

# ALS3600 Series

## Mechanical Bearing, Linear Motor Stage

Large clear aperture

Travel range from 100 mm x 100 mm to 400 mm x 400 mm

High performance linear motion guides

15 arc sec orthogonality

Noncontact linear encoder for high accuracy



The demand for a high-accuracy, robust, open-frame stage is met with the ALS3600. This dual-axis, large aperture, open-frame stage addresses the unique needs of scanning microscopy, wafer and printed circuit board inspection, and automated assembly.

### Design and Construction

The ALS3600 is a three-piece design that allows critical components such as orthogonality, straightness, and flatness to be controlled during the initial machining. This results in a stage with exceptional geometrical tolerances and inherent orthogonality.

The ALS3600 utilizes high-precision linear motion guide (LMG) bearings, with a total of four trucks per axis. These make the ALS3600 ideal for fast, repetitive operations. The LMG bearings also exhibit exceptional stiffness, high load capacity, and extremely low friction.

The high stiffness inherent in this stage allows it to be side-driven, yet still retain excellent performance characteristics. The ALS3600 represents a major upgrade in performance over typical side-drive stages.

### Brushless Linear Servomotor

The ALS3600 incorporates a high power linear motor to meet the needs of the most demanding applications. This results in a stage with all of the advantages of a direct-drive mechanism: zero backlash, no windup, exceptional acceleration, zero friction, and outstanding servo stiffness.

Many applications require extreme stability of motion that can only be met with a linear motor drive. Since the drivetrain has zero friction and no recirculating elements, the ALS3600 is ideal for scanning, imaging, and many other precision applications.

### High-Accuracy Linear Encoder Feedback

The standard feedback device is a high-resolution, noncontact linear encoder. This noncontact encoder offers exceptional repeatability and stability over a range of operating conditions. Both digital and analog output versions are available. The digital version has a resolution of 1  $\mu\text{m}$ , while the analog version, when coupled with an Aerotech multiplier box, can reach resolutions of 20 nm.

### Alternate Configurations

All stage travels offer both single- and dual-axis designs, as well as the option for a solid tabletop. Miniature microscope-size stages are available, as are ball-screw-driven versions (please refer to the ATS3600).

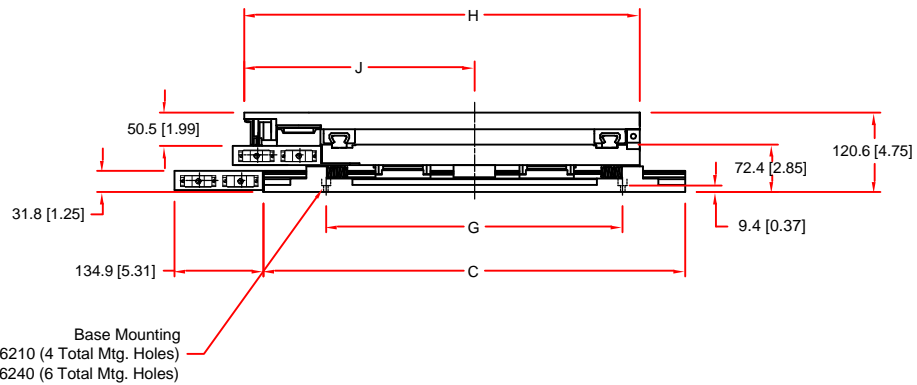
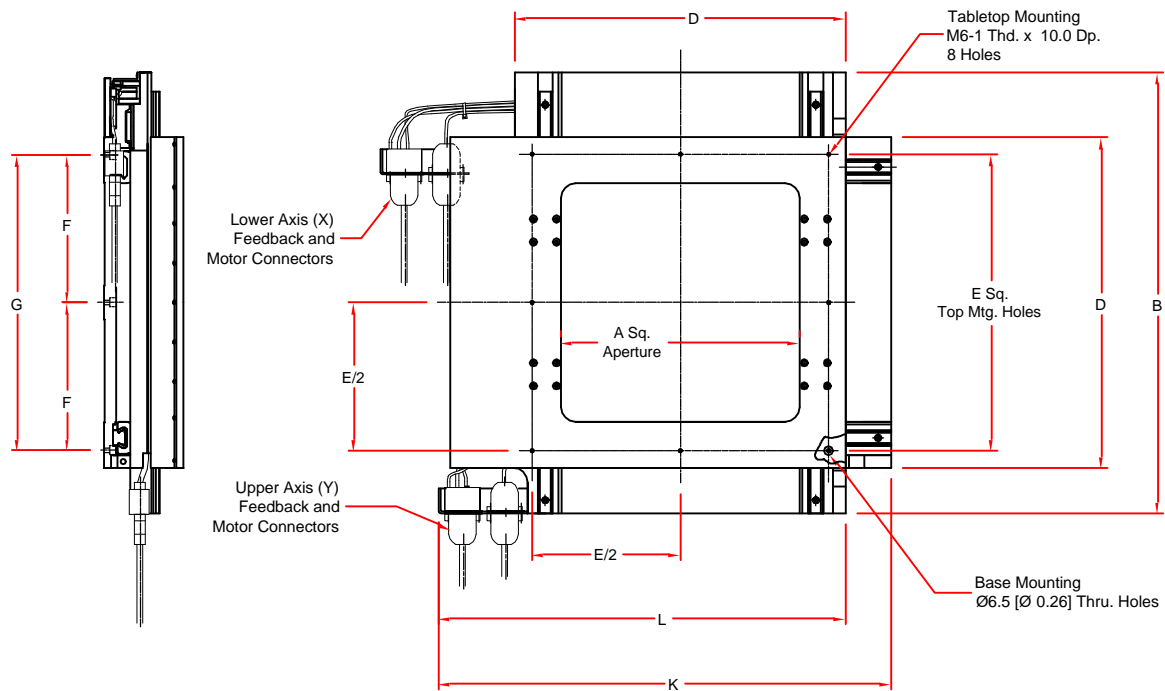
## ALS3600 Series SPECIFICATIONS

| Basic Model                         |                      | ALS36210                                                      | ALS36220           | ALS36230            | ALS36240            |
|-------------------------------------|----------------------|---------------------------------------------------------------|--------------------|---------------------|---------------------|
| Total Travel                        |                      | 100 mm (4 in)                                                 | 200 mm (8 in)      | 300 mm (12 in)      | 400 mm (16 in)      |
| Drive System                        |                      | Linear Brushless Servomotor (BLMFI-142-A)                     |                    |                     |                     |
| Bus Voltage                         |                      | Up to 320 VDC                                                 |                    |                     |                     |
| Continuous Current                  | A <sub>pk</sub>      | Up to 2.5 A                                                   |                    |                     |                     |
|                                     | A <sub>rms</sub>     | Up to 1.8 A                                                   |                    |                     |                     |
| Feedback                            |                      | Noncontact Linear Encoder                                     |                    |                     |                     |
| Resolution                          |                      | 0.005 μm - 1.0 μm (0.2 μin - 40 μin)                          |                    |                     |                     |
| Maximum Travel Speed <sup>(1)</sup> |                      | 300 mm/s (12 in/s)                                            |                    |                     |                     |
| Maximum Linear Acceleration         |                      | 1 g (10 m/s <sup>2</sup> ) (386 in/s <sup>2</sup> ) (No Load) |                    |                     |                     |
| Maximum Load <sup>(2)</sup>         |                      | 90.0 kg (198.4 lb)                                            |                    |                     |                     |
| Accuracy                            | HALAR <sup>(3)</sup> | ±2.0 μm (±80 μin)                                             |                    |                     |                     |
|                                     | Standard             | ±4.0 μm (±160 μin)                                            | ±8.0 μm (±320 μin) | ±12.0 μm (±480 μin) | ±16.0 μm (±640 μin) |
| Repeatability                       |                      | ±1.0 μm (±40 μin)                                             |                    |                     |                     |
| Straightness and Flatness           | Differential         | 1.0 μm/25mm (40 μin/in)                                       |                    |                     |                     |
|                                     | Maximum Deviation    | ±2.0 μm (±80 μin)                                             | ±4.0 μm (±160 μin) | ±6.0 μm (±240 μin)  | ±8.0 μm (±320 μin)  |
| Pitch/Yaw                           |                      | 10 arc sec                                                    | 15 arc sec         | 18 arc sec          | 20 arc sec          |
| Nominal Stage Weight                |                      | 30.0 kg (66.1 lb)                                             | 45.0 kg (99.2 lb)  | 58.0 kg (127.9 lb)  | 76.0 kg (167.6 lb)  |
| Moving Mass (Lower X Axis)          |                      | 23.1 kg (51 lb)                                               | 31.9 kg (70.3 lb)  | 40.1 kg (88.5 lb)   | 49.5 kg (109.2 lb)  |
| Moving Mass (Upper Y Axis)          |                      | 8.6 kg (19 lb)                                                | 11.2 kg (24.7 lb)  | 13.6 kg (30 lb)     | 16.1 kg (35.6 lb)   |
| Construction                        |                      | Aluminum Body/Black Anodize Finish/Hardcoat                   |                    |                     |                     |

Notes:

1. Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.
2. Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.
3. Available with Aerotech controllers.
4. Specifications are for single-axis systems, measured 50 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Consult factory for multi-axis or non-standard applications.

# ALS3600 Series DIMENSIONS



| Basic Model | Total Travel  | Dimensions - Millimeters [Inches] |               |               |                |               |
|-------------|---------------|-----------------------------------|---------------|---------------|----------------|---------------|
|             |               | A                                 | B             | C             | D              | E             |
| ALS36210    | 100.0 [4.00]  | 158.8 [6.25]                      | 425.4 [16.75] | 355.6 [14.00] | 300.99 [11.85] | 250.0 [9.84]  |
| ALS36220    | 200.0 [8.00]  | 260.4 [10.25]                     | 556.6 [21.91] | 516.4 [20.33] | 400.0 [15.75]  | 350.0 [13.78] |
| ALS36230    | 300.0 [12.00] | 362.0 [14.25]                     | 670.1 [26.38] | 640.0 [25.20] | 501.7 [19.75]  | 450.0 [17.72] |
| ALS36240    | 400.0 [16.00] | 463.6 [18.25]                     | 800.0 [31.50] | 800.0 [31.50] | 603.3 [23.75]  | 550.0 [21.65] |
|             | F             | G                                 | H             | J             | K              | L             |
| ALS36210    | -             | 250.0 [9.84]                      | 396.8 [15.62] | 247.6 [9.75]  | 443.0 [17.44]  | 415.7 [16.37] |
| ALS36220    | 175.0 [6.89]  | 350.0 [13.78]                     | 498.4 [19.62] | 298.4 [11.75] | 574.2 [22.61]  | 516.0 [20.32] |
| ALS36230    | 225.0 [8.86]  | 450.0 [17.72]                     | 599.6 [23.61] | 348.8 [13.73] | 686.4 [27.02]  | 617.3 [24.30] |
| ALS36240    | 275.0 [10.83] | 550.0 [21.65]                     | 701.6 [27.62] | 400.0 [15.75] | 817.6 [32.19]  | 719.2 [28.32] |

## ALS3600 Series INFORMATION

### Ordering Example

| ALS362 | 10          | -5    | -2LT10X5       | -NC    |
|--------|-------------|-------|----------------|--------|
| Series | Travel (mm) | Motor | Linear Encoder | Limits |
|        | 10          | -5    | -2LTnnX5       | -NC    |
|        | 20          | -10   | -2LTnnAS       | -NO    |
|        | 30          |       |                |        |
|        | 40          |       |                |        |

### ALS3620 Series Two-Axis, Open Frame, Linear Motor Stage

|          |                                                                           |
|----------|---------------------------------------------------------------------------|
| ALS36210 | 100 mm x 100 mm (4 in x 4 in) travel stage with linear motor and limits   |
| ALS36220 | 200 mm x 200 mm (8 in x 8 in) travel stage with linear motor and limits   |
| ALS36230 | 300 mm x 300 mm (12 in x 12 in) travel stage with linear motor and limits |
| ALS36240 | 400 mm x 400 mm (16 in x 16 in) travel stage with linear motor and limits |

### Motor

|     |                                                               |
|-----|---------------------------------------------------------------|
| -5  | Brushless linear motor (BLMFI-142-A), one per axis (standard) |
| -10 | Brushless linear motor (BLMFS-142-A), one per axis            |

### Standard Linear Encoders

|          |                                                                                                                      |
|----------|----------------------------------------------------------------------------------------------------------------------|
| -2LT10AS | Linear encoder set for model ALS36210; amplified sine output 1 Vpp (20 µm signal period); requires signal multiplier |
| -2LT20AS | Linear encoder set for model ALS36220; amplified sine output 1 Vpp (20 µm signal period); requires signal multiplier |
| -2LT30AS | Linear encoder set for model ALS36230; amplified sine output 1 Vpp (20 µm signal period); requires signal multiplier |
| -2LT40AS | Linear encoder set for model ALS36240; amplified sine output 1 Vpp (20 µm signal period); requires signal multiplier |
| -2LT10X5 | Linear encoder set for model ALS36210; 1.0 micron line driver output                                                 |
| -2LT20X5 | Linear encoder set for model ALS36220; 1.0 micron line driver output                                                 |
| -2LT30X5 | Linear encoder set for model ALS36230; 1.0 micron line driver output                                                 |
| -2LT40X5 | Linear encoder set for model ALS36240; 1.0 micron line driver output                                                 |

Note: Integral signal multipliers available with A3200 amplifier products.

### Limits

|     |                                                         |
|-----|---------------------------------------------------------|
| -NC | Normally-closed end of travel limit switches (standard) |
| -NO | Normally-open end of travel limit switches              |

### Accessories (to be ordered as separate line item)

|       |                                                                               |
|-------|-------------------------------------------------------------------------------|
| HALAR | High-accuracy system – linear error correction for accuracy and repeatability |
|-------|-------------------------------------------------------------------------------|