

Ready to unlock the full potential of your robotic equipment?
Contact our Kollmorgen motion control experts to discuss your robotic equipment needs and goals.

Kollmorgen Robotics Industry Solutions



Empowering Innovators, Creating Excellence

About Kollmorgen

Kollmorgen, a Regal Rexnord Brand, has more than 100 years of motion experience, proven in the industry's highest-performing, most reliable motors, drives, AGV control solutions and automation platforms. We deliver breakthrough solutions that are unmatched in performance, reliability and ease of use, giving machine builders an irrefutable marketplace advantage.

www.kollmorgen.cn

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Why Kollmorgen

Who Are We?

Kollmorgen — Motion Control System Expert

Founded in 1916, with a century of deep cultivation in the motion control system field, Kollmorgen has become a trusted brand in the industry through profound technical accumulation and innovation strength. It provides global OEM machine manufacturers with a full range of products and solutions, including servo/direct drive/stepper motors, drives, motion control systems, and AGV vehicle control systems.

In China, with its Tianjin factory as the core, Kollmorgen strictly implements unified global processes and quality standards, integrating the local supply chain with global R&D resources to customize high-performance, cost-effective products and services for customers, driving the development of various industries: In the robotics field, it empowers joint drives and precise operations; in the semiconductor industry, it drives key equipment to achieve precise and stable production; in the lithium battery industry, it revolutionizes core processes such as coating and die-cutting; in the medical industry, it assists imaging equipment in achieving high-definition imaging and stable operation; in the machine tool field, it achieves micron-level high-precision machining; in the metal forming industry, it enhances dynamic cutting and stamping performance; in the photovoltaic industry, it improves the efficiency of screen printing and laser doping equipment; and in the printing and packaging industry, it leads high-precision direct-drive printing technology. Innovation leads the way, Kollmorgen creates countless legends!



01 Localized Manufacturing with High Efficiency and Cost-effectiveness

90% locally made, fast delivery, lower cost via local supply chain, great value.

03 Industry Deep Expertise, Rich Experience

Years of practice across diverse fields, precise demand matching, and capability to tackle complex challenges.

05 Professional Support, Precise Selection

One-on-one engineer service, customized solutions on demand.



02 Product Excellence, Efficient Service

International quality, reliable performance; local fast delivery and service, rapid response.

04 Global Presence, Empowering Overseas Expansion

Global network, supporting Chinese customers in overseas expansion.

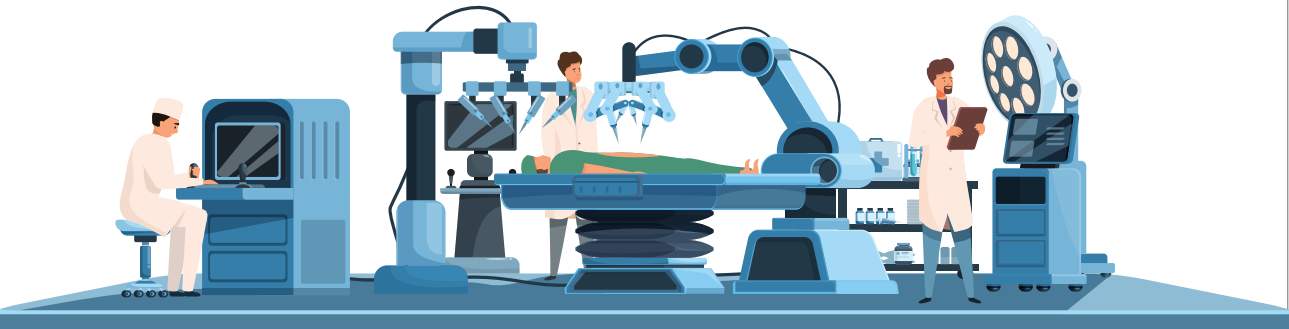
06 Rich Tools, Solid Design

Diverse design tools and resources, empowering innovation throughout the design process.

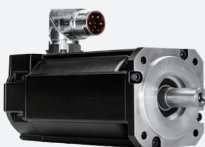
01 Industry Value Targeted Empowerment

Core Values	Advantages Demonstrated
Compact and Lightweight Complete Solutions	• Compact Structure: The small-sized frameless motors can be embedded directly inside robot joints, saving space and reducing arm weight for highly compact and lightweight design. • Comprehensive Product Portfolio: Including high-voltage / low-voltage, framed and frameless motors, drives and motion controllers, to meet full-scenario demands of collaborative, industrial and medical robots.
High Performance and Flexible Customization Capability	• Thermal Control Capability: Adopting advanced electromagnetic and thermal design, the motors operate efficiently in compact spaces with low temperature rise and excellent thermal stability. • High Power Density: Deliver strong power and superior dynamic performance in a compact footprint. • High Control Accuracy: Optimized low-cogging design enables smooth and precise motion control for outstanding performance. • Flexible Customization: Diverse winding types and optimized electromagnetic designs are available for precise customization to meet specific application needs.
High Reliability and Batch Consistency	• High Reliability: Renowned for long service life and maintenance-free operation, our products deliver stable long-term service for leading global robot manufacturers and serve as the preferred solution for many new robot projects. • Excellent Product Consistency: Rigorous production and quality control guarantee stable quality and consistent performance across batches to meet mass production requirements. • Fast Local Delivery: The Tianjin factory and local core component supply chain ensure competitive lead times.
Professional Engineering Support and Cooperation	• Professional Sizing and Integration Guidance: We provide professional sizing calculation based on customer applications, along with dedicated integration guidance for frameless motors. • Co-development Expertise: As long-term partner for many world-leading robot manufacturers, we possess deep collaborative design capability and on-site engineer technical support to help customers accelerate product innovation and market launch.

Empower Robots for Higher Precision and Efficiency



Servo Motors

Product Series ▼	Specifications and Features ▼	Typical Robot Applications ▼
AKM / AKM2G Servo Motor	 Specifications: Frame Size: 40-260 mm (AKM) / 58-192 mm (AKM2G) Power Range: 0.08-19.5 kW Voltage Range: 75 Vdc, 120-480 Vac Features: High performance, high reliability and high torque density with great flexibility. UL and CE certified, supported by a global service network.	• Compact Industrial Robots. • For surgical robots, it delivers millimeter-level precise positioning of catheters. • For cable-suspended robots, it enables large-range, heavy-load automation.
AKM3C / AKME Explosion-proof Servo Motor	 Specifications: Two explosion-proof motor models AKM3C and AKME are available. They comply with CCC for Gas Zone 2 and Dust Zone 21, as well as ATEX and IECEx for Gas Zone 2 and Dust Zone 22. Multiple frame sizes are offered, with maximum speed up to 8000 rpm (AKM3C) / 5000 rpm (AKME). Features: Designed for environments with flammable gas or dust. High power density, compatible with a wide range of standard mounting and feedback options. Local support and fast delivery available.	• For robots and automation equipment operating in environments with flammable dust or gas. • Compliant with explosion-proof certification standards across global regions.
AKM2G Low Voltage Servo Motor	 Specifications: Frame Size: 58-192 mm, standard voltage options of 24, 48, 72 and 96 Vdc; maximum speed up to 8000 rpm. Features: Smaller footprint and wider speed range. Optional feedback, brake and thermal sensor available for greater flexibility and higher energy efficiency.	• Suitable for robot joints or auxiliary drives demanding high space efficiency, speed and energy performance. • Critical for battery-powered applications with strict weight and space constraints.
AKM Low-Temperature Servo Motor	 Specifications: Frame Size: 40-260 mm, power range 0.08-19.5 kW, operating temperature down to -40°C. Features: Engineered for extreme low-temperature environments to ensure reliable operation under harsh conditions such as freezing and cold storage applications.	• Suitable for robot components or auxiliary equipment operating in low-temperature environments.
AKMH Stainless Steel Servo Motor	 Specifications: IP69K protection rating, 316L stainless steel housing, food-grade sealing. Features: Designed for moderate to heavy washdown applications. It withstands rigorous cleaning procedures and meets high hygiene standards for cleanroom environments.	• Suitable for robots or auxiliary equipment in industries requiring high cleanliness, such as food and pharmaceutical sectors.

Frameless Direct Drive Motors

Product Series	Specifications and Features ▼	Typical Robot Applications ▼
TBM / TBM2G Frameless Torque Motor	 Specifications: Stator Outer Diameter: 60-115 mm, continuous torque 0.16-6.03 Nm, low-voltage winding supported. Features: Ultra-high power density delivers high torque within compact space. Low cogging torque, standard package for fast integration.	• Deliver high-performance joint drives for medical robots, humanoid robots, exoskeletons and collaborative robots.
KBM / CBM Frameless Torque Motor	 Specifications: Stator Outer Diameter: 60-850 mm, continuous torque 0.49-3445 Nm, peak torque up to 12,812 Nm, speed up to tens of thousands rpm. Features: High torque density, zero backlash and smooth operation. Flexible structure enables seamless integration with high reliability.	• Applied to lightweight manipulators of collaborative robots. • For industrial applications of flexible end-of-arm tooling, it performs grinding and polishing tasks.
BLM Frameless Direct Drive Motor	 Specifications: Stator Outer Diameter: 35.6-100.2 mm, continuous torque 0.153-4.33 Nm, offering high torque density. Features: Compact construction for seamless integration into robot joints. Direct drive eliminates backlash to improve system stiffness and precision.	• Joint drives for collaborative robots, lightweight industrial robots and medical robots.

Drive and Control Systems

Product Series	Specifications and Features ▼	Typical Robot Applications ▼
AKD / AKD2G Servo Drive	 Specifications: AKD2G is the latest member of the AKD series. Voltage range: 24-100 Vdc / 120-480 Vac, rated current range 3-48 A. It supports single-axis or dual-axis configuration, with integrated functional safety options up to SIL3/PLc. Compatible with multiple industrial buses including EtherCAT, CANopen, PROFINET and Ethernet/IP. Features: High performance and reliability with built-in safety functions, facilitating equipment export. Modular design, supports various feedback types and features high compatibility with the full motor portfolio.	• It provides core drive and control for all Kollmorgen servo motors and direct drive motors, serving as a vital component for building servo systems of various robots including industrial, collaborative and medical robots.
AKD PDMM Programmable Motion Controller with Integrated Drive	 Specifications: Integrates servo drive, multi-axis motion controller and PLC functions into a single hardware unit, capable of controlling 8 axes or more. Features: The three-in-one design greatly reduces system complexity, cabinet space and wiring cost. A unified programming environment shortens development cycles.	• Used for complex multi-axis robot control systems to simplify machine design, shorten development cycles and reduce costs.
PCMM2G Programmable Motion Controller	 Specifications: New-generation controller supporting synchronized path motion control for up to 64 axes. Features: Powerful performance and excellent scalability. Suitable for complex multi-axis motion control with an open and flexible hardware and software platform.	• Enables complex multi-axis synchronization and path planning for high-end medical robots, special-purpose robots and multi-robot collaborative workstations.

03 Successful Case Experienced

General Robots

Industrial Robot

An industrial robot is a programmable, multi-functional automated mechanical device, typically composed of a manipulator, controller, servo drive system and end effector (tool). Designed for structured and controlled industrial environments, it automatically performs repetitive, high-precision or high-intensity production tasks.

Motion Control Requirements

- Robotic joints feature limited space, requiring motors to deliver high torque and power within compact dimensions.
- Motors offer high dynamic response, low speed fluctuation and low torque ripple for smooth high-speed and high-precision motion.

 Kollmorgen Product Solutions: AKM Servo Motor / AKM2G Servo Motor

Solution Values

- » Motors deliver high power in compact form to fit robotic joints and meet high-torque requirements in confined spaces.
- » Advanced electromagnetic design minimizes cogging effect and total harmonic distortion, fundamentally ensuring smooth operation with reduced vibration and noise.



Collaborative Robot

A collaborative robot is a robot designed inherently to work safely alongside humans within a shared workspace. It differs fundamentally from traditional industrial robots, which are normally enclosed behind safety fences.

Motion Control Requirements

- Motors must deliver high torque to drive loads within minimal joint space while maintaining ultra-light weight.
- They shall achieve outstanding performance at low operating temperatures to avoid thermal derating, with quiet and interference-free operation.

 Kollmorgen Product Solutions: BLM Frameless Direct Drive Motor / TBM2G Frameless Torque Motor

Solution Values

- » Motors utilize advanced materials and windings to deliver high torque in compact electromagnetic assemblies shorter than 1 inch axially. They can be directly integrated into robotic joints or harmonic reducers for lightweight design.
- » Full performance is achieved with significantly lower temperature rise to protect other joint components. Its unique ring magnet and winding design minimizes cogging torque for smooth and quiet motion.



Humanoid Robot

A humanoid robot is an intelligent robot that mimics human form and motion capabilities. Its core objective is to work, interact and serve like humans within human environments.

Motion Control Requirements

- Deliver high instantaneous torque in minimal volume for fast motion and shock loads.
- Lightweight motors maintain stable operation under frequent start-stop and shock conditions.
- Joints feature high shock resistance and consistent performance in mass production.

 Kollmorgen Product Solutions: TBM2G Frameless Torque Motor

Solution Values

- » TBM2G Frameless Torque Motors adopt integrated magnetic ring design to deliver high continuous torque in compact size for fast acceleration and high power density.
- » Large inner bore for cable routing optimizes weight and space. Built for dynamic loads to handle high-dynamic motion and shock.
- » Automated production and rigorous quality management guarantee consistent performance and reliability in mass delivery.



Medical Rehabilitation Robots

Surgical Robot

A surgical robot is an intelligent medical device operated by surgeons to perform minimally invasive or remote surgery. Its core function is to extend and enhance surgeons' surgical capabilities for greater precision, minimal invasiveness and stability.

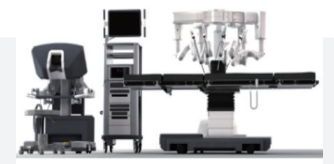
Motion Control Requirements

- Achieve ultra-high torque in millimeter-scale space for slim, flexible joints.
- Micron-level positioning with perfectly smooth, jitter-free motion at ultra-low speeds.
- Strict thermal control, plus long-term stable and consistent supply chain.

 Kollmorgen Product Solutions: AKM2G Servo Motor / TBM2G Frameless Torque Motor

Solution Values

- » TBM2G motors deliver high torque in compact size. Its large through bore accommodates cabling for slim joints.
- » Optimized electromagnetics reduce cogging and keep speed fluctuation under 0.2%, enabling precise smooth motion with high-resolution feedback and harmonic reducers.
- » High efficiency limits temperature rise for safe use. It features long-term supply, consistent global quality and certified support.



Rehabilitation Robot

A rehabilitation robot is a medical robot whose core function is to assist, evaluate and rehabilitate patients with motor dysfunction caused by disease, injury or aging.

Motion Control Requirements

- Operate at safe 24/48 V to eliminate leakage and overheating risks.
- Ultra-compact drive units can be embedded into equipment without extra burden.
- Deliver smooth low-speed torque and high-precision positioning with jitter-free, low-noise operation.

 Kollmorgen Product Solutions: TBM2G Frameless Torque Motor

Solution Values

- » TBM2G frameless motors operate on safe 24 / 48 V power and deliver high torque at low voltage.
- » Without housing and bearings, frameless torque motors embed directly into machinery for superior light weight and compactness.
- » Optimized for low-speed high-torque together with dual encoder feedback, they achieve smooth operation and high-precision position control.



Exoskeleton Robot

An exoskeleton robot is a wearable intelligent mechanical device that provides assistive power for human motion. It senses human motion intention via sensors and outputs corresponding torque through drive joints such as the hip, knee and ankle to augment, assist or restore human mobility.

Motion Control Requirements

- Joints are ultra-lightweight for imperceptible wear while delivering high torque for human assistance.
- Recognize motion intent accurately in real time to provide lag-free, compliant assistive power safely.
- Flexible adjustment adapts to different users without costly full customization.

 Kollmorgen Product Solutions: TBM2G Frameless Torque Motor

Solution Values

- » TBM2G series motors feature high torque density and compact dimensions. They integrate easily with harmonic reducers to form lightweight power units for high torque requirements.
- » Multiple diameter and stack length combinations enable flexible selection for diverse assist demands, delivering custom fit while maintaining standardized, manufacturable core components.



03 Successful Case Experienced

Application-Specific Robots

Mobile Robot

It combines the mobility of an AGV and the manipulation capability of an industrial robot. Essentially, it is an autonomous mobile platform equipped with a manipulator or other tools. Its core mission is to realize unmanned, flexible and intelligent material handling in diverse environments. It is more than a "moving pallet", but also an intelligent logistics execution unit.

Motion Control Requirements

- Compact footprint with high power to drive heavy loads.
- Suits harsh environments such as explosion proof, waterproof, low temperature and shock conditions.
- Battery powered, featuring high efficiency and long endurance under limited heat dissipation.
- Enables millimeter level precise docking, smooth motion and flexible path tracking.



Kollmorgen Product Solutions: AKD Servo Drive / AKM Servo Motor / AKM3C Explosion-proof Servo Motor

Solution Values

- » High power density servo motors deliver greater power for compact and lightweight design.
- » High-bandwidth servo drives deliver precise, powerful control for AGVs.
- » Motors come with certifications and protection ratings such as explosion-proof, IP65 / IP67 and low-temperature resistance.
- » High-efficiency motors and drives with advanced energy-saving algorithms improve energy performance and thermal management.



Cable Robot

A cable-suspended robot is a large-range, high-load suspended automation system. It performs tasks via moving trolleys suspended on rigid or flexible tracks (cables), and its core design addresses material handling, processing or inspection requirements within an extra-large workspace.

Motion Control Requirements

- High torque output within minimal installation space for fast heavy-load driving.
- Standardized, modular servo system enables rapid integration and cost-effective deployment.
- Complies with safety standards; reliable braking upon power loss or faults to prevent load drop.



Kollmorgen Product Solutions: AKD Servo Drive / AKM2G Servo Motor

Solution Values

- » AKM2G delivers on average 30% higher continuous torque within the same frame size, enabling high power output in confined spaces.
- » High-performance standard servo portfolio offers modular solutions for fast deployment and cost efficiency.
- » Integrated holding brake, combined with drive safety functions, secures load locking in emergencies.



Wafer Handling Robot

A wafer handling robot is the core equipment for automated transport in wafer fabs. Its servo motors act as "power joints", directly determining the speed, precision, reliability and cleanliness of handling.

Motion Control Requirements

- Servo motors are compact, lightweight and deliver high torque in limited space.
- Motors run stably in ultra-high vacuum and clean environments with low outgassing and tight sealing.
- The system achieves ± 0.01 mm repeat positioning accuracy, demanding high encoder resolution and control precision.



Kollmorgen Product Solutions: AKD Servo Drive / TBM2G Frameless Torque Motor

Solution Values

- » TBM2G high-power-density frameless motors deliver high torque directly in compact spaces.
- » Custom ultra-low-outgassing materials and special thermal structures support long-term operation in vacuum and clean environments.
- » Paired with AKD drives and electronic filters, together with motor skewed-slot design, it achieves smooth high-speed positioning at micron-level precision.



Special-Purpose Robots

PV Cleaning Robot

A PV cleaning robot is automated equipment specially designed to clean solar panels in photovoltaic power stations or heliostat panels in concentrated solar power plants.

Motion Control Requirements

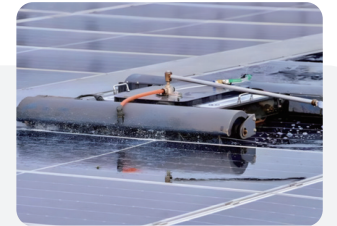
- Servo systems operate stably at -40°C .
- Adapt to off-road terrain with powerful steering and fast response.
- Built for long-term outdoor operation and low maintenance.



Kollmorgen Product Solutions: AKD Servo Drive / AKM Servo Motor / AKM Low-Temperature Servo Motor

Solution Values

- » AKM low-temperature servo motors operate stably at -40°C to guarantee reliable performance in cold environments.
- » High-performance AKM motors drive steering for flexible and precise control over complex terrain.
- » Modular servo systems replace conventional motors to boost long-term outdoor reliability and cut maintenance.



Inspection Robot

An inspection robot is an autonomous or semi-autonomous mobile intelligent device. Its core task is to replace or assist human operators to carry out inspection, monitoring, detection and data collection in hazardous, harsh, repetitive or inaccessible environments.

Motion Control Requirements

- High power density motors provide high torque and speed in compact form.
- Enable precise positioning with smooth low-speed motion, fast response and multi-axis sync in complex environments.
- High system efficiency supports long-duration nonstop inspection.



Kollmorgen Product Solutions: AKD Servo Drive / AKM2G Servo Motor

Solution Values

- » AKM2G motors feature outstanding power density, delivering on average 30% higher continuous torque in the same frame size for compact, agile robot design.
- » Paired with AKD drives, high-speed control and advanced algorithms suppress vibration and enable precise motion control.
- » High-efficiency permanent magnet servo motors with optimized overall energy efficiency greatly extend battery runtime for prolonged continuous operation.



Underwater Robot

An underwater robot is mainly used to replace human operators for missions in hazardous, complex or inaccessible underwater environments. It addresses the challenges of high labor cost, high risk and low efficiency, enabling safe, efficient and high-precision automated operations.

Motion Control Requirements

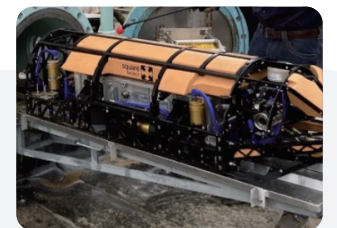
- Fully sealed for long-term operation in corrosive conductive fluids such as oil and seawater, free from short circuits and corrosion.
- Deliver high torque or thrust within minimal installation space.
- Long service life and high reliability to guarantee mission success in non-serviceable environments.
- High efficiency and low heat generation under battery power and limited heat dissipation to extend runtime.



Kollmorgen Product Solutions: AKD Servo Drive / AKM Servo Motor / KBM Frameless Torque Motor / TBM2G Frameless Torque Motor

Solution Values

- » Special-modified motor windings are encapsulated in nitrogen-pressurized vessels for dynamic sealing.
- » KBM frameless motors offer high torque density and high power output within compact dimensions.
- » Certified for reliability and durability, the motor solution reduces maintenance and improves system reliability by design.
- » High-efficiency motor design delivers high power with low heat generation to greatly extend single-charge runtime.



04 Global Footprint Timely Support

Value to Customers:

- ✓ Kollmorgen's multiple global production bases adhere to unified professional design, manufacturing, process management and ISO 9001:2015 quality management system standards.
- ✓ Local production supports fast and stable delivery as well as technical services.
- ✓ Global business cross-regional collaboration provides comprehensive support, including on-site technical services, troubleshooting and on-site product application technical training.



05 Professional Support Precise Selection

One-stop Technical Solutions

Customer-centric, providing full-process support from requirements to after-sales service, ensuring your equipment operates more stably and efficiently!



Requirements Analysis

- Recommend the suitable motor type based on the customer's application scenario.
- If standard products cannot meet the requirements, provide customized motor solutions through CoE (Customization of Engineering).



Precise Selection

- Quickly match motors using intelligent selection software based on load and motion profiles.
- Recommend highly compatible encoders according to accuracy requirements to ensure performance meets specifications.



On-Site Commissioning

- Provide detailed manuals and documentation before commissioning.
- Offer on-site training and technical support when needed to ensure customers fully understand and complete the commissioning smoothly.



Comprehensive Support Capability

- Real-time Online Technical Support.
- Efficient Product Repair and RMA Service.

Intelligent Self-Service Selection Tool

Offering a variety of tools including a servo selection tool, performance curve generator, and 2D/3D model downloads, comprehensively supporting self-service selection to easily meet your personalized needs!



Learn with me! Quick servo system design and selection!

We invite you to explore the secrets of precise, fast and efficient servo system design and selection!

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