Pl glide AT3 Linear Air Bearing Stage

HIGH PERFORMANCE NANOPOSITIONING STAGE

Overview
The Pl glide AT3 series of stages are linear servo motor driven with fully preloaded air bearings and an integral optical linear encoder. The combination of these non-contact components results in a frictionless motion platform that offers the highest performance, quality, and life. These stages are ideally suited for many high precision applications, such as metrology, photonics alignment, semiconductor inspection, flat panel display, laser machining, and precision scanning applications. The non-contact design also makes these stages ideal for cleanroom applications. A high-force linear motor can drive the stage to top speed within a few milliseconds, and the large capacity bearings can support payloads up to 35 kg. The laterally opposed, actively preloaded air bearing design in this model will support normal, vertical, and side-mounted orientations.

A-123 Series
- Ideal for scanning or ultra-precise positioning
- Cleanroom compatible
- Customizable
- Table size 210 mm x 210 mm
- Travel lengths 50 mm to 750 mm
- 35 kg max payload
- Non-contact fully preloaded air bearings
- Ironless cog-free linear motor
- Integral optical linear encoder
- Resolutions to 1nm
- Velocity to 1 m/sec
- Acceleration to 3 g
- Maintenance-free

Accessories and Options
- Multiple encoder options
- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- XY stacks and custom configurations with precision alignment
- Cable track variations
- Counterbalance options for vertical (Z) orientations
- Customizations available
- Granite bases and vibration isolation systems
<table>
<thead>
<tr>
<th>Model</th>
<th>A-123.050</th>
<th>A-123.100</th>
<th>A-123.150</th>
<th>A-123.200</th>
<th>A-123.350</th>
<th>A-123.500</th>
<th>A-123.750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>50 mm</td>
<td>100 mm</td>
<td>150 mm</td>
<td>200 mm</td>
<td>350 mm</td>
<td>500 mm</td>
<td>750 mm</td>
</tr>
</tbody>
</table>

### Drive System
- Brushless ironless linear servomotor, 3-phase

### Feedback System
- Non-contact optical linear encoder with travel limits and home index

### Motor Bus Voltage
- 48 VDC nominal, 80 VDC max

### Motor Force Constant
- 19.9 N/A

### Continuous Force
- 87.5 N

### Peak Force
- 298 N

### Motor Back EMF
- 16 V/m/sec

### Motor Resistance (phase-to-phase)
- 3.6 Ohms

### Motor Inductance (phase-to-phase)
- 1.2 mH

### Maximum Velocity (1)
- 1 m/sec

### Maximum Payload (2)
- 35 kg normal, 25 kg lateral

### Accuracy (3)
<table>
<thead>
<tr>
<th>Specified</th>
<th>+/1.0 µm</th>
<th>+/-1.0 µm</th>
<th>+/-1.5 µm</th>
<th>+/-2.0 µm</th>
<th>+/-3.0 µm</th>
<th>+/-3.5 µm</th>
<th>+/-5.0 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>(uncompensated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(with error compensation)</td>
<td>+/-0.5 µm</td>
<td>+/-1.0 µm</td>
<td>+/-1.5 µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Repeatability (4)
- +/-0.75 µm

### Encoder Resolution (4)
- up to 1 nm (see encoder options table)

### Straightness & Flatness (5)
- < 0.1 µm / 25 mm

### Pitch & Yaw TIR (5)
- 1 arc-sec, 2 arc-sec, 3 arc-sec, 3 arc-sec, 4 arc-sec, 5 arc-sec, 7 arc-sec

### Stage Mass
- 14 kg, 15.5 kg, 16.5 kg, 18 kg, 21.5 kg, 25 kg, 32 kg

### Moving Mass
- 5 kg

### Cabling
- External, moving loop

### Operating Pressure (6)
- 80 (+/-5) psi (550 +/-35 kPa)

### Air Quality
- Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1
- Oil-free - ISO 8573-1 Class 1
- Dry (-15 °C dew point) - ISO 8573-1 Class 3

### Construction
- Hardcoat Aluminum / SS Fasteners

1. Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
2. Assumes payload CG is centered no more than 50mm above the stage table.
3. Improved accuracy can be obtained with controller-based error compensation. Specs listed are for encoder options A & C.
4. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
5. Encoder resolution depends on encoder option chosen and interpolation used if sine encoders are chosen. Resolution will impact repeatability specification.
6. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.

### Ordering Example
**Part# A-123.200C1**
- Model: A-123 (PIglide AT3 linear motorized air bearing stage)
- Travel: 200 mm
- Encoder: C (50 nm resolution incremental A-quad-B (TTL) output)
- Motor Wiring: 1 (48 VDC)
<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B*</th>
<th>C*</th>
<th>D*</th>
<th>E*</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-123.050</td>
<td>350</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>250</td>
<td>25</td>
<td>31.5</td>
<td>4</td>
<td>181.5</td>
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<tr>
<td>A-123.100</td>
<td>400</td>
<td>100</td>
<td>–</td>
<td>–</td>
<td>300</td>
<td>50</td>
<td>56.5</td>
<td>8</td>
<td>206.5</td>
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<tr>
<td>A-123.150</td>
<td>450</td>
<td>100</td>
<td>–</td>
<td>–</td>
<td>350</td>
<td>75</td>
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<td>231.5</td>
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<tr>
<td>A-123.200</td>
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<td>100</td>
<td>–</td>
<td>–</td>
<td>400</td>
<td>100</td>
<td>106.5</td>
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<td>265.5</td>
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<tr>
<td>A-123.350</td>
<td>650</td>
<td>100</td>
<td>325</td>
<td>–</td>
<td>550</td>
<td>175</td>
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<td>12</td>
<td>331.5</td>
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<tr>
<td>A-123.500</td>
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<td>500</td>
<td>700</td>
<td>250</td>
<td>256.5</td>
<td>16</td>
<td>406.5</td>
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<tr>
<td>A-123.750</td>
<td>1050</td>
<td>100</td>
<td>400</td>
<td>700</td>
<td>1000</td>
<td>375</td>
<td>381.5</td>
<td>16</td>
<td>531.5</td>
</tr>
</tbody>
</table>

*Mounting holes symmetric about \( \xi \) located at "J"