

Global Toroid Shaped Frameless Torque Motor Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Toroid Shaped Frameless Torque Motor market size is expected to reach \$ 1594 million by 2032, rising at a market growth of 10.0% CAGR during the forecast period (2026-2032).

In 2025, global Toroid Shaped Frameless Torque Motor production reached approximately 2 million units with an average global market price of around US\$350 per unit. This type of motor is a direct-drive torque motor that utilizes a toroidal coil and radially distributed permanent magnet structure. Eliminating the traditional frame structure with a base and bearing supports, it is integrated directly into the user's mechanical system, offering high torque density, zero transmission backlash, extremely low moment of inertia, and high dynamic response. Its toroidal structure ensures a large hollow channel while also achieving greater torque uniformity and low cogging. It is ideally suited for applications requiring high-precision positioning and smooth torque output, such as satellite attitude control systems, aerospace servos, semiconductor wafer handling, medical imaging equipment, and advanced robotic joints. With increasing demand for high-performance direct-drive technology in precision equipment, aerospace exploration, and the new energy industry, TFMs are becoming a key growth area in the drive sector.

The future development trends of toroid shaped frameless torque motors, from the perspective of corporate revenue and profit, have clearly pointed to the core track of embodied intelligence robotics. During its 2025 earnings call, Weiguang Holdings disclosed that the robotic joint modules developed by its wholly-owned subsidiary have entered the small-batch delivery stage, and the products have passed verification by individual complete machine manufacturers. These modules integrate the toroid shaped frameless torque motor with components such as encoders. The company explicitly

stated it would accelerate the development and industrialization of core robotic components to cultivate new productive forces. Jiangsu Leili confirmed on its investor interaction platform that its self-developed frameless torque motors have been integrated with planetary gearboxes and encoders to launch intelligent rotary joint module products, which have already achieved small-batch shipments. During its third-quarter 2025 earnings call, Kinco Automation disclosed that the main drivers for the growth of its robotics business are the rapid development of new directions such as industrial robots, humanoid robots, and collaborative robots, with sales of frameless torque motors increasing significantly. On the policy front, the Science, Technology and Economy Commission of Shanghai Pudong New Area issued a special application notice, explicitly providing support for enterprises undertaking the industrialization of frameless torque motors for humanoid robots, with an amount not exceeding a certain percentage of the sales contract value from the first batch. The maximum cumulative support for a single enterprise is clearly defined, and no duplicate rewards are given for similar products. This local incentive policy indicates that the government is guiding enterprises to push toroid shaped frameless torque motors from the prototype trial stage toward scaled supply. In summary, the major trends in the toroid shaped frameless torque motor industry are as follows: the demand driver is shifting entirely from traditional industrial automation to humanoid robot joint applications; the profit model is upgrading from single motor sales to system solutions for joint modules integrating encoders and reducers; and a company's revenue growth and profit margins will depend on its progress in industrializing core areas such as magnetic circuit optimization design, process consistency control, and module integration capabilities.

This report studies the global Toroid Shaped Frameless Torque Motor production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Toroid Shaped Frameless Torque Motor and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Toroid Shaped Frameless Torque Motor that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Toroid Shaped Frameless Torque Motor total production and demand, 2021-2032, (K Units)

Global Toroid Shaped Frameless Torque Motor total production value, 2021-2032, (USD Million)

Global Toroid Shaped Frameless Torque Motor production by region & country,

production, value, CAGR, 2021-2032, (USD Million) & (K Units), (based on production site)

Global Toroid Shaped Frameless Torque Motor consumption by region & country, CAGR, 2021-2032 & (K Units)

U.S. VS China: Toroid Shaped Frameless Torque Motor domestic production, consumption, key domestic manufacturers and share

Global Toroid Shaped Frameless Torque Motor production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (K Units)

Global Toroid Shaped Frameless Torque Motor production by Type, production, value, CAGR, 2021-2032, (USD Million) & (K Units)

Global Toroid Shaped Frameless Torque Motor production by Application, production, value, CAGR, 2021-2032, (USD Million) & (K Units)

This report profiles key players in the global Toroid Shaped Frameless Torque Motor market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Kollmorgen, Aerotech, Wittenstein, Parker, Sensata, Maxon Motor, Allied Motion, TQ Robodrive, Magnetic Innovations, Tecnotion, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Toroid Shaped Frameless Torque Motor market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (K Units) and average price (US\$/Unit) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Toroid Shaped Frameless Torque Motor Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Toroid Shaped Frameless Torque Motor Market, Segmentation by Type:

Inner Rotor Type

Outer Rotor Type

Global Toroid Shaped Frameless Torque Motor Market, Segmentation by Frame Size:

25mm

50mm

60mm

Others

Global Toroid Shaped Frameless Torque Motor Market, Segmentation by Cooling Method:

Water-cooled

Liquid-cooled

Global Toroid Shaped Frameless Torque Motor Market, Segmentation by Application:

Robot Joints

Semiconductor Equipment

Flight Control Systems

Industrial Automation

Others

Companies Profiled:

Kollmorgen

Aerotech

Wittenstein

Parker

Sensata

Maxon Motor

Allied Motion

TQ Robodrive

Magnetic Innovations

Tecnotion

Moog

Nidec

Akribis

Celera Motion

Shenzhen Mosrac Motor

Kinco Automation (Shanghai)

Guangzhou Haozhi Industrial

Chengdu Weijing Motor

Wolong Electric Group

China Leadshine Technology

Key Questions Answered:

1. How big is the global Toroid Shaped Frameless Torque Motor market?
2. What is the demand of the global Toroid Shaped Frameless Torque Motor market?
3. What is the year over year growth of the global Toroid Shaped Frameless Torque Motor market?
4. What is the production and production value of the global Toroid Shaped Frameless Torque Motor market?
5. Who are the key producers in the global Toroid Shaped Frameless Torque Motor market?
6. What are the growth factors driving the market demand?

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