VIBRATION ISOLATION SYSTEMS
Ultimate Active Vibration Isolation System for Semiconductor/Display Metrology Tools

DVIA–P series is an active pneumatic vibration isolation system, specially designed to control vibrations for advanced semiconductor and display metrology and inspection tools that are integrated with ultra-precision motorized linear stages. These tools require vibration isolation in the low frequency as well as the ultra-fast settling time. The DVIA–P isolators incorporate extremely sensitive sensors and powerful pneumatic actuators, generating enormous force to counteract incoming vibrations from building floors and tools.

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>DVIA-P2200</th>
<th>DVIA-P4000</th>
<th>DVIA-P7000</th>
<th>DVIA-P10000</th>
<th>DVIA-P20000</th>
<th>DVIA-P30000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolator Dimensions (W x D x H)</td>
<td>350 x 350 x 110 mm</td>
<td>420 x 420 x 110 mm</td>
<td>450 x 450 x 120 mm</td>
<td>465 x 400 x 240 mm</td>
<td>645 x 600 x 284 mm</td>
<td>735 x 700 x 284 mm</td>
</tr>
<tr>
<td>Maximum Load Capacity</td>
<td>1100 – 3700 kg</td>
<td>2100 – 7000 kg</td>
<td>3600 – 12000 kg</td>
<td>5000 – 17000 kg</td>
<td>11000 – 38000 kg</td>
<td>15000 – 50000 kg</td>
</tr>
<tr>
<td>Actuator</td>
<td>Pneumatic Actuator</td>
<td>6 degrees</td>
<td>0.5 – 150 Hz</td>
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<tr>
<td>Degrees of Freedom</td>
<td></td>
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<tr>
<td>Active Isolation Range</td>
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<tr>
<td>Vibration Isolation Performance</td>
<td>40 – 70% at 1 Hz / ≥90% at ≥2 Hz</td>
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<tr>
<td>Settling Time</td>
<td>≥0.3 sec*</td>
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<tr>
<td>Position Accuracy</td>
<td>±10 um</td>
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<td></td>
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</tr>
<tr>
<td>Input Voltage (V)</td>
<td>AC single phase 100 – 240 V</td>
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<tr>
<td>Power Consumption (W)</td>
<td>100 W</td>
<td></td>
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<tr>
<td>Required Air Pressure</td>
<td>≥5.5 kg/cm²</td>
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<tr>
<td>Air Consumption</td>
<td>Standard valve : 60 NL/min High speed response valve : 250 NL/min</td>
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</tr>
</tbody>
</table>

*0.3 sec settling time is measured after a 90% reduction of the input. (The settling time varies with several conditions, such as the payload, force, natural frequency, etc.)
Features

· **Optimal Vibration Solution for Metrology Tools with Integrated Linear Stages**
  The stage feedforward control system in DVIA–P series effectively compensates residual vibrations caused by the motorized linear stages, based on the analog input and the acceleration data in real-time.

· **Fast Settling Time & Excellent Position Accuracy**
  The position sensors continuously measure the position of the isolation system and then maintain its position through a digital signal processor. As a result, the position accuracy of the system is significantly improved. Furthermore, accelerometers instantly detect vibrations originating from the floor or the moving stages, then transmit the digital signals to operate pneumatic actuators to cancel out the vibrations.

· **Smart control system with a digital processor**
  A digital controller of DVIA–P Series employs a A/D 19–channel 16–bit and a D/A 10–channel 24–bit D/A converter to obtain synchronous sampling of vibrations. The digital controller controls the system by constantly calculating all sources of vibration, then transmitting signals to drive the pneumatic actuators.

· **Powerful Pneumatic Actuators to Support Moving Stage Applications**
  The integrated pneumatic actuators in DVIA–P series generate the significant amount of force to support the semiconductor / display metrology tools with integrated motorized linear stages.

· **Superior Vibration Isolation Performance in Low Frequency**
  DVIA–P isolators incorporate pneumatic actuators and extremely sensitive sensors with feedforward and feedback control systems to maximize vibration isolation performance in 1 – 10 Hz.

· **On–Site Tuning for Maximum Performance**
  Vibration levels vary with environment, location, vibration sources, etc. Therefore, we offer on–site tuning by our experienced engineers to guarantee the maximum performance level and customers’ satisfaction. The engineer conduct a site survey to measure vibration data which is used to tune the feedback and feedfoward control systems, maximizing vibration isolation performance.
Case Studies of DVIA-P series

Wafer Bump Inspection Machine

- A site survey indicated that the floor vibration was VC-B in z-axis, and VC-A in x and y axes.
- DVIA-P noticeably reduced the floor vibration to VC-E in all axes.

<table>
<thead>
<tr>
<th>Test Direction</th>
<th>Floor</th>
<th>Isolated Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-axis</td>
<td>VC-B</td>
<td>VC-E</td>
</tr>
<tr>
<td>X-axis</td>
<td>VC-A</td>
<td>VC-E</td>
</tr>
<tr>
<td>Y-axis</td>
<td>VC-A</td>
<td>VC-E</td>
</tr>
</tbody>
</table>

ADVANTEST CD-SEM

- A site survey indicated that the floor vibration of the installation site was VC-A in z-axis, VC-B in x-axis and VC-C in y-axis.
- DVIA-P reduced the floor vibration to VC-E in z-axis and VC-F in x and y axes.

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<td>VC-F</td>
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<tr>
<td>Y-axis</td>
<td>VC-C</td>
<td>VC-F</td>
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Enabling Vision for the Future.
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