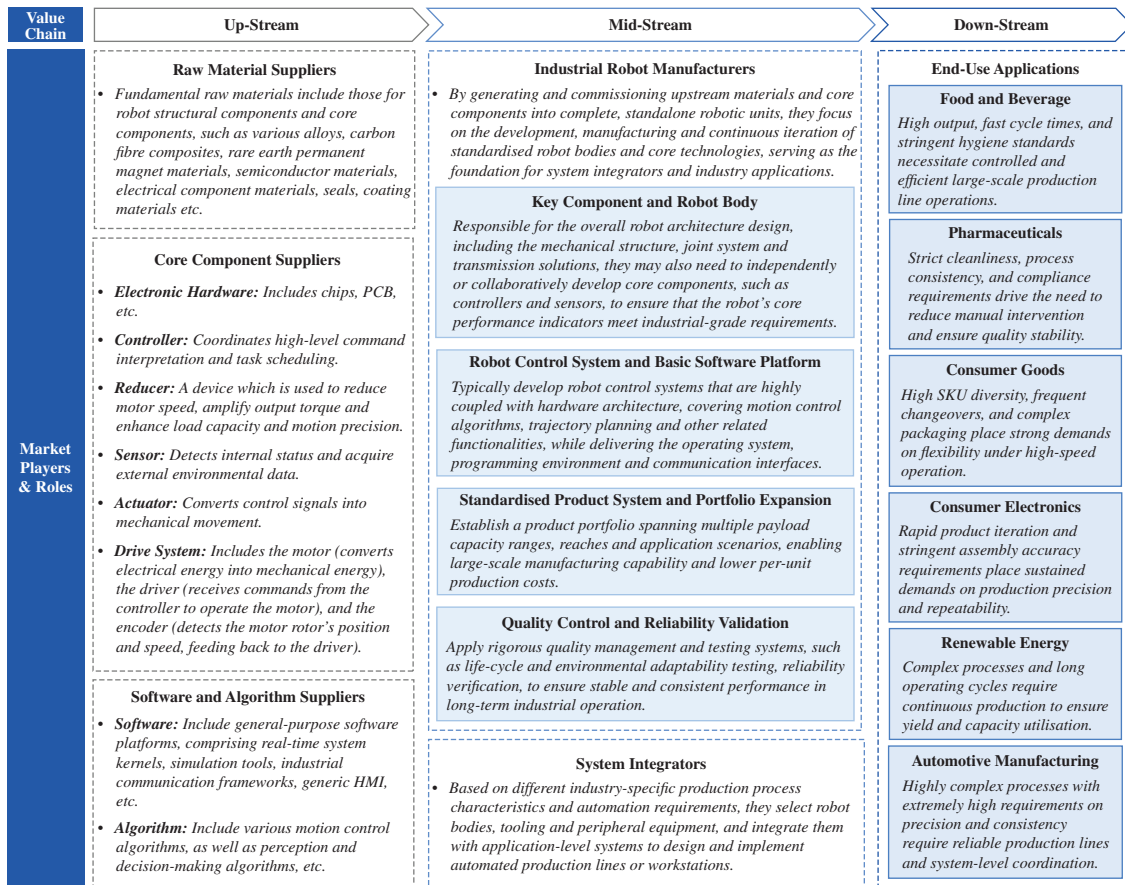
Robot body manufacturers occupy a central position, integrating upstream inputs to carry out the R&D, manufacturing, and iteration of standardised robot platforms. Their core functions include the design of mechanical structures, the development of highly coupled control systems, the implementation of motion control and vision algorithms, and the construction of standardised product portfolios across multiple payloads and application scenarios. To ensure overall performance and system compatibility, body manufacturers often extend upstream through in-house development or close collaboration with core component suppliers to jointly develop controllers, sensors and other core components, enabling high hardware — software integration and performance optimisation.

System integrators, in addition, operate close to end-user industries and are responsible for application-level integration and solution deployment based on the production processes and automation requirements of different sectors. Their primary tasks include selecting appropriate robot bodies, end-effectors, and peripheral equipment for specific use cases, designing automated production lines or workstations, and performing system integration and commissioning to ultimately deliver fully operational robot application solutions.

INDUSTRY OVERVIEW

- **Down-stream: End-use Applications**

Downstream end-use applications of industrial robots primarily span consumer goods, food and beverage, pharmaceutical, consumer electronics, renewable energy and automotive manufacturing. Owing to differences in production characteristics, these industries impose differentiated requirements on robot systems, and drive technological iteration and overall industry development across the value chain.



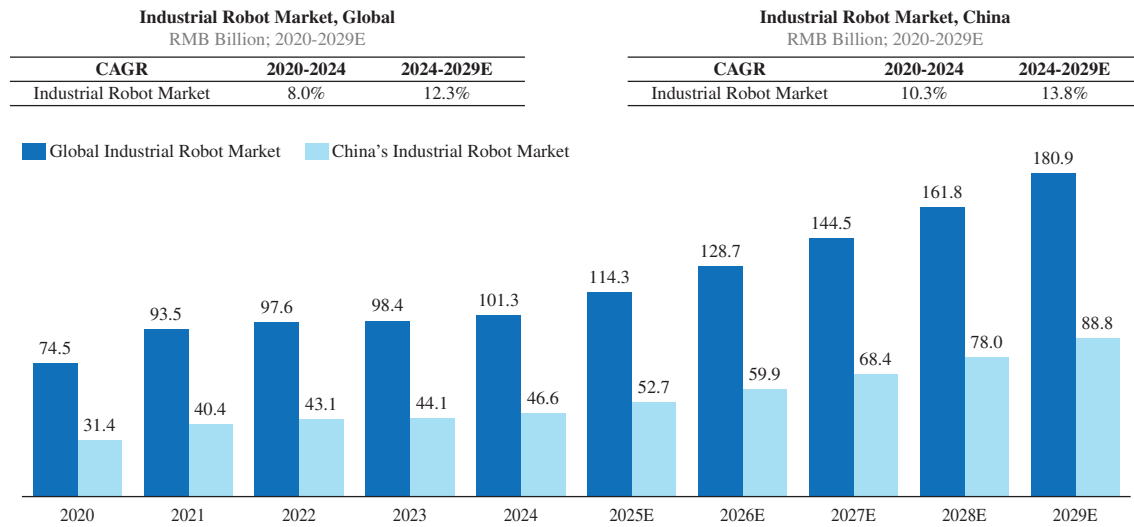
Source: Frost & Sullivan Analysis

Global and China's Industrial Robot Market

Industrial robot is the cornerstone of advanced manufacturing, enabling production systems to evolve toward higher levels of intelligence, automation and flexibility. Against the backdrop of the sustained advancement of intelligent manufacturing and structurally rising labour costs in the manufacturing sector, industrial robots have increasingly been adopted as critical automation equipment to replace repetitive, labour-intensive and hazardous tasks, thereby supporting improvements in production efficiency, process stability and product quality. In 2021, both the global and China's industrial robot markets experienced a pronounced surge, with year-on-year growth in shipment values reaching approximately 25.5% and 28.5%, respectively. This rapid expansion was primarily driven by the explosive growth of

INDUSTRY OVERVIEW

downstream demands, most notably the new energy vehicle (NEV) sector. In the same year, global and China’s NEV sales volume increased by approximately 102.4% and 157.6% year on year, significantly accelerating capital investment and capacity expansion in vehicle manufacturing and power battery production, and in turn stimulating a concentrated release of demand for industrial robots across key manufacturing processes.



Source: Frost & Sullivan Analysis and Estimates

Note: The market size refers to the total shipment value of industrial robots.

From 2020 to 2024, both global and China’s industrial robot shipment values exhibited a clear upward trajectory, increasing from approximately RMB74.5 billion and RMB31.4 billion to approximately RMB101.3 billion and RMB46.6 billion, with CAGRs being approximately 8.0% and 10.3%, respectively. Over the same period, China’s share of the global industrial robot shipment value increased from roughly 42.2% to 46.0%, reflecting its strengthening position in the global industrial robot market.

Looking ahead, the growth momentum of the industrial robot market is expected to be sustained, underpinned by the continued deepening of intelligent manufacturing, ongoing labour cost pressures, and the accelerating automation upgrade across a broad range of industries. The global industrial robot shipment value is forecast to reach approximately RMB180.9 billion by 2029, while China’s shipment value is expected to increase to approximately RMB88.8 billion, reinforcing China’s position as the world’s largest industrial robot market and underscoring the long-term structural demand for industrial robots amid manufacturing transformation and upgrading.

INDUSTRY OVERVIEW

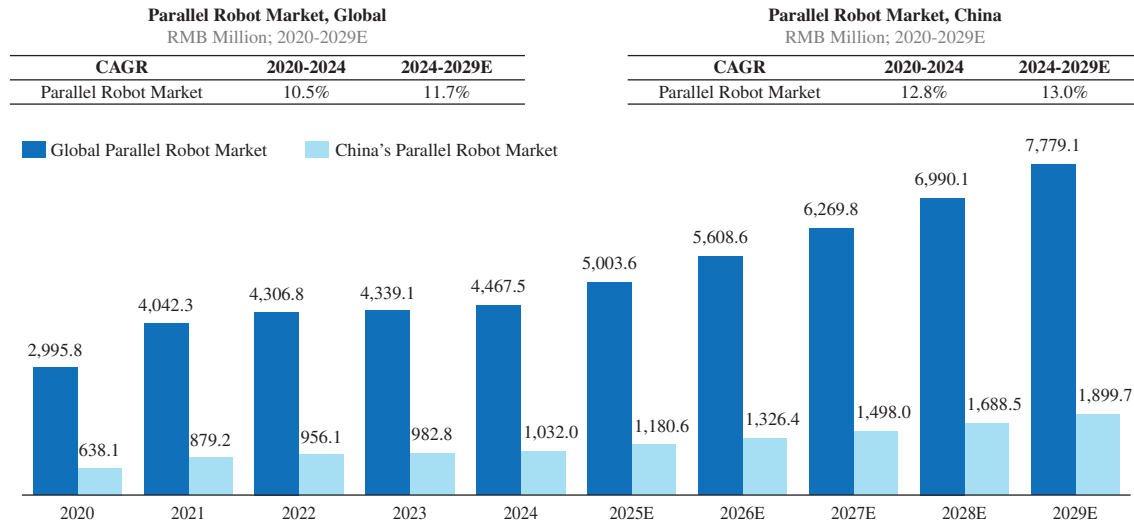
Global and China's Parallel Robot Market

The growth of the parallel robot market stems from its irreplaceable performance advantages in specific high-demand scenarios. Unlike versatile industrial robots, parallel robots excel in processes requiring extreme speed, precision, and dynamic stability, such as high-throughput sorting, rapid assembly, and high-speed packaging. These are often production bottlenecks where traditional solutions struggle to balance efficiency and reliability. From 2020 to 2024, the global and China's parallel robot shipment values increased from approximately RMB2,995.8 million and RMB638.1 million to approximately RMB4,467.5 million and RMB1032.0 million, respectively.

From a growth perspective, the parallel robot market exhibits a clear pattern of deepening development. On the one hand, in proven core application areas such as food & beverage and pharmaceutical, penetration rates continue to rise, with adoption expanding from leading customers and benchmark production lines to broader industry use cases, thereby driving a transition toward scaled deployment. On the other hand, supported by ongoing improvements in core component performance and system-level control capabilities, parallel robots are gradually extending into emerging applications with more demanding process requirements, including micro-assembly of consumer electronics components and semiconductor back-end processes. These scenarios, characterised by higher requirements for precision stability and takt-time consistency, are becoming important sources of incremental demand. Overall, the primary driver of the parallel robot market stems from downstream manufacturing's sustained pursuit of extreme production speeds, superior consistency and enhanced process controllability. In such applications, parallel robots are evolving from tools for efficiency optimisation into critical foundational equipment that underpins production line capacity and yield performance, significantly strengthening both their market position and demand certainty.

By 2029, the global parallel robot shipment value is expected to reach approximately RMB7,779.1 million. Driven by sustained investment in high-throughput automated production lines and faster penetration into high-value application scenarios, China's parallel robot shipment value is projected to reach approximately RMB1,899.7 million with a higher CAGR of approximately 13.0% from 2024 to 2029, outpacing global market growth.

INDUSTRY OVERVIEW



Source: Frost & Sullivan Analysis and Estimates

Note: The market size refers to the total shipment value of parallel robots.

Global and China's SCARA Robot Market

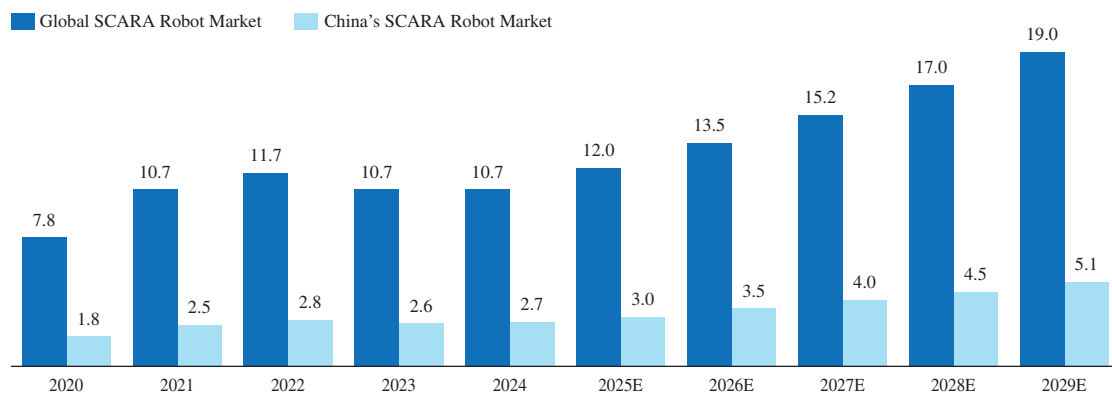
SCARA robots' horizontal flexibility and vertical rigidity give them performance advantages that have driven widespread use in precision assembly, material handling, and positioning inspection. Market demand has closely followed key downstream sectors, with consumer electronics and renewable energy leading growth. In consumer electronics, shorter product cycles and higher precision requirements sustain strong demand for automated assembly and high-speed dispensing. In renewable energy, rapid expansion of battery production and process standardisation have spurred equipment demand in cell sorting, module assembly, and PACK. As global capacity and supply chains concentrate in China, China's SCARA market growth has become closely tied to these strategic industries.

Between 2020 and 2024, the SCARA robot market has exhibited a fluctuating trend, with the global and China's markets eventually rising from approximately RMB7.8 billion and RMB1.8 billion in 2020 to approximately RMB10.7 billion and RMB2.7 billion in 2024, primarily driven by the cyclical nature of the downstream consumer electronics industry. Over this period, the consumer electronics sector, which is the largest application sector for SCARA robots, experienced noticeable market volatility due to a combination of factors, including changes in the global macroeconomic environment, structural adjustments in end-user demand, and periodic fluctuations in the supply chain. However, the overall global SCARA robot market achieved a CAGR of approximately 8.3%, while China's market grew at a CAGR of approximately 11.0%, exceeding the global average. This clearly reflects the leading growth momentum of China's market driven by the country's dominant position in the global supply chains, and underscores the continuing value of SCARA robots in high-frequency, standardised processes.

INDUSTRY OVERVIEW

Looking ahead, With the accelerated pace of product technology iterations, the intelligent upgrade driven by deep AI integration, and the continued expansion of emerging products such as wearable devices, the consumer electronics industry is expected to gradually emerge from its adjustment phase and enter a new cycle of steady recovery. As a result, SCARA robots are expected to maintain strong penetration potential across multiple industries and application scenarios. The global and China’s SCARA robot shipment values are projected to continue growing at a CAGR of roughly 12.2% and 14.0%, reaching approximately RMB19.0 billion and RMB5.1 billion by 2029.

SCARA Robot Market, Global <small>RMB Billion; 2020-2029E</small>			SCARA Robot Market, China <small>RMB Billion; 2020-2029E</small>		
CAGR	2020-2024	2024-2029E	CAGR	2020-2024	2024-2029E
SCARA Robot Market	8.3%	12.2%	SCARA Robot Market	11.0%	14.0%



Source: Frost & Sullivan Analysis and Estimates

Note: The market size refers to the total shipment value of SCARA robots.

Global and China’s Collaborative Robot Market

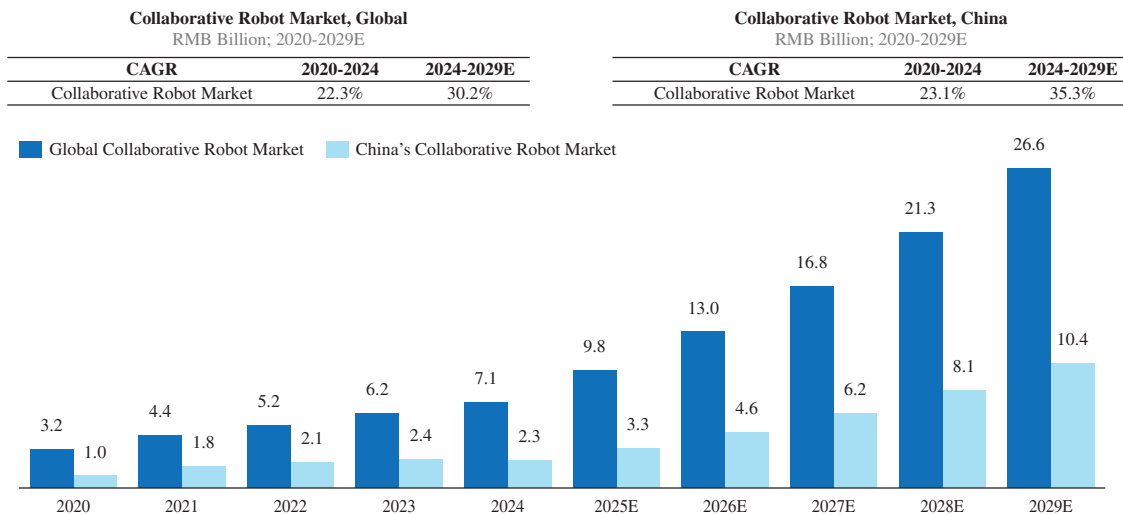
Collaborative robots, as a key development direction in industrial automation, derive their core technological value from the ability to work safely alongside humans in shared spaces. Compared with traditional industrial robots, collaborative robots offer significant advantages in safety, ease of deployment, and operational flexibility, filling the application gap between conventional industrial robots and purely manual operations. Over the past few years, the global and China’s collaborative robot shipment values have experienced explosive growth, rising from approximately RMB3.2 billion and RMB1.0 billion in 2020 to approximately RMB7.1 billion and RMB2.3 billion in 2024, corresponding to CAGRs of approximately 22.3% and 23.1%, respectively, from 2020 to 2024, reflecting the rapid release of market demand.

Currently, the market demand is rapidly expanding from early-stage applications such as simple material handling and loading/unloading to more complex processes including precision assembly, inspection, and packaging, with collaborative robots’ particularly strong advantages in small-batch, multi-product mixed production scenarios. Meanwhile, modular design and

INDUSTRY OVERVIEW

open interfaces are lowering deployment barriers, while AI-powered vision and force control enhance their ability to perform complex tasks. This is extending their use in precision assembly, quality inspection, and material handling, driving adoption from isolated applications toward full production line integration.

The forecast period indicates an accelerated growth trajectory, with the global and China’s collaborative robot shipment values projected to reach approximately RMB26.6 billion and RMB10.4 billion by 2029, representing CAGRs of around 30.2% and 35.3%, respectively, from 2024 to 2029. This acceleration is underpinned by the increasing penetration of collaborative robots in higher-value applications, the expansion of downstream industries embracing flexible and intelligent manufacturing, and the continuous evolution of AI-enabled capabilities, highlighting the long-term growth potential of collaborative robots within industrial automation systems.



Source: Frost & Sullivan Analysis and Estimates

Note: The market size refers to the total shipment value of collaborative robots.

Between 2020 and 2024, the combined market for parallel, SCARA and collaborative robots expanded steadily, with the global market increasing from approximately RMB13.9 billion to approximately RMB22.2 billion, while China’s market grew from approximately RMB3.4 billion to approximately RMB6.0 billion. Driven by the accelerating adoption of intelligent manufacturing, this segment is expected to maintain strong momentum, with the global and China’s markets projected to reach roughly RMB53.3 billion and RMB17.4 billion by 2029, representing CAGRs of approximately 19.1% and 23.8%, respectively, from 2024 to 2029.

INDUSTRY OVERVIEW

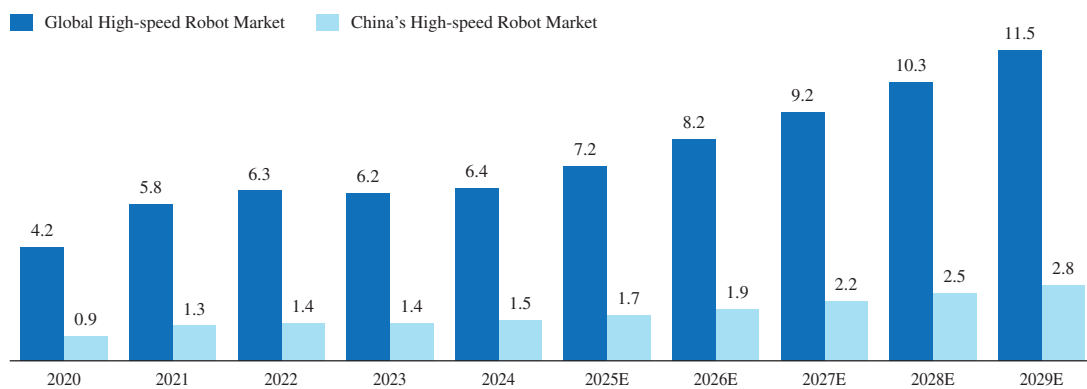
At the industry level, robot manufacturers are undergoing a strategic shift in response to the growing downstream demand for integrated solutions. This evolution reflects growing customer demand for integrated automation systems that combine hardware, software, and process expertise to improve deployment efficiency and overall value creation. Furthermore, the continued advancement of AI and embodied intelligence is expected to further expand the addressable market for industrial robots. Enhancements in perception, control, and autonomous decision-making capabilities are likely to broaden application scenarios and unlock additional long-term growth potential for the industrial robotics market.

Global and China’s High-speed Industrial Robot Market

High-speed industrial robots refer to a category of industrial robots designed with high cycle rates, high end-effector speeds, and high acceleration as their core performance objectives. They are primarily deployed in industrial scenarios characterised by short operating cycles, highly repetitive tasks, and stringent requirements for throughput per unit time. The core value of high-speed Industrial Robot lies in significantly reducing single-cycle operation time while maintaining the required levels of precision and operational stability, thereby enhancing overall production line capacity and improving equipment overall equipment effectiveness.

High-speed industrial robots are increasingly emerging as a key development direction in the technological evolution of industrial robots, driven primarily by the manufacturing sector’s sustained demand for higher throughput efficiency, lower unit production costs, and stable capacity output. Between 2020 and 2024, the global and China’s high-speed industrial robot markets experienced steady growth, with shipment values rising from approximately RMB4.2 billion and RMB0.9 billion to approximately RMB6.4 billion and RMB1.5 billion, respectively. The period from 2022 to 2024 saw slight market fluctuations, mainly attributable to the volatility in the aforementioned SCARA robot segment.

High-speed Industrial Robot Market, Global <small>RMB Billion; 2020-2029E</small>			High-speed Industrial Robot Market, China <small>RMB Billion; 2020-2029E</small>		
CAGR	2020-2024	2024-2029E	CAGR	2020-2024	2024-2029E
High-speed Industrial Robot Market	10.9%	12.5%	High-speed Industrial Robot Market	13.2%	14.0%



Source: Frost & Sullivan Analysis and Estimates

INDUSTRY OVERVIEW

Note: The market size refers to the total shipment value of high-speed industrial robots.

Specifically, the sustained growth of high-speed industrial robots is predominantly fuelled by the increasing demands of downstream sectors. In the food and beverage industry, high-speed pick-and-place operations for flexible packaging, sorting, and bottling are essential to meet high-volume throughput. The consumer goods and cosmetics sector rely on rapid yet delicate handling for filling, capping, and assembly. In pharmaceutical, stringent cleanroom standards and the need for precise manipulation in packaging and sterile handling drive adoption. Furthermore, the automotive industry, especially with the shift toward electric vehicles, requires these robots for battery assembly, power electronics manufacturing, and precision component placement. These diverse, sector-specific requirements, along with pressures to shorten cycle times and enhance production flexibility, continue to accelerate the deployment of high-speed SCARA and parallel robots in automated production environments.

Looking forward, as control precision, payload optimisation, and vibration damping continue to improve, high-speed industrial robots are expected to extend into assembly, inspection, and selected precision manufacturing processes, with their application boundaries set to expand further. Both the global and China’s high-speed industrial robot markets are projected to grow at an accelerated pace, at CAGRs of approximately 12.5% and 14.0% from 2024 to 2029, reaching approximately RMB11.5 billion and RMB2.8 billion by 2029, respectively.

COMPETITIVE LANDSCAPE OVERVIEW

Growth Drivers of China’s High-speed Industrial Robot Market

- **Labour Structure Shifts and Rising Costs:** Global manufacturing is increasingly challenged by structural changes in labour supply. In traditional manufacturing hubs such as China, growth in the working-age population has slowed, and labour costs continue to rise. Against this backdrop, industrial robots offer advantages in terms of predictable operating costs, consistent output quality and continuous operation, resulting in a favourable total cost of ownership profile. Within this category, high-speed industrial robots — characterised by rapid motion execution, compact structures, and flexible deployment — are increasingly adopted in applications requiring high-frequency operations, repetitive tasks, and rapid production cycles. Their core value lies in directly reducing reliance on manual labour and associated operational risks, while ensuring production continuity and quality stability, which in turn enhances cost predictability and controllability.
- **Downstream Demand for Responsive and Efficiency-driven Production Lines:** As manufacturing trends increasingly toward product diversification and customisation, downstream sectors emphasise not only production flexibility and agility, but also greater efficiency in cycle time, throughput, and equipment utilisation. High-speed industrial robots, with their rapid motion execution and high repeatability, combined with programmable operation and modular integration, can be deployed as highly efficient

INDUSTRY OVERVIEW

production modules. When equipped with adaptive end-effectors, they enable quick reconfiguration and fast changeovers, effectively supporting high-frequency product switching, multi-variant batch production, and complex high-speed processes. Their role is critical in achieving both high throughput and adaptive manufacturing, serving as a key enabler of efficient, resilient and responsive production lines.

- **Advances across Multiple Disciplines Underpin the Intelligence of Robots:** Improvements in the performance and cost efficiency of core hardware provide a solid foundation for achieving higher levels of precision, speed and reliability in robot execution. In parallel, rapid progress in perception algorithms, machine vision, motion control algorithms, and other AI algorithms has significantly enhanced robots’ capabilities in environmental perception, motion capabilities and information processing. Breakthroughs in hardware performance enable the stable deployment of increasingly complex algorithms, while advanced algorithms fully unlock hardware potential. The deep integration of these two dimensions constitutes the core technological basis for the evolution of industrial robots from automated equipment toward intelligent operational units.
- **National Strategies and Industrial Policy Support:** China has identified intelligent manufacturing as a core strategy for enhancing national competitiveness, as reflected in policy frameworks such as the “14th Five-Year Plan for the Development of Intelligent Manufacturing” and “Implementation Opinions on Promoting the Innovative Development of Future Industries”. Industrial robots, as key enabling equipment, play a critical role in advancing manufacturing automation and digital transformation. At the policy level, initiatives including the ““Robot+” Application Action Plan” and the “14th Five-Year Plan for the Development of Robot Industry” underscore government support for the sector and, in conjunction with other measures such as R&D incentives, industry standards and industrial alliance development, contribute to a supportive environment for the long-term development of the industrial robot industry.

Entry Barriers of China’s High-Speed Industrial Robot Market

- **Barriers in Technical Expertise & Industry Adaptation:** The high-speed industrial robot industry is technology-intensive, requiring integration of long-term accumulated system-level development capabilities and cross-disciplinary knowledge. SCARA and parallel robots must manage severe vibration and dynamic shock at high cycle rates, necessitating expertise in the design and integration of advanced control algorithms, mechanical design, and precision components. This knowledge is built through long-term R&D investment, talent cultivation, and extensive field validation, which new entrants often lack. Additionally, applications span diverse sectors like electronics, FMCG, and automotive, each with distinct speed, precision, and safety demands. New players without sector-specific domain know-how struggle to address specific customer needs. Furthermore, the necessity for rigorous product reliability testing and operational

INDUSTRY OVERVIEW

validation demands heavy asset investment throughout the entire process from R&D, testing, to mass production. This capital-intensive approach significantly increases upfront costs and operational risks, thereby establishing a substantial barrier to entry.

- **Barriers in Manufacturing Scale and Supply Chain Integration:** High-speed applications demand tight consistency in machining accuracy, assembly processes, and end-of-line testing to ensure stable performance under continuous high-frequency operation. Achieving such consistency typically requires scaled production, standardised manufacturing systems, and mature quality management, which are difficult for new entrants to replicate quickly. In parallel, leading players benefit from integrated supply chains for critical components such as servo systems, controllers, precision parts, and key suppliers of fixtures and testing equipment, enabling shorter lead times, better cost control, and faster iteration. These capabilities collectively raise the threshold for competitive, large-scale commercialisation.
- **Barriers in Customer Acquisition and Brand Recognition:** The high-speed industrial robot market is characterised by long sales cycles and high customer switching costs. End-users require extensive on-site validation, performance testing, and technical support before adoption. Established players benefit from years of field experience, proven track records, and strong brand recognition, making it difficult for new entrants to gain customer trust. Additionally, the high cost of failure in production lines means customers are risk-averse and prefer suppliers with established reliability. This creates a “proof of concept” barrier where new players must invest heavily in demonstration projects and customer education, often without guaranteed returns, significantly increasing their time-to-market and capital requirements.
- **Barriers in Regulatory Compliance and Certification:** High-speed industrial robots must comply with stringent international safety standards and industry-specific certifications. The certification process is time-consuming and costly, requiring extensive documentation, testing, and third-party validation. Established manufacturers have already navigated these regulatory hurdles and maintain ongoing compliance systems, while new entrants must invest significant resources in understanding and meeting these requirements. Furthermore, industry-specific certifications for sectors like food and beverage or pharmaceutical add additional layers of complexity. The lengthy approval timelines and high compliance costs create significant delays and financial burdens for market entry, favouring incumbents with established regulatory frameworks.

Future Trends of China’s High-speed Industrial Robot Market

- **Application Penetration across Industries and Production Stages:** The expansion of high-speed industrial robot applications exhibits both horizontal broadening and vertical deepening. Horizontally, adoption is extending from traditional sectors such as food and consumer goods to emerging industries, including semiconductor and renewable energy, which require higher standards of cleanliness, precision and reliability. Vertically, applications are moving beyond labour substitution in single repetitive tasks — such as

INDUSTRY OVERVIEW

material handling and sorting — toward more complex processes — such as inspection, precision assembly and dispensing — enabling broader functional coverage across individual production lines and entire factory operations. This trend reflects the evolution of high-speed industrial robots from addressing localised automation needs to supporting end-to-end flexible and intelligent manufacturing.

- **Technology Progression Toward Higher Autonomy and Adaptability:** Building on the convergence of high-performance hardware and intelligent algorithms, high-speed industrial robots are evolving from assisted execution toward greater autonomous decision-making. Hardware development continues to advance toward higher integration, precision and weight-to-payload efficiency, supporting improved motion performance, precision and load capacity, and providing a stable physical foundation for complex tasks. At the software and algorithm level, progress in areas such as real-time perception, autonomous task planning, and process-adaptive optimisation is enabling closed-loop operation in dynamic and unstructured environments. Through tighter hardware — software co-design and system-level integration, high-speed industrial robots are achieving higher levels of autonomy and transferability.
- **Ecosystem-Based and Integrated Solution Capabilities as Key Competitive Factors:** To build sustainable competitive advantages, leading robot manufacturers are extending upstream along the technology stack through collaborative or independent development of core components and advanced intelligent algorithms, strengthening self-control over core technologies and product performance. Downstream, greater emphasis is being placed on building open and collaborative ecosystems with system integrators, end-effector suppliers and end users. Through ecosystem collaboration and the integration of industry-specific process know-how, manufacturers are delivering stable, easy-to-deploy end-to-end solutions, thereby establishing new competitive advantages centered on overall performance and service value.
- **Domestic Substitution and Global Expansion:** Against the backdrop of China’s manufacturing sector placing increasing emphasis on self-reliance and supply chain security, downstream industries are showing rising acceptance of domestically produced industrial robots, with deployment expanding across multiple sectors and applications as scale-driven cost advantages and implementation feasibility become more evident. Meanwhile, the acceleration of intelligent manufacturing globally is sustaining overseas demand for cost-effective, fast-to-deploy automation solutions, creating expansion opportunities for Chinese vendors with sufficient technological maturity and cost control capabilities. Overall, domestic substitution strengthens the industry’s internal growth foundation, while international expansion provides incremental structural growth.

INDUSTRY OVERVIEW

Ranking of the Global Leading High-speed Industrial Robot Manufacturers

In 2024, the global shipment volume of the top five high-speed industrial robot companies reached approximately 10,945 units in total, representing around 31.5% of the global shipment volume of high-speed industrial robots. In 2024, the Company ranked 5th in the global high-speed industrial robot market with share of approximately 3.0% as measured by shipment volume.

The table below sets forth the top five high-speed industrial robot manufacturers in terms of the global shipment volume in 2024.

Ranking of the Leading High-speed Industrial Robot Manufacturers, Global⁽¹⁾, 2024 by Global Shipment Volume, Unit

Ranking	Company	Global Shipment Volume	Market Share ⁽²⁾
1	Company A ⁽³⁾	3,500	10.1%
2	Company B ⁽⁴⁾	3,360	9.7%
3	Company C ⁽⁵⁾	1,800	5.2%
4	Company D ⁽⁶⁾	1,240	3.6%
5	Our Company	1,045	3.0%
Top5	NA	10,945	31.5%

Notes:

- (1) The ranking is based on the global shipment volume of high-speed industrial robots by global companies.
- (2) Denominator of the percentage is the global shipment volume of high-speed industrial robots, which is approximately 34.7 thousand units in 2024.
- (3) Company A is a company established in 1892 and it is headquartered in Pfäffikon, Switzerland. It focuses on three core business areas: industrial connectors, industrial robots, and textile machinery. Its industrial robot product line primarily includes SCARA and articulated robots. With a global workforce of approximately 6,000 employees, the company is committed to driving innovation and delivering high-precision solutions across industries worldwide.
- (4) Company B is a company established in 1988 and it is headquartered in Zurich, Switzerland. It is a technology leader in the electrical and automation field, with its global operations organised into four business divisions: Electrification, Automation, Motion Control, and Robots & Discrete Automation. The company is committed to integrating engineering expertise with software technologies to deliver solutions that optimise manufacturing, transportation, energy, and operational efficiency. It employs approximately 105,000 people worldwide. Its industrial robot product portfolio includes articulated robots, SCARA robots, parallel robots, and collaborative robots.

INDUSTRY OVERVIEW

- (5) Company C is a company established in 1975 and it is headquartered in Suwa, Japan. It offers a wide range of industrial robots, including SCARA robots, six-axis robots, and collaborative robots. With a global workforce of approximately 76,000 employees, the company, the company widely ranges from printing solutions and visual communications to manufacturing-related and wearables business.
- (6) Company D is a company established in 1933 and it is headquartered in Kyoto, Japan. It is a globally recognised manufacturer of automation control and electronic equipment, with core competencies in sensing and control technologies. Its product portfolio spans a wide range of fields, including industrial automation control systems, electronic components, social infrastructure systems, and healthcare equipment, and the company employs more than 28,000 people worldwide. Its industrial robot product portfolio includes articulated robots, SCARA robots, and parallel robots.

Ranking of Leading High-speed Industrial Robot Manufacturers in China

In 2024, China’s shipment volume of the top five high-speed industrial robot companies reached approximately 4,817 units, representing around 36.7% of the total market. In 2024, the Company ranked 2nd in China’s high-speed industrial robot market with share of approximately 7.6% as measured by shipment volume.

The table below sets forth the top five high-speed industrial robot manufacturers in terms of China’s shipment volume in 2024.

Ranking of the Leading High-speed Industrial Robot Manufacturers, China⁽⁷⁾, 2024 by China’s Shipment Volume, Unit

Ranking	Company	China’s Shipment Volume	Market Share ⁽⁸⁾
1	Company A ⁽³⁾	1,200	9.1%
2	Our Company	997	7.6%
3	Company B ⁽⁴⁾	895	6.8%
4	Company C ⁽⁵⁾	880	6.7%
5	Company E ⁽⁹⁾	845	6.4%
Top5	NA	4,817	36.7%

Notes:

- (7) The ranking is based on the shipment volume of high-speed industrial robots in China by global companies.
- (8) Denominator of the percentage is the shipment volume of high-speed industrial robots in China, which is approximately 13.1 thousand units in 2024.
- (9) Company E is a company listed on Shenzhen Stock Exchange and headquartered in Shanghai. Established in 1995, it focuses on the field of industrial robots, with motion control technology as its core, and engages in the research and development and manufacturing of multi-joint, SCARA, and semiconductor wafer robots.

INDUSTRY OVERVIEW

Ranking of the Global Leading Parallel Robot Manufacturers

In 2024, the global parallel robot market exhibited a relatively dispersed competitive landscape. The top five parallel robot companies shipped a total of approximately 6,222 units globally, accounting for approximately 29.5% of the global shipment volume of parallel robots.

The table below sets forth the top five high-speed industrial robot manufacturers in terms of the global shipment volume in 2024.

Ranking of the Leading Parallel Robot Manufacturers, Global⁽¹⁰⁾, 2024 by Global Shipment Volume, Unit

Ranking	Company	Global Shipment Volume	Market Share ⁽¹¹⁾
1	Company B ⁽⁴⁾	3,200	15.2%
2	Our Company	1,012	4.8%
3	Company D ⁽⁶⁾	760	3.6%
4	Company F ⁽¹²⁾	650	3.1%
5	Company G ⁽¹³⁾	600	2.8%
Top5	NA	6,222	29.5%

Notes:

- (10) The ranking is based on the global shipment volume of parallel robots by global companies.
- (11) Denominator of the percentage is the global shipment volume of parallel robots, which is approximately 21.1 thousand units in 2024.
- (12) Company F is a company established in 2017 and it is headquartered in Zhenjiang, Jiangsu Province. It is a technology-oriented company integrating industrial robot systems with automation solutions. The company focuses on the research, development, and sales of parallel robots, with products widely applied across industries including food, pharmaceutical, logistics, consumer goods, consumer electronics, and renewable energy, and distributed to markets worldwide.
- (13) Company G is a company established in 1878 and it is headquartered in Tokyo, Japan. It is a diversified heavy industry group with operations spanning aerospace, railway vehicles, shipbuilding & marine, precision machinery, and industrial robots. The company employs approximately 40,000 people, and its industrial robot offerings include articulated robots, SCARA robots and parallel robots.

INDUSTRY OVERVIEW

Ranking of Leading Parallel Robot Manufacturers in China

In 2024, China’s parallel robot market exhibited a relatively higher degree of concentration, with the total shipment volume of the top five companies reached approximately 3,114 units in China, representing around 39.7% of the total shipment volume of parallel robots in China. The table below sets forth the top five parallel robot manufacturers in terms of China’s shipment volume in 2024.

Ranking of the Leading Parallel Robot Manufacturers, China⁽¹⁴⁾, 2024 by China’s Shipment Volume, Unit

Ranking	Company	China’s Shipment Volume	Market Share ⁽¹⁵⁾
1	Our Company	964	12.3%
2	Company B ⁽⁴⁾	765	9.7%
3	Company F ⁽¹²⁾	600	7.6%
4	Company H ⁽¹⁶⁾	485	6.2%
5	Company I ⁽¹⁷⁾	300	3.8%
Top5	NA	3,114	39.7%

Notes:

- (14) The ranking is based on the shipment volume of parallel robots in China by global companies.
- (15) Denominator of the percentage is the shipment volume of parallel robots in China, which is approximately 7.9 thousand units in 2024.
- (16) Company H is a company established in 2012 and it is headquartered in Taizhou, Zhejiang Province. It is a company integrating industrial robot R&D and manufacturing, control system development, vision system development, intelligent manufacturing solutions, and equipment provision. Its industrial robot products include articulated robots, SCARA robots, and parallel robots.
- (17) Company I is a company established in 2011 and it is headquartered in Dongguan, Guangdong Province. It focuses on the research, development, and industrial application of industrial robots and AI intelligent technologies. Its industrial robot products primarily include parallel robots and collaborative robots, which are currently widely used across multiple sectors such as pharmaceutical, consumer electronics, food, and consumer goods.