

# ALIO INDUSTRIES

## NANOMETER PRECISION ROBOTICS

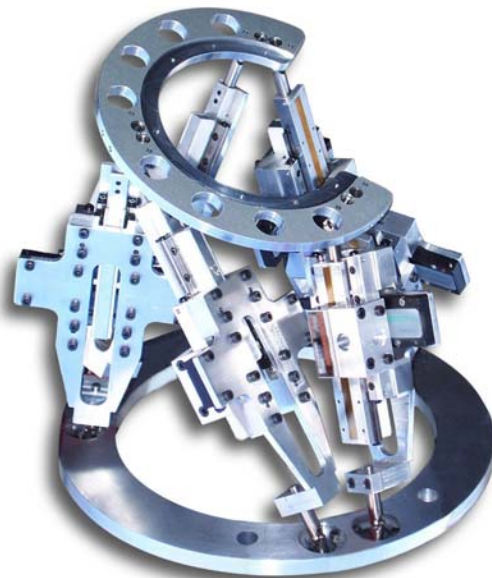
ALIO Industries patent pending 3 and 6 degrees of freedom parallel kinematic robotic manipulator was designed for demanding nanometer precision applications. Applications in fiber optics, semiconductor, medical, pharmaceutical and micro machining are just some of the uses. Parallel kinematics increase repeatability and performance over stacked stage serial kinematic approaches.

### Features /Benefits:

- Parallel kinematics are very rigid platforms that can easily withstand fiber bonding reactive forces or manipulating laser optics.
- Increased repeatability over stacked stage serial kinematic structures.
- Simplified programming with tool center point (TCP).
- Ability to rotate TCP repeatably about a virtual point in space.
- Coordinated 6 axis of motion at TCP.
- System resolution versus summation of individual stage resolutions.
- Virtual elimination of stacked stage cosine and sine errors.
- Open architecture Windows operating system and intuitive GUI for application development.
- C++, Visual Basic and LabVIEW compatible.

### Quality and Performance:

- High-resolution 5 interpolated nm non-contact encoders for exceptional repeatability.
- Nanomotion linear piezo servo motors provide high speeds with fast settling time and no servo dither and no hysteresis.
- Precision cross roller bearings assure high accuracy with long life.
- CE compliant components and assemblies.
- Vacuum chamber performance to 10e-10 TORR.
- Optional D.C. mode for 1 nm resolutions.



## Parallel Kinematic Robot Specifications

| <b>MODEL</b>         | <b>AI-Hexapod</b>           | <b>AI-Tripod</b>            |
|----------------------|-----------------------------|-----------------------------|
| <b>Work Envelope</b> | <b>20 mm to 200 mm</b>      | <b>22 mm to 100 mm</b>      |
| <b>Resolution</b>    | <b>5 nm</b>                 | <b>5 nm</b>                 |
| <b>Repeatability</b> | <b>50 nm servo</b>          | <b>50 nm servo</b>          |
| <b>Repeatability</b> | <b>10 nm D.C. Mode</b>      | <b>10 nm D.C. Mode</b>      |
| <b>Maximum Speed</b> | <b>200 mm/sec</b>           | <b>200 mm/sec</b>           |
| <b>Payload</b>       | <b>0.25 kg to 10 kg</b>     | <b>0.25 kg to 4.5 kg</b>    |
| <b>Motion</b>        | <b>6 degrees of freedom</b> | <b>3 degrees of freedom</b> |

### STANDARD EQUIPMENT

- Delta Tau UMAC controller with forward and inverse kinematics.
- P.C. with Windows operating system and basic robotic GUI .
- Nanomotion piezo-electric motors and amps.
- Renishaw encoders with DT interpolators
- Hephaist spherical ball joints.
- N B ultra-precision cross roller bearings.

### OPTIONAL FEATURES

- Custom application software and equipment.
- Clean room class 10 or class 100 compatible.
- Vacuum chamber compatible to 10 E-10 Torr with 130 degrees C bake out.
- Variable payload and work envelop for OEM applications.

### Environmental

Operating Temperature: 0 to 100 degrees C

Humidity: 10 to 80% non-condensing

### Standard Products Electrical

Power requirements: 120 volts A.C. 15 amps

Amplifier Differential Analog Input: +/- 10V

Encoder power input: +5 Vdc

Optional amplifier with Servo and D.C. mode for high resolution.



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