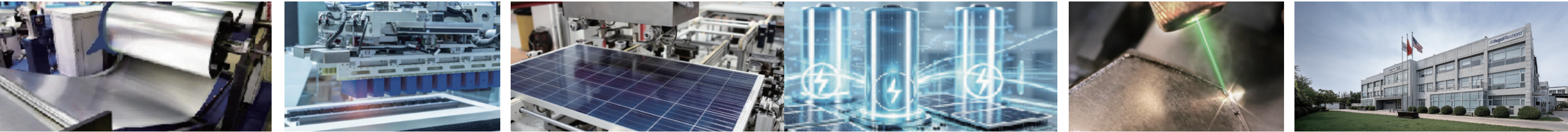


Ready to unlock the full potential of your new energy equipment?
Contact Kollmorgen motion control experts to discuss your new energy equipment needs and goals.

Kollmorgen New Energy 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

KOLLMORGEN
A REGAL REXNORD BRAND



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KOLLMORGEN
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Why Kollmorgen

Who Are We?

Kollmorgen — Motion Control System Expert

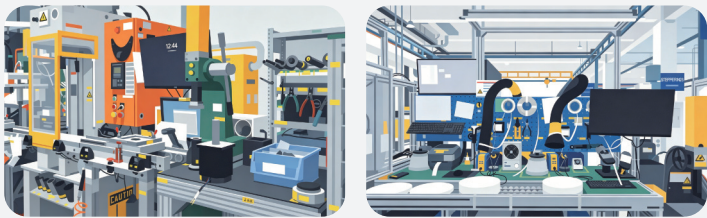
Founded in 1916, with a century of deep cultivation in the motion control system field, Kollmorgen has become a trusted brand in the industry through profound technical accumulation and innovation strength. It provides global OEM machine manufacturers with a full range of products and solutions, including 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 new energy industry, it improves equipment efficiency, precision and yield rate; 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 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; and in the printing and packaging industry, it leads high-precision direct-drive printing technology. Innovation leads the way, Kollmorgen creates countless legends!



01 Industry Value Targeted Empowerment

Core Values	Advantages Demonstrated
Direct Drive Technology Outstanding Performance	• Direct Drive Eliminates Transmission Errors: Removing intermediate transmission components, direct-drive motors fundamentally eliminate backlash and wear, laying the hardware foundation for micron-level precision and minimal speed fluctuation. • High Power Density & Fast Response: Featuring high torque/thrust density, the motors support high acceleration and rotational speed, delivering core power for rapid equipment start-stop operation.
Full Certifications Global Coverage	• Comprehensive Global Certification System: The product portfolio has obtained major global certifications including UL, CE, CCC, ATEX and IECEx explosion-proof certifications. It meets market access requirements across China, North America, Europe and other regions, removing barriers for worldwide equipment sales.
Intelligent Drive Cooperative Control	• Advanced Algorithm Compensation: AKD/AKD2G drives adopt cogging compensation and anti-resonance filtering to suppress resonance and minimize speed fluctuation for consistent processing. • High-speed Real-time Synchronization: Supporting EtherCAT, PROFINET RT/IRT, they tightly coordinate with motion controllers for high-speed multi-axis sync and accurate complex trajectory control. • Comprehensive Functional Safety: TÜV-certified SIL2/SIL3 safety functions such as SLS, dual STO, SS1 and SS2 are integrated to boost machine safety.
Deep Customization Flexible Integration	• Diversified Product Portfolio: Iron-core / ironless linear motors, frameless torque motors and more are available. Deep customization on high/low voltage, windings and cooling options meets coating, welding, stacking and other process requirements. • Inherently Compact Design: Frameless motors enable embedded mounting; linear motors allow multiple units sharing one magnetic rail, simplifying transmission structure and cutting footprint by up to 50%.
In China For the World	• Local Manufacturing & Fast Delivery: Supported by the Tianjin plant and local supply chain, local production delivers competitive lead times and stable mass delivery. • Global Network & Professional Support: As a premium servo brand, it maintains a complete global network, offering cross-region on-site technical and after-sales support for Chinese customers expanding overseas and enabling global machinery export.
Improve efficiency, precision and yield of new energy equipment.	



Linear Motors

Product Series ▼	Specifications and Features ▼	Typical New Energy Applications ▼
Iron-core Linear Motor	Specifications: Peak thrust up to 12500 N with high thrust density. Features: High stiffness, high thrust density and excellent heat dissipation. Suitable for heavy-duty applications requiring high continuous thrust and rigidity.	• XY motion platform for laser welding of lithium battery top covers, enabling high-speed and high-precision trajectory welding. • In hydrogen fuel cell stack assembly equipment, it replaces robotic arms for pick-and-place stacking operations to boost efficiency and save space.
Ironless Linear Motor	Specifications: Max peak thrust 1600 N, continuous thrust 262 N. Zero cogging delivers ultra-smooth motion with minimal thrust ripple. Features: No magnetic attraction and zero cogging for ultra-smooth movement. Lightweight, ideal for applications demanding ultra-high precision and low moving mass.	• Precision coating platform drive for perovskite solar cell film coaters in photovoltaics, enabling nanometer-level uniform coating. • Positioning stage for high-precision optical inspection equipment, used for defect detection of new energy materials.
Water-cooled Linear Motor	Specifications: Integrated high-efficiency water cooling channels boost continuous thrust by 30–50% compared with uncooled iron-core linear motors. Features: Superior heat dissipation enables long-term stable operation under high duty cycles and high continuous thrust, greatly improving power output and reliability.	• Linear drive unit for new energy equipment with high power and long-duration continuous operation.

Frameless Direct Drive Motors

Product Series ▼	Specifications and Features ▼	Typical New Energy Applications ▼
KBM / CBM Frameless Direct Drive Motor	Specifications: Stator outer diameter 60–850 mm, continuous torque 0.49–3445 Nm, peak torque up to 12812 Nm, speed up to tens of thousands of rpm. Features: High torque density, zero backlash, smooth operation, flexible structure for seamless integration and high reliability.	• Winding needle shaft drive for winding machines, replacing conventional belt and gear transmissions to improve winding speed and consistency. • Precision motion axis for photovoltaic laser patterning and doping machines, meeting requirements for high-precision positioning and high-speed start-stop operation.
CDDR Direct Drive Motor	Specifications: Frame size 108–350 mm, continuous torque 4.57–510 Nm. Plug-and-play with housing, unique structural design enables installation and removal within 5 minutes. Features: Factory pre-calibrated, easy installation comparable to conventional servos. High torque density (approximately 50% higher than traditional servos), greatly shortening customer integration cycles.	• Drives the main steel roller of lithium battery coaters to enhance speed, precision and stability. • Main transmission mechanism for lithium battery electrode die-cutting machines, delivering high-speed intermittent feeding.

Servo Motors

Product Series ▼	Specifications and Features ▼	Typical New Energy 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 Max speed: 8000 rpm Features: High performance and reliability with high torque density and great flexibility. Multiple winding options available to meet applications from low-speed high-torque to high-speed requirements.	• Auxiliary axis drives for unwinding, web guiding and sheet feeding in battery winding machines. • Works with DDL linear motors and lead screws to perform stacking actions in hydrogen fuel cell stack assembly equipment. • Drives for various auxiliary axes and transport mechanisms of new energy equipment.
AKM3C / AKME Explosion Proof Servo Motor	Specifications: Two explosion-proof motor models, AKM3C and AKME. Compliant with CCC for Zone 2 gas and Zone 21 dust, as well as ATEX and IECEx for Zone 2 gas and Zone 22 dust. Multiple frame sizes; maximum speed up to 8000 rpm (5000 rpm for 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.	• Key drives for lithium battery production equipment (e.g., mixing, lithium replenishment) operating in environments with flammable gas, eliminating potential safety hazards.
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.	• Drive for heliostat panel cleaning vehicles in photovoltaic solar systems operating under low-temperature conditions. • Guarantees reliable operation of outdoor new-energy equipment in frigid regions.

Drive and Control Systems

Product Series ▼	Specifications and Features ▼	Typical New Energy 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: 3–24 A. Supports single-axis or dual-axis configuration with built-in functional safety up to SIL3/PLe. Compatible with multiple industrial buses including EtherCAT, CANopen, PROFINET and Ethernet/IP. Features: High performance and reliability with integrated safety functions to facilitate equipment export. Modular design supports various feedback types and offers excellent compatibility with the full range of motors.	• Provides core drive and control for AKM, KBM, DDL, CDDR and other motors across all new energy applications, serving as the key to high equipment performance. • Delivers next-generation drive cores for new energy equipment requiring ultra-high dynamic performance and fast response.
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 3-in-1 design significantly reduces system complexity, cabinet space and wiring costs. A unified programming environment shortens development cycles.	• Complex multi-axis new energy equipment (such as integrated battery module test lines and photovoltaic module production lines) for integrated motion control, logic control and data acquisition.
PCMM2G Programmable Motion Controller	Specifications: Next-generation controller supporting synchronized path motion control for up to 64 axes. Features: Powerful performance and outstanding scalability for multi-axis motion control. Open and flexible hardware and software platform.	• Central motion control platform for multi-axis new energy production lines or test systems with demanding motion control requirements.

03 Successful Case Experienced

Mixer

Lithium battery mixers uniformly disperse cathode/anode active materials, conductive agents, binders and solvents under vacuum or inert gas to prepare electrode slurry with defined viscosity, solid content and dispersion.

Motion Control Requirements

- Wide speed range, high low-speed torque
- Precise start-stop & tracking for large inertia loads
- Reliable low-noise operation in vacuum or sealed environments
- Explosion-proof safety for hazardous gas zones



Kollmorgen Product Solutions: AKD Servo Drive / AKME Explosion Proof Servo Motor / AKM3C Explosion Proof Servo Motor

Solution Values

- » Explosion-proof servo motors paired with AKD servo drives deliver high torque at low speeds and smooth operation with minimal speed fluctuation.
- » High motor dynamics and AKD advanced algorithms suppress overshoot and vibration for fast, precise start-stop and process tracking.
- » With IP65/IP67 protection and optional special seals and coatings, the motors run stably in sealed vacuum environments.
- » AKM3C (CCC) and AKME (ATEX / IECEx) motors are built for hazardous gas/dust areas, forming a fully compliant explosion-proof motion system with AKD drives.



Coater

Coaters produce battery cathode and anode sheets by applying mixed electrode slurry uniformly and precisely onto metal foils (copper, aluminum), followed by drying to form electrode sheets.

Motion Control Requirements

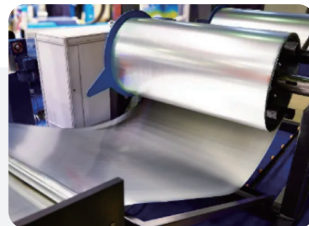
- Reduce areal density and thickness errors to raise yield
- Minimal speed fluctuation eliminates uneven coating
- Motor locks position firmly to avoid scrap from roller micro-movement



Kollmorgen Product Solutions: AKD Servo Drive / CDDR Direct Drive Motor

Solution Values

- » CDDR motors deliver high-precision speed control: speed fluctuation $\leq 0.2\%$ at 30–50 rpm and $\leq 0.1\%$ at 3 rpm, ensuring ultra-smooth roller rotation and reduced electrode density deviation.
- » AKD drives feature proprietary cogging compensation, using feedforward current to counteract cogging torque and maintain steady, consistent slurry output.
- » The semi-enclosed direct-drive CDDR connects the coating roller directly to the rotor. It delivers precise positioning and prevents electrode scrap caused by roller micro-movement during standstill.



Electrode Die-cutting Machine

Electrode die-cutting machines are critical for the front-end lithium battery process, punching cathode and anode sheets with tabs.

Motion Control Requirements

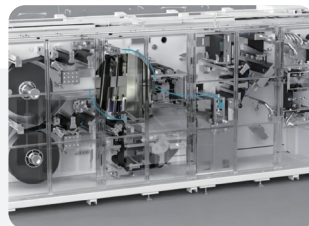
- Frequent stop-cut start-stop accelerates reducer wear, causing precision loss and unstable tab spacing
- Higher throughput requires fast, coordinated multi-axis dynamics
- Conventional transmissions have many wear parts, leading to frequent maintenance, precision decay and low yield stability



Kollmorgen Product Solutions: AKD Servo Drive / CDDR Direct Drive Motor / KBM Frameless Direct Drive Motor

Solution Values

- » Direct drive motors power rollers directly with no gearbox backlash or wear, maintaining ultra-high positioning accuracy under 3 Hz cutting cycles, featuring maintenance-free operation and low noise.
- » Direct drive motors at key stations paired with high-performance AKD drives enable fast multi-axis synchronization via high-speed bus and advanced algorithms.
- » Fewer mechanical components realize maintenance-free operation, eliminating lubricant leakage, slipping and wear to cut costs and boost reliability.



Cylindrical Cell Winding Machine

Cylindrical cell winding machines are core mid-stage lithium battery manufacturing equipment, precisely winding cathode sheets, anode sheets and separators into cylindrical cells.

Motion Control Requirements

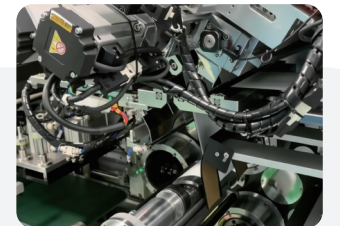
- Constant winding speed prevents electrode/seperator stretching and wrinkling
- Low tension fluctuation with varying roll diameter for tight, neat winding
- Fast response & short settling time for high-speed precision positioning



Kollmorgen Product Solutions: AKD Servo Drive / KBM Frameless Direct Drive Motor

Solution Values

- » KBM direct-drive winding needles paired with AKD high triple-loop refresh eliminate transmission backlash for higher and stable linear speed.
- » The drive pre-calculates and compensates speed differences among unwinding, winding needle and traction axes to synchronize motions. High response bandwidth suppresses fluctuations and prevents material stretching.
- » KBM direct drive delivers a short, rigid transmission chain for high loop gain, faster response and shorter settling time. Consistent parameters across units simplify commissioning and improve efficiency.



Fully Automatic Square Winding Machine

Fully automatic square winding machine winds the positive electrode sheet, negative electrode sheet and separator of the battery into square cells at high speed and high precision with accurate sequence and tension control.

Motion Control Requirements

- Remove belts, gears and sliding shafts to reduce inertia and boost efficiency and response
- Smooth trajectory avoids anomalies, suppresses tension fluctuation for tight winding
- Higher stable line speed increases throughput
- Shared parameters simplify commissioning and guarantee consistency across winding needles and machines



Kollmorgen Product Solutions: AKD Servo Drive / KBM Frameless Direct Drive Motor

Solution Values

- » Direct drive motors eliminate belts, gears and sliding shafts for simpler structure, faster response and smaller size.
- » AKD drives with high triple-loop refresh achieve high-speed precision closed-loop control and suppress tension fluctuation.
- » KBM direct drive and AKD deliver higher, smoother winding speed to boost productivity.
- » Direct drive removes mechanical errors. Consistent winding needle motors share optimized parameters to simplify commissioning and stabilize production.



Blade Battery Cutting and Stacking Integrated Machine

Blade battery cutting and stacking integrated machine precisely stacks and assembles positive sheets, negative sheets and separators in accurate sequence and position to form prismatic or pouch battery cells.

Motion Control Requirements

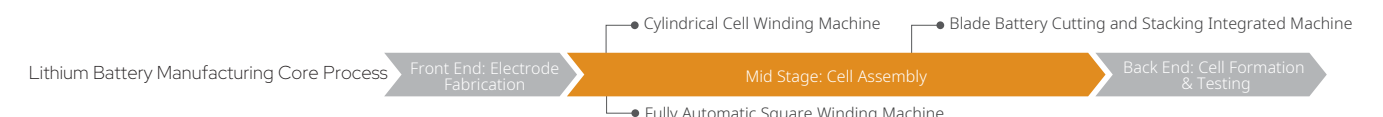
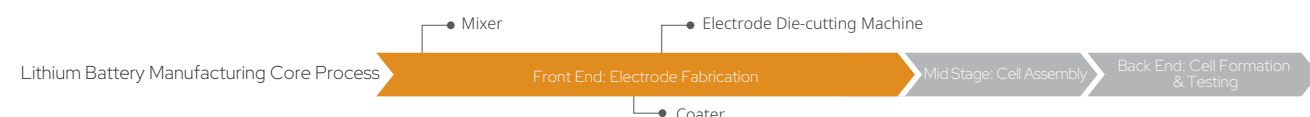
- Drives heavy platforms for long-travel precise motion
- High acceleration and short cycles lift throughput
- Micron-level positioning at high speed ensures neat stacking
- Plug-and-play in limited space for rapid performance upgrade



Kollmorgen Product Solutions: AKD Servo Drive / DDL Linear Motor / CDDR Direct Drive Motor / KBM Frameless Direct Drive Motor

Solution Values

- » DDL linear motors feature high load capacity, rigidity and response to meet strict positioning requirements for large-format stacking.
- » They deliver high peak thrust and acceleration for stable high-speed production.
- » Compact direct-drive design integrates easily into existing equipment for quick upgrades.
- » With no transmission backlash or wear, they offer precise, smooth motion to ensure neat stacks and consistent cell quality.



03 Successful Case Experienced

Can Top Laser Welding Machine

The can top laser welding machine is core mid-stage equipment for lithium battery production, performing hermetic welding between prismatic battery casings and cover plates.

Motion Control Requirements

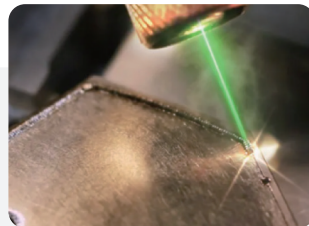
- Greatly boost welding speed to break throughput bottlenecks
- High instantaneous acceleration ensures stable cornering without deceleration
- Precise corner positioning with minimal overshoot
- Wide force and acceleration range for multi-model welding



Kollmorgen Product Solutions: AKD Servo Drive / IC Linear Motor / ICF Linear Motor

Solution Values

- » IC / ICF high-performance linear motors achieve high welding speed and break traditional speed limits.
- » High instantaneous acceleration plus PVT true-circle algorithm enables stable high-speed small-radius cornering without deceleration.
- » AKD drives with high three-loop refresh rate deliver fast response, low overshoot and precise positioning to boost sealing and yield.
- » Direct drive supplies wide continuous and peak force for diverse loads and high acceleration, improving machine flexibility.



PV Screen Printer

Screen printing is a core back-end process for PV cell production. It precisely prints positive and negative electrode circuits on mono or polycrystalline silicon wafers to form grid lines for current collection and conduction.

Motion Control Requirements

- Shorten rotary table positioning time and boost throughput
- Arc-second precision guarantees consistent grid printing and fewer defects
- High instant torque & fast settling eliminate overshoot and vibration
- Efficient cooling protects slurry and accuracy from heat



Kollmorgen Product Solutions: AKD Servo Drive / DDL Linear Motor / KBM Frameless Direct Drive Motor

Solution Values

- » DDL linear motors reduce load while KBM direct drive motors offer fast response to shorten cycle time and raise throughput.
- » Direct drive motors with high-resolution feedback and zero backlash deliver micron or arc-second repeat positioning for stringent printing.
- » High torque-density KBM motors with AKD high-bandwidth control auto-tune large inertia loads without overshoot.
- » Water-cooled direct drive motors keep stable temperature in long operation to sustain performance and positioning accuracy.



Electrolyte Filling Machine for Lithium Battery

The lithium battery electrolyte filling machine is key mid-stage equipment (before formation) to inject precise and quantified electrolyte into assembled cell housings.

Motion Control Requirements

- High-speed multi-axis continuous production
- Full certifications for overseas export projects
- Motors offer excellent explosion-proof performance for safe production



Kollmorgen Product Solutions: AKD2G Servo Drive / DDL Linear Motor / AKM3C / AKME Explosion-proof Servo Motor

Solution Values

- » AKD2G integrates multiple filters to suppress resonance disturbances. Combined with high-speed linear motor windings, it enables smooth start-stop and high-cycle operation to raise productivity.
- » Drives and motors hold mandatory certifications including UL and CE for global export compliance.
- » Explosion-proof motors complying with CCC Zone 2 / 21, ATEX and IECEx Zone 2 / 22, paired with safety-enabled AKD2G drives, meet safety production requirements.



Perovskite Coater

Perovskite coaters are core equipment for perovskite solar cell production. They evenly apply perovskite precursor solution onto large-area substrates to form high-quality perovskite films after crystallization.

Motion Control Requirements

- Ultra-low speed fluctuation ensures uniform coating thickness
- Vibration-free motion maintains consistent coating
- Fast start-stop & high acceleration for quick settling without overshoot
- Zero-maintenance, uniform large-area coating with long-term stability



Kollmorgen Product Solutions: AKD Servo Drive / DDL Linear Motor

Solution Values

- » DDL linear motors provide smooth thrust. AKD high-refresh-rate control ensures stable low-speed motion and uniform coating.
- » Direct drive eliminates transmission errors. Embedded mounting reduces vibration and improves system rigidity.
- » Lightweight direct-coupled motors feature low inertia ratio for high acceleration, fast settling and higher productivity.
- » Direct drive has no wearing parts and requires zero maintenance. AKD filter algorithms adapt to varied loads for consistent large-area coating.



Lithium Battery Assembly Line

The lithium battery assembly line assembles cells, housings, tops and safety components into complete modules or packs after cell assembly.

Motion Control Requirements

- Ultra-high repeat positioning for stable precision mating
- Mixed force-position control with real-time monitoring prevents overpressure in press-fitting
- Gantry truss maintains stable end accuracy under heavy high-speed loads to avoid collisions
- Full certifications and high safety to meet overseas export requirements



Kollmorgen Product Solutions: AKD / AKD2G Servo Drive / DDL Linear Motor

Solution Values

- » High-resolution encoders and nanoscale position control enable stable micron positioning.
- » AKD force-sensing full closed-loop with embedded algorithms achieves precise force and motion profiles for better assembly quality.
- » DDL linear motors plus AKD filters suppress low-frequency vibration, maintaining accuracy under heavy high-speed loads.
- » Drives and motors hold UL, CE and other global certifications. AKD2G's rich safety functions support machine export.



Fuel Cell Stacking Machine for Hydrogen Energy

Hydrogen fuel cell stacking machines are core manufacturing equipment that stack single cells (bipolar plates) into stacks at high speed and precision in strict sequence.

Motion Control Requirements

- Greatly improve stacking cycle rate, breaking bottlenecks of multi-axis robot motion
- Reduce machine footprint for compact production lines
- Higher positioning accuracy ensures sheet alignment and stack quality
- Simplify complex mechanics, cutting initial investment and long-term maintenance cost



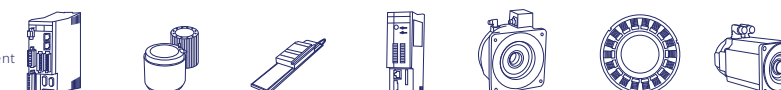
Kollmorgen Product Solutions: AKD Servo Drive / DDL Linear Motor

Solution Values

- » DDL linear motors enable rapid horizontal travel to cut cycle time and boost productivity.
- » Linear direct drive replaces rotary robotic arms, simplifying transmission and reducing machine footprint.
- » Zero-backlash, high-stiffness direct drive, paired with high-precision linear scales and AKD control, delivers accurate stacking alignment.
- » The direct-drive servo solution replaces multi-joint robots, minimizing wear points for higher reliability and lower lifecycle cost.



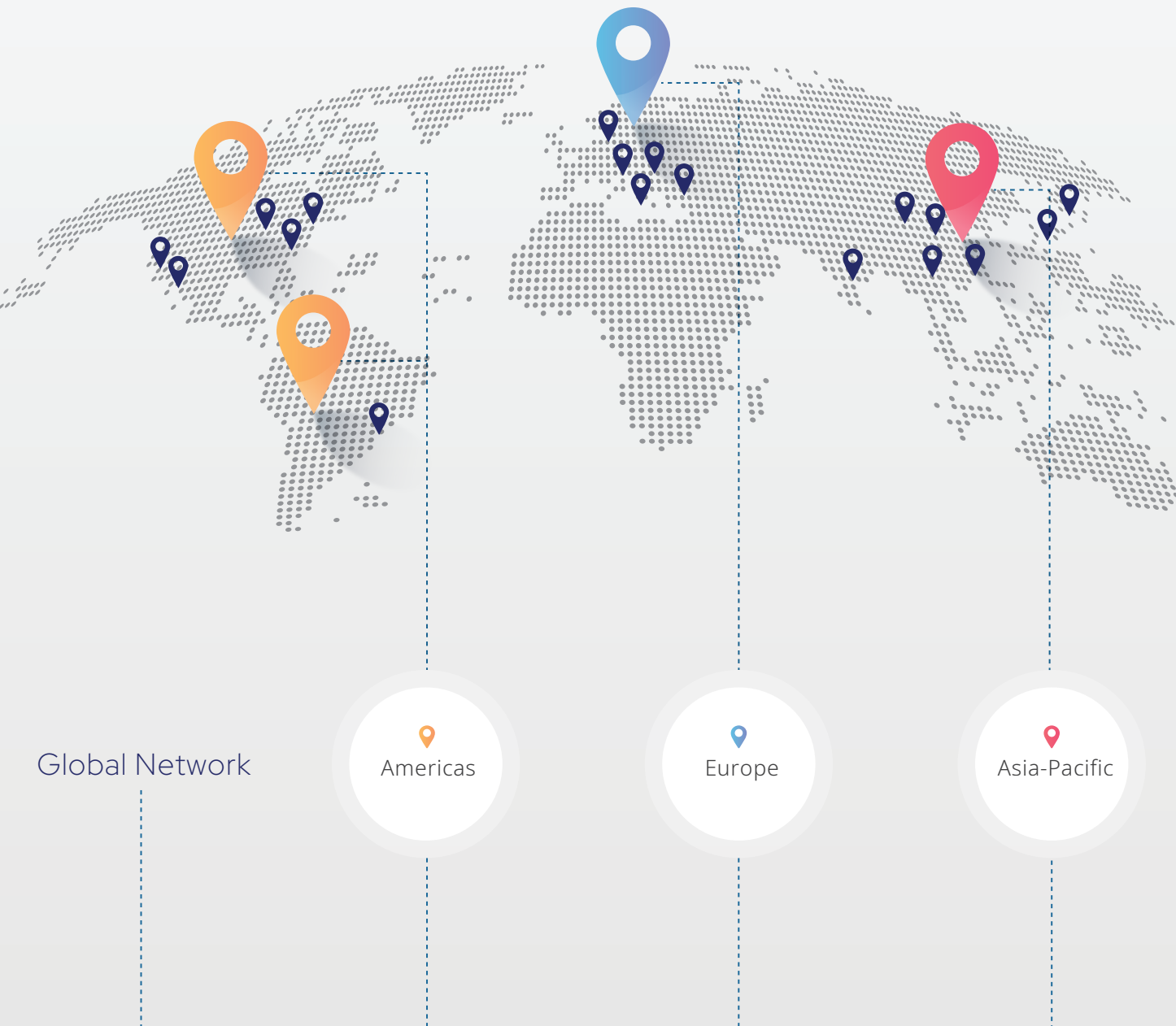
High-performance Products Empower New Energy Equipment



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

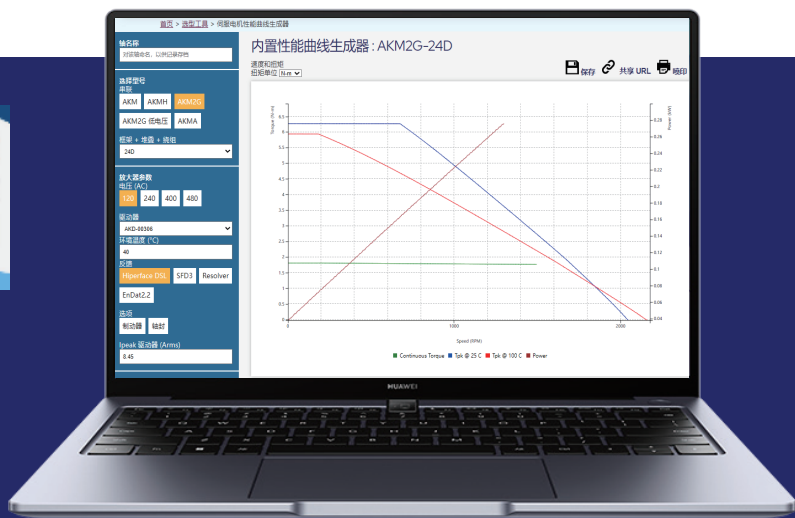
Offering a variety of tools including a servo selection tool, performance curve generator, and 2D/3D model downloads, comprehensively supporting self-service selection to easily meet your personalized needs!



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