

Force Torque Sensors Market Forecasts to 2032 – Global Analysis By Sensor Type (Axis Type, Torque Measurement Type, Output Type and Other Sensor Types), Axis Configuration, Range & Accuracy, Technology, Application, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Force Torque Sensors Market is accounted for \$1.6 billion in 2025 and is expected to reach \$2.5 billion by 2032 growing at a CAGR of 6.8% during the forecast period. Force torque sensors are precision devices that measure the magnitude and direction of applied forces and torques across multiple axes. Commonly integrated into robotic arms, automation systems, and testing equipment, they enable accurate monitoring of mechanical interactions. These sensors convert physical loads into electrical signals, facilitating real-time feedback and control. Their high sensitivity and multi-axis capabilities make them essential for tasks requiring delicate manipulation, safety assurance, and performance optimization in industrial, medical, and research applications.

Market Dynamics:

Driver:

Increasing adoption in minimally invasive procedures and rehabilitation devices

The increasing integration of force torque sensors in minimally invasive surgical systems and rehabilitation robotics is significantly driving market growth. These sensors enable precise force feedback and control, which is critical for delicate medical procedures and patient recovery tools. As healthcare providers adopt robotic-assisted technologies, demand for multi-axis sensing capabilities continues to rise. Additionally,

the push for personalized treatment and remote rehabilitation is accelerating sensor deployment in wearable and assistive devices. This trend reflects a broader shift toward precision medicine and intelligent healthcare infrastructure.

Restraint:

Slower adoption due to lack of technical expertise and infrastructure

Integrating force torque sensors into legacy systems requires skilled personnel and specialized calibration, which can be cost-prohibitive for smaller facilities. Moreover, the lack of standardized protocols across industries hampers seamless implementation. These barriers are particularly evident in emerging economies, where industrial automation is still evolving. As a result, market penetration remains uneven, slowing overall growth in under-resourced sectors.

Opportunity:

Development of compact, IoT-enabled sensors for mobile and remote applications

Manufacturers are investing in wireless connectivity and edge computing capabilities to support decentralized operations. These miniaturized sensors offer real-time data transmission and enhanced interoperability with smart systems, making them ideal for autonomous robots, drones, and portable diagnostic tools. This innovation aligns with the growing demand for flexible, scalable sensing solutions across industries such as logistics, defense, and telemedicine. As digital transformation accelerates, these smart sensors are poised to redefine operational efficiency and user experience.

Threat:

Entry of low-cost manufacturers affecting margins and quality standards

The influx of low-cost manufacturers into the force torque sensor market is creating pricing pressure and raising concerns about product quality. While affordability can boost accessibility, substandard sensors may compromise performance in critical applications like surgery or aerospace. Additionally, counterfeit components and inconsistent calibration standards pose risks to end-user safety and regulatory compliance. This competitive landscape demands strategic differentiation and robust quality assurance.

Covid-19 Impact:

The COVID-19 pandemic had a dual impact on the force torque sensors market, disrupting supply chains while accelerating automation. Initial lockdowns led to delays in sensor production and component sourcing, affecting delivery timelines. However, the crisis also underscored the need for contactless operations and remote diagnostics, boosting demand for robotics and smart sensing systems. Healthcare and manufacturing sectors prioritized automation to minimize human exposure, driving sensor adoption in surgical robots, lab automation, and logistics.

The axis type segment is expected to be the largest during the forecast period

The axis type segment is expected to account for the largest market share during the forecast period due to its versatility in multi-directional force measurement. These sensors are essential in robotic arms, CNC machines, and automated testing systems where precision across multiple axes is critical. Their ability to capture complex force interactions enhances safety and performance in dynamic environments. As industries demand more adaptive and intelligent systems, multi-axis sensors are becoming standard in advanced automation setups.

The micro/low-force sensors segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the micro/low-force sensors segment is predicted to witness the highest growth rate driven by their application in sensitive environments. These sensors are ideal for tasks requiring delicate manipulation, such as biomedical research, prosthetics, and consumer electronics assembly. Their compact form factor and high sensitivity make them suitable for integration into wearable devices and miniature robotics. Technological advancements in MEMS and nanomaterials are further enhancing their responsiveness and durability.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share owing to its robust industrial automation ecosystem and advanced healthcare infrastructure. The region is home to leading sensor manufacturers and research institutions driving innovation in robotics and smart systems. Government initiatives supporting precision manufacturing and surgical robotics are further boosting adoption. Additionally, high investment in defense and aerospace applications

contributes to sustained demand for high-performance force torque sensors.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR fueled by rapid industrialization and expanding access to automation technologies. Countries like China, India, and South Korea are investing heavily in smart manufacturing and healthcare robotics. The region's growing electronics and automotive sectors also present significant opportunities for sensor integration. Supportive government policies, rising labor costs, and a shift toward digital factories are accelerating the deployment of force torque sensors across diverse applications.

Key players in the market

Some of the key players in Force Torque Sensors Market include ATI Industrial Automation, Kistler Group, FUTEK Advanced Sensor Technology, Inc., Honeywell International Inc., TE Connectivity, Sensata Technologies, Hottinger Br?el & Kj?r (HBK) (formerly HBM), Interface, Inc., Schunk GmbH & Co. KG, Advanced Mechanical Technology, Inc. (AMTI), Strainert Company, ROBOTIQ, ABB Ltd., Bota Systems AG, Sensodrive GmbH, NXP Semiconductors N.V., FANUC Corporation, Applied Measurements Ltd., and Burster Pr?zisionsmesstechnik GmbH & Co KG.

Key Developments:

In September 2025, Honeywell's Board approved the spin-off of Solstice Advanced Materials, effective October 30. Shareholders will receive one Solstice share for every four Honeywell shares held. This strategic move aims to streamline Honeywell's portfolio.

In September 2025, Kistler launched a telemetric measurement system with wireless signal transmission for process monitoring. This innovation enhances precision and flexibility in industrial production environments. It supports real-time data acquisition without physical wiring.

In August 2025, Honeywell partnered with Stereolabs to develop a mobile logistics solution. The system measures package dimensions in real time, improving warehouse efficiency. It reflects Honeywell's push into AI-driven supply chain tech.

Sensor Types Covered:

Axis Type

Torque Measurement Type

Output Type

Other Sensor Types

Axis Configurations Covered:

Single-axis Sensors

Multi-axis Sensors

Range & Accuracies Covered:

Micro/low-Force Sensors

Medium-Range Sensors

High-Capacity

Technologies Covered:

Strain Gauge-based Force/Torque Sensors

Piezoelectric Force/Torque Sensors

Capacitive Force/Torque Sensors

Magnetoelastic Force/Torque Sensors

Optical Force/Torque Sensors

Other Technologies

Applications Covered:

Assembly & Welding

Polishing & Grinding

Machine Tending

Engine & Powertrain Testing

Steering Systems

Brake-by-wire Systems

Vehicle Crash Testing

Aircraft Flight Control Systems

Aerodynamic Testing

Satellite Payload Deployment

Other Applications

End Users Covered:

Robotics & Automation

Automotive & Transportation

Aerospace & Defense

Test & Measurement

Healthcare

Other End Users

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free

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customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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