



Direct Drive Rotary Stages & Worm Gear Rotation Stages / Goniometers | Motorized, High Performance

Different Direct Drive Principles with 3-Phase and Piezo-Electric Motors

High Performance Rotation Stages for Industry and Research

The PI Group provides a variety of direct drive rotation stages and worm-gear driven goniometers and rotary stages, designed for a large spectrum of automation and research applications. High speed, high performance rotation stages are equipped with 3-phase electromagnetic motors and mechanical bearings or air bearings – for frictionless and maintenance free operation with the highest accuracy and geometric precision. Our extensive knowledge in the design and manufacture of highly precise rotation stages and multi-axis positioning systems has helped many customers solve precision motion control problems in variety of applications, including optical metrology, precision automation, beamline instrumentation, fiber-optical alignment, semiconductor inspection, bio-medical instrumentation, and X-ray crystallography.

Choose from a Product Group below, or scroll to see all Product Groups



PI



Direct Drive Rotation
Stages with Torque
Motors: High
Precision, High Speed



Air Bearing Rotation
Stages with Torque
Motors: Ultra-high
Precision, High Speed.
Large Aperture, Low
Profile & Vacuum
Chuck Options.



Rotation Stages with
Worm Gear Drive:
Stepper and Servo
Motors, Large
Aperture, High Load



Miniature Rotation
Stages with Worm
Gear Drive: Stepper
and Servo Motors



Goniometers: Servo &
Stepper Motors



Low Profile Rotation
Stages with Ultrasonic
Piezo Motor: High
Speed, Self Locking



Miniature Rotation
Stages with Ultrasonic
Piezo Motor: High
Speed, Self Locking



Ultra-Compact
Rotation Stages with
Piezo Inertia Motor:
Low Cost, High
Resolution, Self
Locking

The advantage of working with PI is the access to a large variety of different drive and guiding technologies.

Highest performance is guaranteed through the complete control of the design and machining process, the selection of components and assembly. Our air-bearing rotary stage selection is the most accurate in the industry with minimized eccentricity and wobble, while providing the highest repeatability and accuracy. A variety of motors and drive principles are available from stepper-motor driven worm gear designs to direct drive closed-loop torque motors. Low profile piezo motor stages provide self-locking capabilities with zero jitter, drift and no holding current at rest.



PI



How Ultrasonic Transducer Ring Actuators Work



Silent Ultrasonic Direct-Drive Motor: Leica Theodolite



Rotary Stages with Direct Drive Torque Motor

Miniature Piezo Motor Rotary Stage

Low Profile Piezo Motor Rotary Stage

Rotary Stages with Direct Drive Torque Motor

Miniature Rotation Stages with Mechanical Bearings, Worm Gears and Servo / Stepper Motors



DT-34 Small Rotation Stage

Worm Gear, Servo & Stepper

- 10mm aperture, 20mm turn table
- 700 μ rad min. inc. motion
- 195-675°/sec max. velocity
- 1.5kg load

[DETAILS →](#)



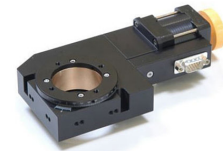
RS-40 Small Rotation Stage

Worm Gear, Servo & Stepper

- 20mm aperture, 34mm turn table
- 87 μ rad min. inc. motion
- 7°/sec max. velocity
- 2kg load

[DETAILS →](#)

[VACUUM VERSION →](#)



DT-80 Small Rotation Stage

Worm Gear, Servo & Stepper

- 40mm aperture, 64mm turn table
- 70 μ rad min. inc. motion
- 40°/sec max. velocity
- 2kg load

[DETAILS →](#)

**PI**

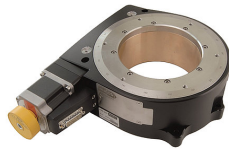
Gears and Servo / Stepper Motors



L-611 Precision Rotary Stage

Worm Gear, Servo / Stepper

- 35mm aperture, 80mm turn table
- 0.7 μ rad min. inc. motion
- 50-200°/sec max. velocity
- 10kg load
- Direct encoder option

[DETAILS →](#)[VACUUM VERSION →](#)[BUY ONLINE →](#)

PRS-200 Precision Rotary Stage

Worm Gear, Servo / Stepper

- 120mm aperture, 200mm turn table
- 0.5 – 8.7 μ rad min. inc. motion
- 35-75°/sec max. velocity
- 50kg load
- Direct encoder option

[DETAILS →](#)

M-060/1/2 Precision Rotary Stage

Worm Gear, Servo / Stepper

- 20/35/45mm aperture, 60/100/120mm turn table
- 5 – 32 μ rad min. inc. motion
- 7.5-90°/sec max. velocity
- 50kg load
- Rotary encoder

[DETAILS →](#)[BUY ONLINE →](#)

**PI**

Torque Motors for High Speed. Direct Metrology Closed-Loop Encoder. Mechanical Bearings.



V-610 High Precision Rotation Stage

Direct Drive, Direct
Encoder

- 25mm aperture, 100mm turn table
- 27 μ rad min. inc. motion
- 540°/sec max. velocity
- 2kg load
- Torque motor, sine/cosine encoder
- Optional brake

[DETAILS →](#)

V-611 High Precision Rotation Stage

Direct Drive, Absolute
Encoder Option

- 35mm aperture, 100mm turn table
- 1 μ rad min. inc. motion
- 2880°/sec max. velocity
- 10kg load
- Torque motor
- Sine/cosine or absolute encoder

[DETAILS →](#)



PI



Bearings. High Performance Direct Drive Torque Motor, Direct Metrology Closed-Loop Encoder



A-621 - A-627 Air Bearing Rotary Stages

Direct Drive, High Load

- 2/4/6/8/12" table diameter
- 13 to 420kg load
- 0.008 μ rad max. resolution
- 40 to 100nm flatness
- 500 to 2500 RPM max.

DETAILS →

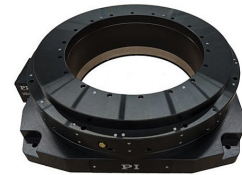


A-634 – A-638 Air Bearing Rotary Stages

Low Profile, Large
Diameter

- 6/8/14" table diameter
- 20/32/60/120kg load capacity
- 0.03 μ rad max. resolution
- <100nm eccentricity & flatness
- 500 RPM max.
- Self-locking option at rest

DETAILS →



A-688 Air Bearing Rotary Stage

Large Clear Aperture

- \varnothing 260mm clear aperture
- 77kg load capacity
- 0.0015 μ rad max. resolution
- 500 RPM max.
- Flatness/Eccentricity <175/300nm
- Wobble: < 1 μ rad
- Direct drive

DETAILS →



ARTICLE →




PI


A-523 Z-Tip-Tilt Air Bearing Stage

Low Profile

- ø250mm table
- 8 kg load capacity
- 5mm Z-stroke, to 2° tip/tilt
- 10nm/0.06μrad incremental motion
- 1nm sensor resolution

DETAILS →



A-361 X-Y-θ Air Bearing Alignment Stage

Voice Coil Driven, Low Profile

- 5mm x 5mm x 2° Travel
- 40mm height, ø200mm
- Air Bearings & Voice Coils
- Parallel Kinematics
- Lock-down Capable
- 6-DOF Option

REQUEST INFORMATION →

Large Custom Rotary Air Bearing Stages

ARTICLE →



Non-motorized Rotary Air Bearings



A-601 – A-607

Rotary Air Bearings

Non Motorized, Encoder Options



A-651 - A-657

Spherical Air Bearings

3 Degrees of Freedom

**PI**

- Ideal for optics testing
- 2/3/4/6/8/12" table diameter
- 13 to 420kg axial load
- 5 to 270kg radial load
- 75 to 300nm eccentricity
- Optional high resolution encoder

DETAILS →

- Ideal for zero gravity simulation
- 2/3/4/6/8/10/12" sphere diameter
- 15 to 635kg load
- ±45 degrees rotation range

DETAILS →**ARTICLE →**

Direct-Drive Rotation Stages, Ultrasonic Motor, Low Profile, Self Locking Drive, Wide Dynamic Range, Direct Metrology Encoder



U-651 Low Profile Ultrasonic Motor Stage

Direct Drive, Direct Encoder



U-628 Miniature Ultrasonic Motor Stage

Direct Drive, Direct Encoder



U-624 Miniature Ultrasonic Motor Stage

Direct Drive, Direct Encoder

**PI**

- 540°/sec max. velocity
- 2kg load
- Ultrasonic motor, self locking

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- 720°/sec max. velocity
- 0.5kg load
- Ultrasonic motor, self locking

[DETAILS →](#)[BUY ONLINE →](#)

- 720°/sec max. velocity
- 0.1kg load
- Ultrasonic motor, self locking

[DETAILS →](#)[BUY ONLINE →](#)

U-622 Miniature Ultrasonic Motor Stage

**Direct Drive, Direct
Encoder**

- 18.5mm turn table, 10mm height
- 525μrad min. inc. motion
- 720°/sec max. velocity
- 0.03kg load
- Ultrasonic motor, self locking

[DETAILS →](#)

**PI**

Motor, Self Locking



Q-632 Q-Motion® Miniature Rotation Stage

Inertia Motor, Direct
Encoder

- 30mm turn table, 10mm height
- 3μrad min. inc. motion
- 45°/sec max. velocity
- 0.1kg load
- Piezo inertia motor, self locking

[DETAILS →](#)

Goniometer Cradle Stages with Mechanical Bearings, Worm Gears and Servo / Stepper Motors

**PI**

WT-90 Motorized Precision Goniometer

Servo / Stepper, 8kg
Load

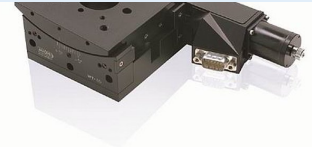
- 90° rotation range
- 2.7 - 50 μ rad min. inc. motion
- 10 - 15°/sec max. velocity
- 8kg load
- Direct encoder option

[DETAILS →](#)

WT-120 Motorized Precision Goniometer

Servo / Stepper, 20kg
Load

- 90° rotation range
- 17.5 - 70 μ rad min. inc. motion
- 25 - 30°/sec max. velocity
- 20kg load
- Direct encoder option

[DETAILS →](#)

WT-85 Motorized Precision Goniometer

Aperture, Servo /
Stepper

- 10° rotation range
- 2 - 17.5 μ rad min. inc. motion
- 7 - 15°/sec max. velocity
- 2kg load
- 30mm aperture
- Direct encoder option

[DETAILS →](#)

WT-100 Motorized Precision Goniometer



- 10° rotation range
- 8.7 - 17μrad min. inc. motion
- 7-15°/sec max. velocity
- 2kg load
- 50mm aperture
- Direct encoder option

[DETAILS →](#)

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