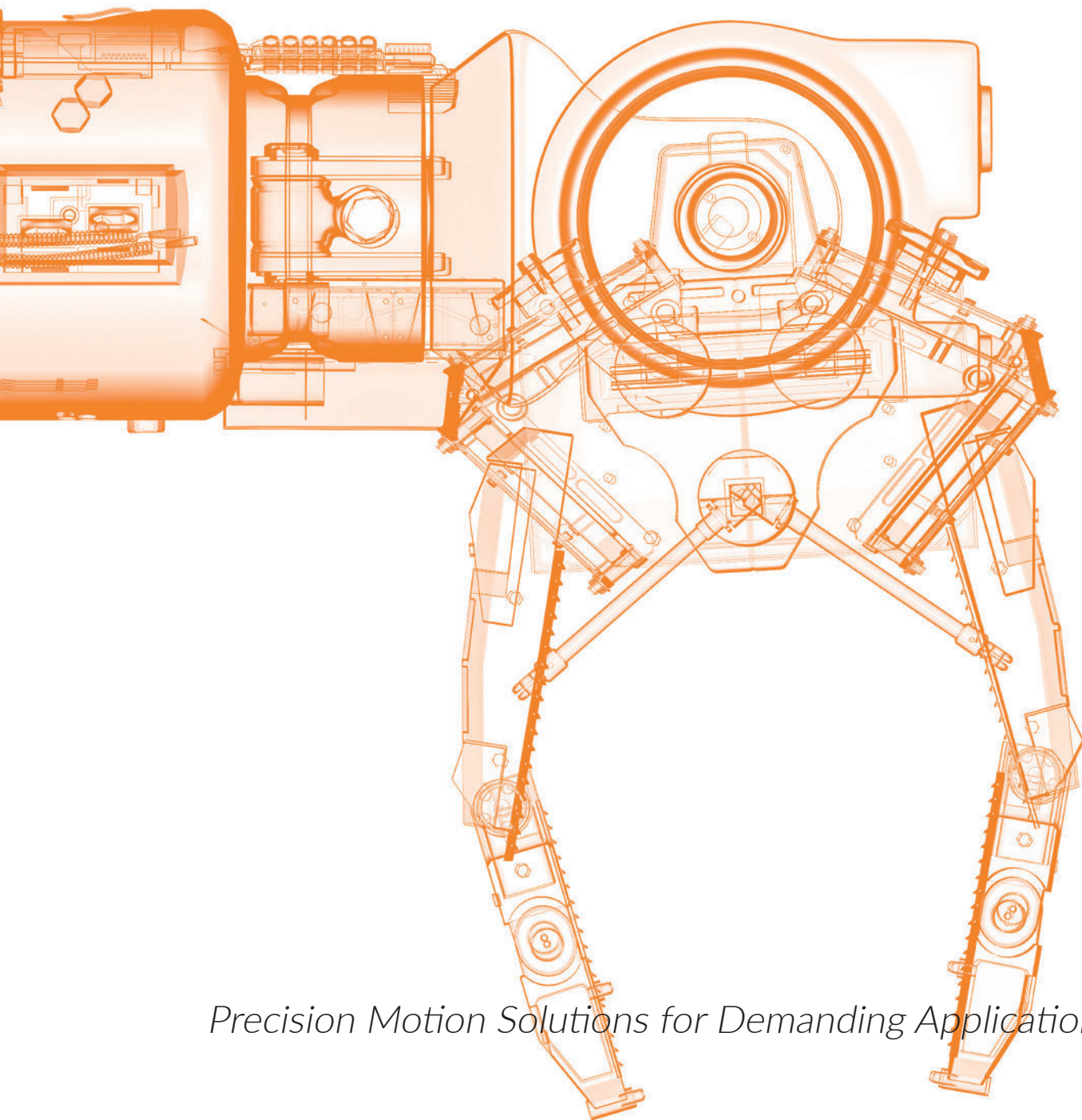


TIMKEN | PRECISION DRIVES

Engineered for Your Industry



Precision Motion Solutions for Demanding Applications

Engineered for What Moves Industry

Timken Precision Drives brings together advanced motion technologies and engineering expertise to solve complex motion challenges across demanding industries. Our portfolio spans precision gearing, drive systems, encoders and motion control technologies designed to deliver the accuracy, reliability and performance today’s applications require.

Through **Cone Drive**, **CGI**, **SPINEA** and **Timken Encoders**, we offer complementary technologies including strain wave, cycloidal and precision planetary gearing, along with advanced position feedback solutions. This breadth allows our engineers to look beyond a single product or technology and focus on what matters most: finding the right solution for the application.

From automation and robotics to aerospace, defense, medical equipment and other highly engineered markets, Timken Precision Drives helps customers turn challenging motion requirements into reliable, high-performance solutions.

One Partner. Every Motion Challenge.



Explore our precision motion solutions.

www.TimkenPrecisionDrives.com

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TIMKEN | PRECISION DRIVES

for AUTOMATION & ROBOTICS

PRECISION MOTION FOR ADVANCED AUTOMATION

From industrial robots and collaborative automation to autonomous mobile platforms and precision positioning systems, Timken Precision Drives brings together complementary motion technologies to help OEMs improve accuracy, productivity, and performance.

- Robot Joints
- Cobots
- End Effectors
- AGVs/AMRs
- Positioning Systems
- Factory Automation

Designed to Meet Critical Requirements

- ✓ Zero or low backlash
- ✓ High torque density
- ✓ High torsional stiffness
- ✓ Compact system designs
- ✓ Precise, repeatable motion

Timken Precision Drives combines **strain wave, cycloidal, planetary, worm, micro gearing, and integrated actuator technologies** with **precision bearings, high-resolution encoders, and custom motion solutions** to optimize motion throughout automated systems.



Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies



TIMKEN | PRECISION DRIVES

for HUMANOID ROBOTICS

PRECISION MOTION FOR HUMAN-LIKE MOVEMENT

Humanoid robots require motion systems that deliver precision, torque density, stiffness, efficiency, and reliability. Timken Precision Drives brings together complementary motion technologies to help OEMs solve these demanding design challenges.

- Arm Joints
- Leg Joints
- Waist Rotation
- End Effectors
- Vision Systems
- Mobile Bases

Designed to Meet Critical Requirements

- ✓ Zero or low backlash
- ✓ High torque density
- ✓ High torsional stiffness
- ✓ Compact, lightweight packaging
- ✓ Long service life and reliability

Timken Precision Drives combines **strain wave, cycloidal, planetary, worm, micro gearing, and integrated actuator technologies** with **precision bearings, high-resolution encoders, and custom motion solutions** to help engineers optimize robotic motion throughout the entire system.



Built on Timken Capabilities

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- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies





TIMKEN | PRECISION DRIVES

for MEDICAL AUTOMATION

PRECISION MOTION FOR ADVANCED MEDICAL EQUIPMENT

From surgical robotics and diagnostic systems to laboratory automation and patient positioning, Timken Precision Drives delivers compact, precise motion technologies for advanced medical equipment.

Surgical Robotics Diagnostics Lab Automation Imaging Patient Positioning Pharmacy Automation

Designed to Meet Critical Requirements

- ✓ High positioning accuracy
- ✓ Zero or low backlash
- ✓ Smooth, precise motion
- ✓ Compact lightweight designs
- ✓ Long service life and reliability

Timken Precision Drives combines **strain wave, cycloidal, planetary, worm, and micro gearing technologies** with **integrated actuators, precision bearings, high-resolution encoders, and custom motion solutions** to help medical equipment manufacturers solve demanding automation and positioning challenges.



Laboratory Automation



Surgical Robotics

Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies



Imaging and Positioning



TIMKEN | PRECISION DRIVES

for AEROSPACE & DEFENSE

PRECISION MOTION FOR CRITICAL SYSTEMS

From aircraft and unmanned systems to radar, satellite communications, and defense platforms, Timken Precision Drives delivers compact, precise motion technologies for demanding applications.

Radar EO/IR UAV Flight Controls SatCom Targeting

Designed to Meet Critical Requirements

- ✓ Compact, lightweight designs
- ✓ High positioning accuracy
- ✓ Low backlash
- ✓ Long service life
- ✓ Reliable operation in demanding environments

Timken Precision Drives combines **micro gearing, strain wave, cycloidal, planetary, worm, and slew drive technologies**, including **integrated actuator technologies**, with **precision bearings, high-resolution encoders, and custom motion solutions** to solve complex aerospace and defense motion challenges.



Satellite Communications



EO/IR Sensor Stabilization

Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies



Aircraft Actuation



TIMKEN | PRECISION DRIVES

for SATELLITE COMMUNICATIONS

PRECISION MOTION FOR ACCURATE TRACKING & POSITIONING

From fixed installations to mobile and airborne systems, Timken Precision Drives delivers precise, reliable motion technologies for accurate antenna tracking and positioning.

- Ground Stations
- Mobile Terminals
- UAV Antennas
- Radar
- Tactical SatCom
- Comms-on-the-Move

Designed to Meet Critical Requirements

- ✓ High positioning and tracking accuracy
- ✓ Low backlash
- ✓ High torque and moment capacity
- ✓ Smooth, repeatable azimuth and elevation motion
- ✓ Reliable operation in demanding environments

Timken Precision Drives combines **worm, strain wave, cycloidal, and slew drive technologies** with **precision bearings, high-resolution encoders, and engineered motion solutions** to support accurate positioning and stabilization across satellite communication systems.



Mobile Terminal Positioning

Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies



Ground Station Positioning



Shipboard SatCom



TIMKEN | PRECISION DRIVES

for FOOD & BEVERAGE

PRECISION MOTION FOR HIGH-PERFORMANCE AUTOMATION

From processing and packaging to robotic handling and inspection, Timken Precision Drives delivers precise, reliable motion technologies for automated food and beverage equipment.

- Processing
- Packaging
- Filling
- Conveying
- Robotics
- Inspection

Designed to Meet Critical Requirements

- ✓ Precise, repeatable motion
- ✓ High-speed operation
- ✓ Compact system designs
- ✓ High duty-cycle performance
- ✓ Long service life and reliability

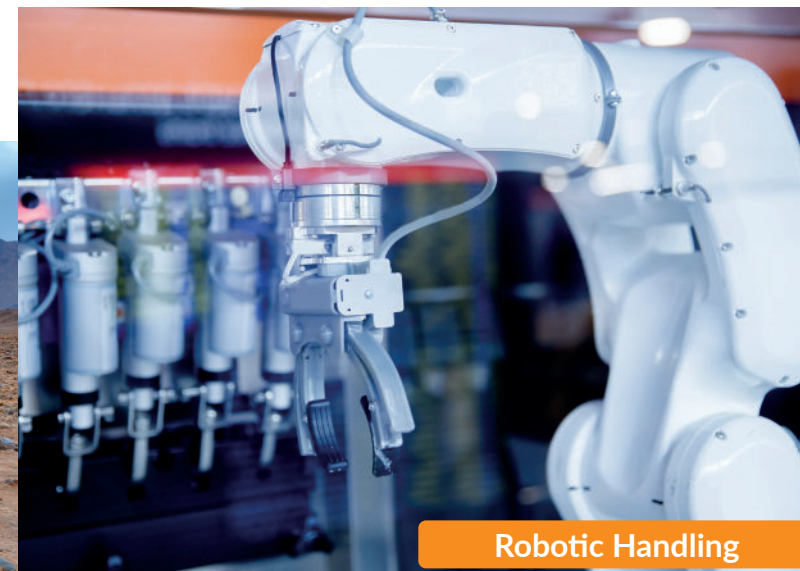
Timken Precision Drives combines **planetary, cycloidal, strain wave, worm, and micro gearing technologies** with **integrated actuators, precision bearings, high-resolution encoders, and custom motion solutions** to support high-performance automation throughout food and beverage production.



Packaging Automation

Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple precision motion technologies



Robotic Handling



Processing and Filling



TIMKEN | PRECISION DRIVES

for RENEWABLE ENERGY

RELIABLE MOTION FOR RENEWABLE ENERGY SYSTEMS

From solar tracking to wind energy, Timken Precision Drives delivers reliable motion technologies for accurate positioning and long-term performance.

Solar Tracking Single and Dual Axis Trackers Concentrated Solar Wind Energy Energy Automation

Designed to Meet Critical Requirements

- ✓ High torque and moment capacity
- ✓ Accurate, repeatable positioning
- ✓ Long service life
- ✓ Low maintenance requirements
- ✓ Reliable outdoor operation with robust sealing

Timken Precision Drives combines **slew drives and bearings, worm, planetary, cycloidal, and precision gearing technologies** with **encoders and engineered motion solutions** to support reliable positioning and automation throughout renewable energy systems.



Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple motion technologies



TIMKEN | PRECISION DRIVES

for CONSTRUCTION

RUGGED MOTION FOR HEAVY-DUTY EQUIPMENT

From cranes and aerial platforms to material handling and specialty equipment, Timken Precision Drives delivers robust motion technologies engineered to move, position, and support demanding loads.

Cranes Aerial Platforms Utility Trucks Demolition Robotics Concrete Equipment Specialty Vehicles

Designed to Meet Critical Requirements

- ✓ High torque capacity
- ✓ High radial, axial, and moment load capacity
- ✓ Shock and impact resistance
- ✓ Long service life
- ✓ Reliable operation in demanding environments

Timken Precision Drives combines **slew drives and bearings, worm, planetary, cycloidal, and custom gearing technologies** with **precision bearings and engineered motion solutions** for demanding construction and heavy-equipment applications.



Built on Timken Capabilities

- ✓ Global manufacturing and support
- ✓ Collaborative application engineering
- ✓ Advanced engineering and R&D resources
- ✓ Decades of proven quality systems
- ✓ Standard, modified, and custom solutions
- ✓ Multiple motion technologies





TIMKEN

PRECISION
DRIVES

 Cone Drive



SPINEA

TIMKEN
ENCODERS

ONE PARTNER. MULTIPLE MOTION TECHNOLOGIES.

Distinct technologies engineered for different motion challenges.
Together, they create one of the industry's most comprehensive precision motion portfolios.



STRAIN WAVE GEARING

Compact, zero-backlash precision

- ✓ Zero backlash
- ✓ High reduction ratios
- ✓ Exceptional positioning accuracy



WORM GEARING

Reliable right-angle motion

- ✓ High torque capacity
- ✓ Wide range of reduction ratios
- ✓ Flexible mounting configurations



SLEW BEARINGS & DRIVES

Integrated rotary positioning

- ✓ High-capacity rotary positioning
- ✓ Smooth rotary positioning
- ✓ Bearing and drive configurations



MAGNETIC ENCODERS

High-resolution motion feedback

- ✓ High-resolution position sensing
- ✓ Accurate speed feedback
- ✓ Compact, integrated design



CYCLOIDAL GEARING

High torque and exceptional rigidity

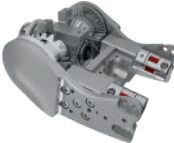
- ✓ High torque capacity
- ✓ Exceptional torsional stiffness
- ✓ DriveSpin® integrated actuators



PLANETARY GEARING

Compact, efficient power transmission

- ✓ High power density
- ✓ Low backlash options
- ✓ Efficient torque transmission



MICRO GEARING

Miniature precision motion

- ✓ Extremely small package sizes
- ✓ Precision gearheads
- ✓ Custom configurations available



ENGINEERED SOLUTIONS

Integrated motion solutions

Standard, modified, and custom solutions backed by application engineering expertise.

Why Timken Precision Drives?

- ✓ Multiple Motion Technologies
- ✓ Proven Quality & Reliability
- ✓ System-Level Engineering
- ✓ Global Support
- ✓ Standard, Modified, & Custom Solutions
- ✓ 125+ Years of Innovation

Precision motion. Global engineering and manufacturing. Timken quality.

TIMKEN

PRECISION
DRIVES

SPECIALIZED EXPERTISE. One Motion Partner.



Micro & Planetary Gearing

 **Cone Drive**

Strain Wave, Double-Enveloping Worm & Slewing Technologies

 **SPINEA**

Cycloidal Gearing & Actuators

TIMKEN
ENCODERS

Absolute & Incremental Magnetic Encoders

www.TimkenPrecisionDrives.com



THE STRENGTH OF TIMKEN.
The Expertise of Motion Specialists.

Timken Precision Drives brings together specialized motion technologies with the global strength, engineering expertise and resources of The Timken Company. The result is a motion partner with the technology, experience and support to solve demanding motion challenges.

125+ YEARS OF INNOVATION

A legacy of engineering expertise built on solving demanding mechanical challenges.

GLOBAL ENGINEERING & SUPPORT

Engineering, manufacturing and customer support capabilities serving OEMs around the world.

PROVEN QUALITY & RELIABILITY

Products and solutions backed by a company built around performance, quality and dependability.

APPLICATION-DRIVEN INNOVATION

Engineering expertise that goes beyond individual components to develop complete motion solutions.



LET'S SOLVE YOUR NEXT MOTION CHALLENGE

From standard products to engineered solutions, our team can help identify the right technology for your application.

READY TO DISCUSS YOUR APPLICATION?

Scan to connect with our team.

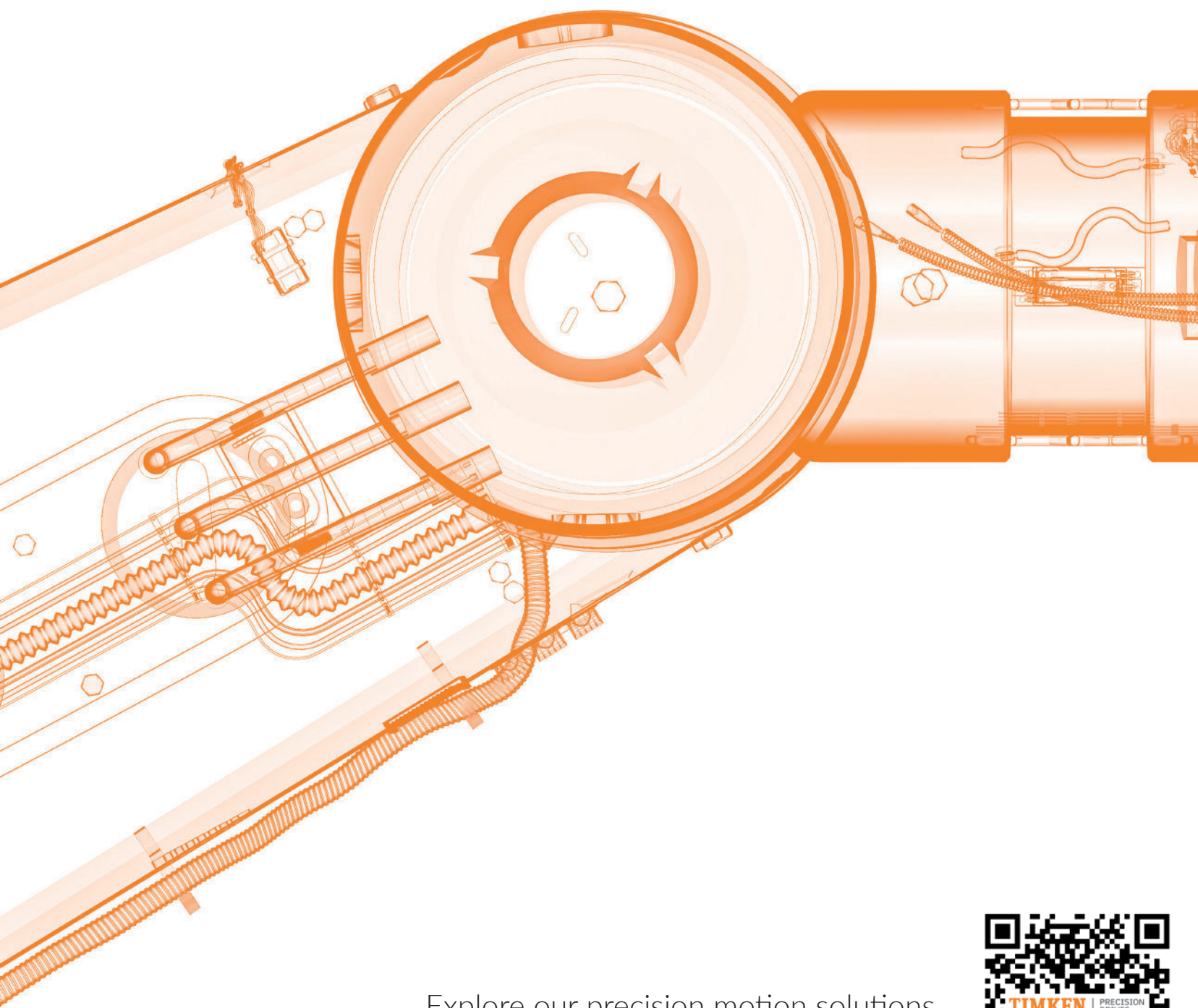


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Explore our precision motion solutions.

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