

ABL9000 Series

Two-Axis Air-Bearing Direct-Drive Linear Stage

Full preload on all axes

Dual linear-motor-driven Y axes

Travel to 1.2 meter x 1.2 meter

Linear encoder or laser interferometer feedback

Active yaw control



Aerotech has a long history of engineering and manufacturing the world's highest performance motion systems to directly address our customers' key application needs. These efforts have helped to enable key technologies in a multitude of industries including semiconductor, medical, and military/aerospace. This extensive history and experience have culminated in the development of the ABL9000 air-bearing motion platform. Designed to meet the exacting requirements of wafer, flat panel display, and optical inspection and fabrication, the ABL9000 sets new standards of performance.

Air-Bearing Design

The ABL9000 incorporates an active preload on both vertical and horizontal surfaces. The opposing thin-film pressure maintains the bearing nominal gap tolerance. This design, in addition to the large air-bearing surface that distributes the load over a large surface area, results in a stage with outstanding stiffness that is ideal for heavy or offset loading.

Proprietary manufacturing techniques result in a stage with unsurpassed geometrical characteristics. The air bearing has an inherent averaging effect that maximizes performance. The thin film will fill small surface voids and allow for other irregularities. This characteristic yields superior pitch, roll, yaw, straightness, and flatness specifications.

Linear Motor Drive

The driving force behind this stage is Aerotech's BLM series brushless linear servomotor. Aerotech's long history and experience as a motor manufacturer is reflected in this latest design. The BLM utilizes an ironlessforcer, which means there is zero cogging and no attractive forces, resulting in unsurpassed smoothness of motion. Capable of generating high force and velocity, the BLM represents the ultimate combination of power and performance.

Zero Maintenance

Our totally noncontact air bearing, noncontact linear motor drive, and noncontact feedback device ensure years of maintenance-free operation at the high performance levels expected of Aerotech equipment. Because there is no mechanical contact between moving elements, the ABL9000 experiences no wear or reduction in performance over time. Service life is virtually unlimited and since there is no lubrication – only clean, dry gas – air bearings are ideal for cleanroom and medical applications.

Cable Management

We carefully optimize the cable bend radius to ensure years of trouble-free operation. In the unlikely event of failure, Aerotech's modular design makes cable replacement quick and easy with minimal downtime.

To facilitate integration into the final system, we include all customer-required cables, air hoses, etc. in our CMS bundle. Both ends are fully connectorized for simple integration into the customer's machine.

ABL9000 Series SPECIFICATIONS

| Basic Model | | ABL9000 -0300-0300 | ABL9000 -0500-0500 | ABL9000 -0750-0750 | ABL9000 -1000-1000 | ABL9000 -1200-1200 |
|--|--|---|--|-----------------------|-----------------------|-----------------------|
| Total Travel ⁽¹⁾ | | 300 mm x 300 mm | 500 mm x 500 mm | 750 mm x 750 mm | 1000 mm x 1000 mm | 1200 mm x 1200 mm |
| Bus Voltage ⁽²⁾ | | 80 VDC | | | | |
| Feedback | | Noncontact Linear Encoder | | | | |
| Maximum Travel Speed ⁽³⁾ | | 500 mm/s | | | | |
| Maximum Acceleration (no load) | | 1 g (10 m/s ²) | | | | |
| Maximum Load ⁽⁴⁾ | | 30.0 kg | | 125.0 kg | | |
| Accuracy ⁽⁵⁾ | High-Accuracy Linear Encoder Feedback | ±0.5 µm | ±0.75 µm | ±0.85 µm | ±1.0 µm | ±1.25 µm |
| | Laser Interferometer Feedback | Standard ±10 ppm; Compensated ±1.5 ppm ⁽⁶⁾ | Contact an Aerotech Application Engineer for further details | | | |
| Repeatability ⁽⁵⁾ | | ±0.1 µm | | ±0.2 µm | | |
| Straightness and Flatness | Max Deviation | ±0.5 µm | ±1.5 µm | ±2.0 µm | ±2.5 µm | ±3.0 µm |
| Pitch/Roll/Yaw | | 2 arc sec | 3.5 arc sec | 4.5 arc sec | 5.5 arc sec | 6 arc sec |
| Stage Mass | | 320 kg | 690 kg | 3200 kg | 4130 kg | 5200 kg |
| Moving Mass | Bridge | 9.5 kg | | 35.0 kg | | |
| | Gantry | 44 kg | 57 kg | 120 kg | 130 kg | 140 kg |
| Orthogonality | | 2 arc sec | 3 arc sec | 3.5 arc sec | 4 arc sec | 5 arc sec |
| Operating Pressure ⁽⁷⁾ | | 551.6 kPa + 0, -34 kPa | | | | |
| Air Consumption ⁽⁸⁾ | | 45 SLPM (1.6 SCFM) | | 85 SLPM (3.0 SCFM) | | |
| Material | | Aluminum | | | | |
| Finish | | Hard Coating (62 Rockwell Hardness) | | | | |

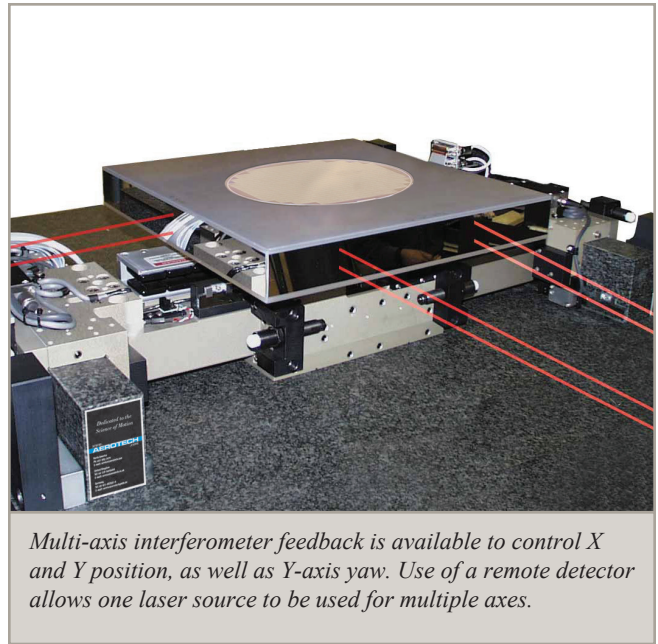
Notes:

- Travel can be customized to meet application-specific requirements. Consult Aerotech for other travel options.
- 80 VDC bus limit with standard ribbon cable. Up to 320 VDC is available with round cables.
- Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
- Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.
- Available with Aerotech controllers and calibration.
- Requires environmental compensation.
- To protect air bearing against under-pressure, an in-line pressure switch tied to motion controller E-stop input is recommended.
- Air supply must be clean, dry to 0° F dewpoint and filtered to 0.25 µm or better; recommend nitrogen at 99.9% purity.
- Specifications are for single-axis systems, measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

ABL9000 Series SPECIFICATIONS



ABL9000 systems are available with custom granite assemblies, travel lengths, and cable management schemes.



Multi-axis interferometer feedback is available to control X and Y position, as well as Y-axis yaw. Use of a remote detector allows one laser source to be used for multiple axes.

Please contact an Aerotech Application Engineer for ordering information on the ABL9000 series.