

Global Joint Torque Sensors for Humanoid Robots Market 2026 by Manufacturers, Regions, Type and Application, Forecast to 2032

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Abstracts

According to our (Global Info Research) latest study, the global Joint Torque Sensors for Humanoid Robots market size was valued at US\$ 24.49 million in 2025 and is forecast to a readjusted size of US\$ 742 million by 2032 with a CAGR of 56.1% during review period.

In 2025, global sales of joint torque sensors for humanoid robots were approximately 132.5 thousand units, with an average selling price of about USD 180 per unit, corresponding to a market size of approximately USD 23.8 million. Joint torque sensors for humanoid robots are high-precision torque measurement components installed or integrated in rotary joints, joint actuators, and harmonic or planetary reduction joint assemblies of humanoid robots. They are mainly used to directly detect axial joint torque, external load changes, collision contact, motion impedance, and force-control feedback, providing real-time sensing signals for compliant control, dynamic balance, joint protection, gait control, and safe human-robot interaction. These sensors are typically installed in joint actuators, reducer output sections, or rotary transmission units in the form of thin, annular, hollow, flange-mounted, or customized sensor modules, and measure torque changes on the joint rotation axis through sensing principles such as strain gauge, capacitive, and Hall effect technologies.

Humanoid robot joint torque sensors are gradually evolving from laboratory validation components into critical sensing devices within scaled supply chains. As humanoid robots move beyond demonstration prototypes into small-batch deployment, joint systems face significantly higher requirements for force control, compliant control, collision detection, overload protection, and gait stability. Torque estimation based solely on motor current is increasingly unable to meet the demands of high safety and

fast dynamic response.

From the demand side, market growth is primarily driven by three factors. First, increasing humanoid robot shipments are generating greater installation demand for joint torque sensors. Second, embodied intelligence applications are expanding from walking demonstrations into material handling, manipulation, service tasks, and industrial collaboration, increasing reliance on joint force feedback. Third, manufacturers in China, South Korea, Japan, and Europe are successively launching torque sensor products designed specifically for robotic joints, accelerating the transition from high-cost customization toward standardization, miniaturization, and volume production. In the short term, the market will remain dominated by R&D prototypes, small-volume orders, and validation projects conducted by leading robot manufacturers, with relatively high prices and fragmented product specifications. Over the medium to long term, as mass-production platforms are finalized and domestic suppliers begin volume deliveries, average prices are expected to decline gradually, while shipment growth becomes the primary driver of market expansion.

In terms of the competitive landscape, the global supplier base remains fragmented and at an early stage of development. Companies including Bota Systems, Sensodrive, I-PEX, AIDIN ROBOTICS, AL.Robot, and DACELL, as well as Chinese suppliers such as ZEMIC, SRI, Kunwei Technology, Blue Point Touch, XJC Sensor, Keli Sensing, Amphenol Advanced Sensors, and PaXini, have established relatively clear product positions. Future competition will extend beyond individual accuracy specifications and increasingly focus on slim designs, hollow-shaft structures, resistance to off-axis loads, dynamic response, temperature-drift control, digital communication interfaces, reliability validation, and integration capabilities with joint modules. Overall, although the market remains relatively small, it represents a humanoid robot component segment with high technical barriers, long customer qualification cycles, and clear opportunities for domestic substitution. It therefore warrants continued monitoring of supplier penetration into mass-production customers, product price declines, and the market elasticity created by rising sensor content per robot.

Report Scope

This report is a detailed and comprehensive analysis for global Joint Torque Sensors for Humanoid Robots market. Both quantitative and qualitative analyses are presented by manufacturers, by region & country, by Type and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets.

Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global Joint Torque Sensors for Humanoid Robots market size and forecasts, in consumption value (\$ Million), sales quantity (K Units), and average selling prices (US\$/Unit), 2021-2032

Global Joint Torque Sensors for Humanoid Robots market size and forecasts by region and country, in consumption value (\$ Million), sales quantity (K Units), and average selling prices (US\$/Unit), 2021-2032

Global Joint Torque Sensors for Humanoid Robots market size and forecasts, by Type and by Application, in consumption value (\$ Million), sales quantity (K Units), and average selling prices (US\$/Unit), 2021-2032

Global Joint Torque Sensors for Humanoid Robots market shares of main players, shipments in revenue (\$ Million), sales quantity (K Units), and ASP (US\$/Unit), 2021-2026

The Primary Objectives in This Report Are:

To determine the size of the total market opportunity of global and key countries

To assess the growth potential for Joint Torque Sensors for Humanoid Robots

To forecast future growth in each product and end-use market

To assess competitive factors affecting the marketplace

This report profiles key players in the global Joint Torque Sensors for Humanoid Robots market based on the following parameters - company overview, sales quantity, revenue, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Bota Systems AG, Sensodrive GmbH, I-PEX Inc., AIDIN ROBOTICS, AL.Robot, DACELL CO., LTD., Zhonghang Electronic Measuring Instruments Co., Ltd., Sunrise Instruments, Changzhou Kunwei Sensing Technology Co., Ltd., Link-touch Technology Co., Ltd., etc.

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

Market Segmentation

Joint Torque Sensors for Humanoid Robots market is split by Type and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for consumption value by Type, and by Application in terms of volume and value. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Type

0 to 50 Nm Joint Torque Sensors

More than 50 to 150 Nm Joint Torque Sensors

More than 150 to 400 Nm Joint Torque Sensors

More than 400 Nm Joint Torque Sensors

Other

Market segment by Sensing Principle

Strain Gauge Torque Sensors

Capacitive Torque Sensors

Hall Effect Torque Sensors

Other

Market segment by Application

Hip Joints

Knee Joints

Ankle Joints

Shoulder Joints

Elbow Joints

Wrist Joints

Hand and Finger Joints

Torso and Waist Joints

Neck and Head Joints

Other

Major players covered

Bota Systems AG

Sensodrive GmbH

I-PEX Inc.

AIDIN ROBOTICS

AL.Robot

DACELL CO., LTD.

Zhonghang Electronic Measuring Instruments Co., Ltd.

Sunrise Instruments

Changzhou Kunwei Sensing Technology Co., Ltd.

Link-touch Technology Co., Ltd.

SHENZHEN XJCSENSOR TECHNOLOGY CO., LTD.

Ningbo Keli Sensing Technology Co., Ltd.

Ampron Technology Co., Ltd.

PaXini Tech

Beijing Teamdrive Sensor Co., Ltd.

NBIT

Changzhou Right Measurement and Control System Co., Ltd.

ULTRAFORCE MEASUREMENT AND CONTROL SYSTEM

Market segment by region, regional analysis covers

North America (United States, Canada, and Mexico)

Europe (Germany, France, United Kingdom, Russia, Italy, and Rest of Europe)

Asia-Pacific (China, Japan, Korea, India, Southeast Asia, and Australia)

South America (Brazil, Argentina, Colombia, and Rest of South America)

Middle East & Africa (Saudi Arabia, UAE, Egypt, South Africa, and Rest of Middle East & Africa)

Chapter Outline

Chapter 1, to describe Joint Torque Sensors for Humanoid Robots product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top manufacturers of Joint Torque Sensors for Humanoid Robots, with price, sales quantity, revenue, and global market share of Joint Torque Sensors for Humanoid Robots from 2021 to 2026.

Chapter 3, the Joint Torque Sensors for Humanoid Robots competitive situation, sales quantity, revenue, and global market share of top manufacturers are analyzed emphatically by landscape contrast.

Chapter 4, the Joint Torque Sensors for Humanoid Robots breakdown data are shown at the regional level, to show the sales quantity, consumption value, and growth by regions, from 2021 to 2032.

Chapter 5 and 6, to segment the sales by Type and by Application, with sales market share and growth rate by Type, by Application, from 2021 to 2032.

Chapter 7, 8, 9, 10 and 11, to break the sales data at the country level, with sales quantity, consumption value, and market share for key countries in the world, from 2021 to 2026. and Joint Torque Sensors for Humanoid Robots market forecast, by regions, by Type, and by Application, with sales and revenue, from 2027 to 2032.

Chapter 12, market dynamics, drivers, restraints, trends, and Porters Five Forces analysis.

Chapter 13, the key raw materials and key suppliers, and industry chain of Joint Torque Sensors for Humanoid Robots.

Chapter 14 and 15, to describe Joint Torque Sensors for Humanoid Robots sales channel, distributors, customers, research findings and conclusion.

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