Hexapod Six-DOF
Positioning System

HexGen®
HEX500-350HL

Unmatched Performance, Superior Design

Our HEX500-350HL HexGen® hexapod combines high load capacity, large travels, high speeds and sub-micrometer precision to eliminate compromises on application specifications. Actuated with six high-accuracy struts built with precision preloaded bearings and ball screws and driven by our AC brushless, slotless servo motors, the HEX500-350HL delivers maximum device lifetime and performance, increased drive stiffness, higher positioning accuracy and superior minimum incremental motion (20 nm in XYZ and 0.2 µrad for $\theta_x\theta_y\theta_z$).

Key Applications

The HEX500-350HL is the premier high load, ultra-precision hexapod for many demanding applications, including:

- X-ray diffraction
- Sensor testing
- High-force device manipulation

KEY FEATURES:

- Six degree-of-freedom positioning with **LINEAR TRAVELS TO 110 mm & ANGULAR TRAVELS TO 40°**
- Precision design with **GUARANTEED POSITIONING ACCURACY SPECIFICATIONS**
- **MINIMUM INCREMENTAL MOTION** to 20 nm in XYZ & 0.2 µrad in $\theta_x\theta_y\theta_z$
- Flexible configurations & customization
- Vacuum preparation available upon request
- Powerful controls & software with **VISUALIZATION OF WORK & TOOL COORDINATE SYSTEMS**

HEX500-350HL SPECIFICATIONS

Mechanical Specifications			HEX500-350HL					
Axis			**X**	**Y**	**Z**	**A (θ_x)**	**B (θ_y)**	**C (θ_z)**
Travel[1]			100 mm	110 mm	54 mm	22 deg		40 deg
Axis Positioning Accuracy[2,3]	**Over Full Travel**	**Standard (-PL3)**	±4 µm		±3 µm	±50 µrad (±10.3 arc-sec)		±25 µrad (±5.2 arc-sec)
		ULTRA (-PL4)	±1 µm		±0.75 µm	±10 µrad (±2.1 arc-sec)		
Resolution (Minimum Incremental Motion)			20 nm			0.2 µrad (0.04 arc sec)		
Bidirectional Repeatability, pk-pk[3]			±0.6 µm		±0.35 µm	±5 µrad (±1 arc sec)		
Unidirectional Repeatability, pk-pk			±0.25 µm		±0.15 µm	±2.5 µrad (±0.5 arc sec)		
Maximum Speed[4]			50 mm/s		25 mm/s	10 deg/s		20 deg/s
Load Capacity, All Positions[5]		**Vertical**	200 kg (Push); 120 kg (Pull)					
		Horizontal	35 kg					
Holding Capacity, De-Energized[6]			165 kg					
Stage Mass			49 kg					
Material			Anodized Aluminum Platform and Base; Steel Used in Joints and Inside Struts					

Notes:
1. Travels are mutually-exclusive. Consult our HexGen workspace simulator for detailed workspace sizing.
2. Measured with single-axis moves at a height of 50 mm above the moving platform. Results can be payload and workpoint dependent.
3. X, Y, Z performance certified as standard. X, Y, Z, A, B, C performance certified with ULTRA.
4. Requires the selection of an appropriate amplifier with sufficient voltage and current.
5. Centered loading—consult load curves.
6. Horizontal base plate, centered loading—consult load curves.

Electrical Specifications	HEX500-350HL
Drive System	Precision Ball Screw, Brushless Servomotor
Feedback	Noncontact Encoder – Incremental and Absolute Options
Maximum Bus Voltage	80 VDC
Limit Switches	5 V, Normally-Closed (Located on Each Strut)

Feedback (Required)

-E2 Absolute encoders

-E3 Incremental encoders

Performance Grade (Required)

-PL3 Base performance

-PL4 Ultra high-accuracy performance, ULTRA

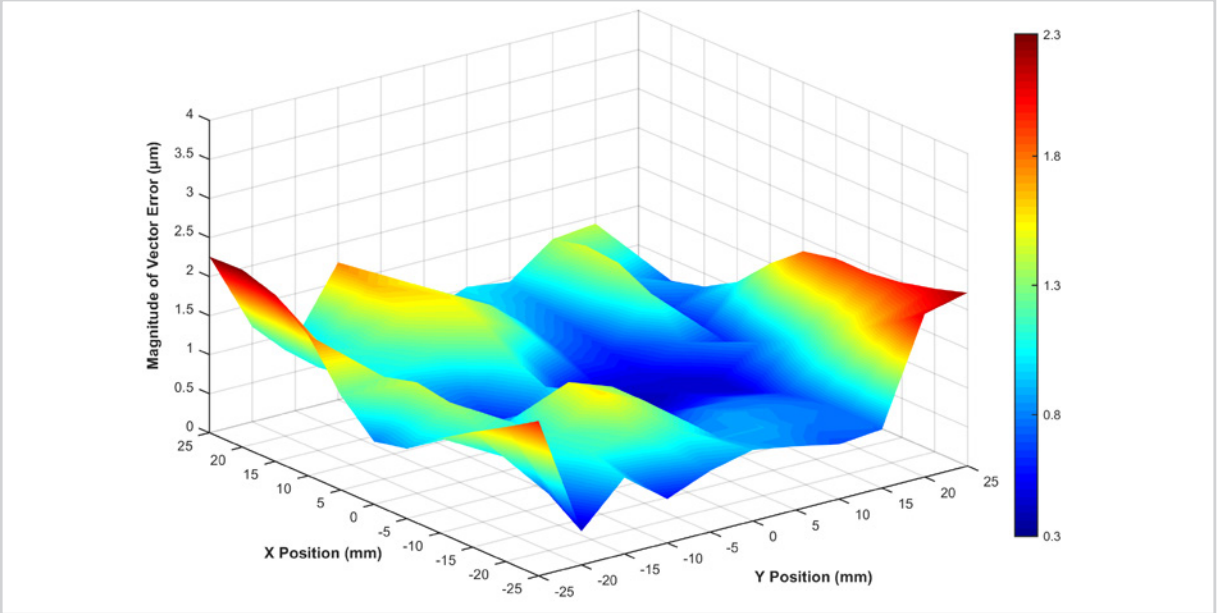
Integration (Required)

Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire custom integration support with your system.

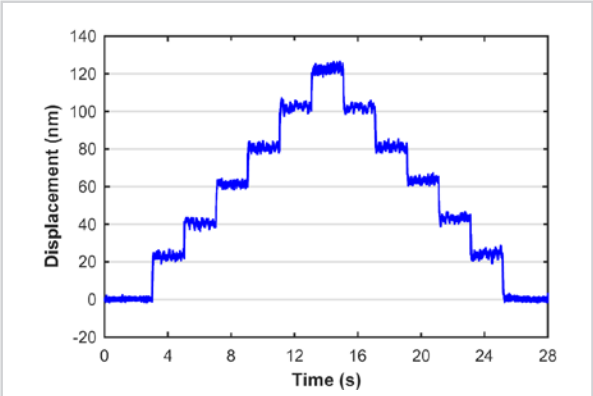
-TAS **Integration - Test as system**
Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller and stage). This includes parameter file generation, system tuning and documentation of the system configuration.

-TAC **Integration - Test as components**
Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

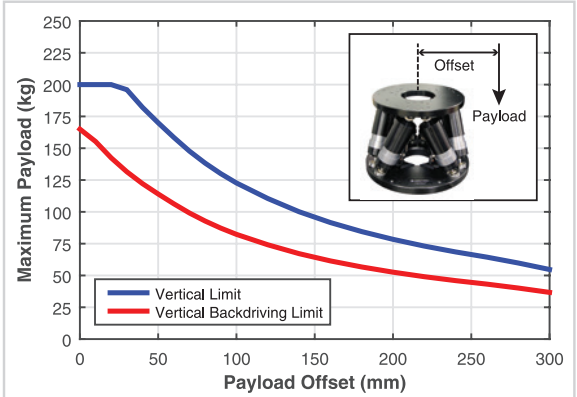
HEX500-350HL SERIES SPECIFICATIONS



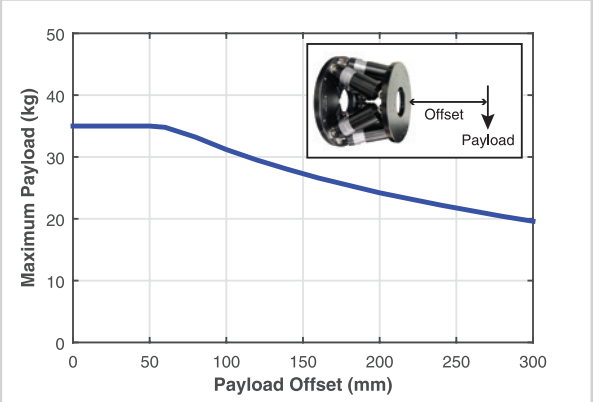
HEX500-350HL three-dimensional vector accuracy error measured when commanded to move in the XY plane at a Z position of 0 mm. The measurement was taken with three interferometers (X, Y, and Z directions) targeting a three-sided optic. The results show the outstanding three-dimensional accuracy capability of the HEX500-350HL.



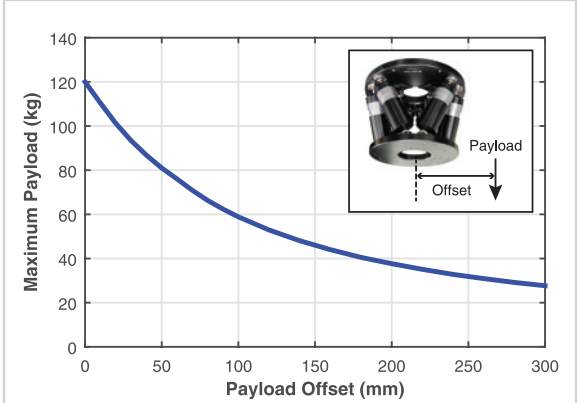
Minimum incremental step plot of the X-axis of the HEX500-350HL. All axes of the HEX500-350HL have industry-leading resolutions enabling higher-resolution processes.



HEX500-350HL vertical load capacity.

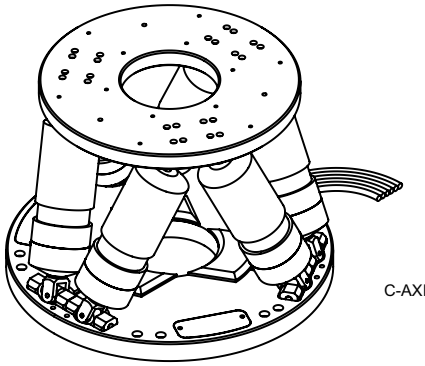


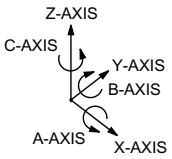
HEX500-350HL horizontal load capacity.

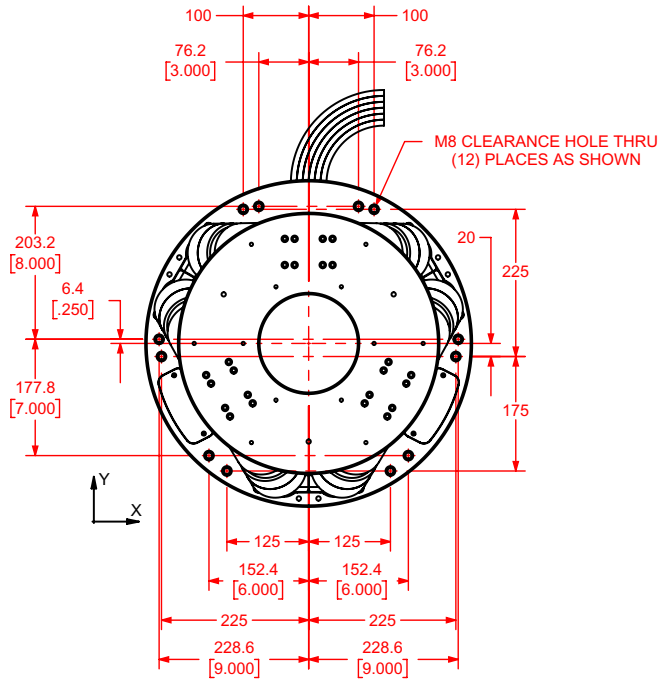


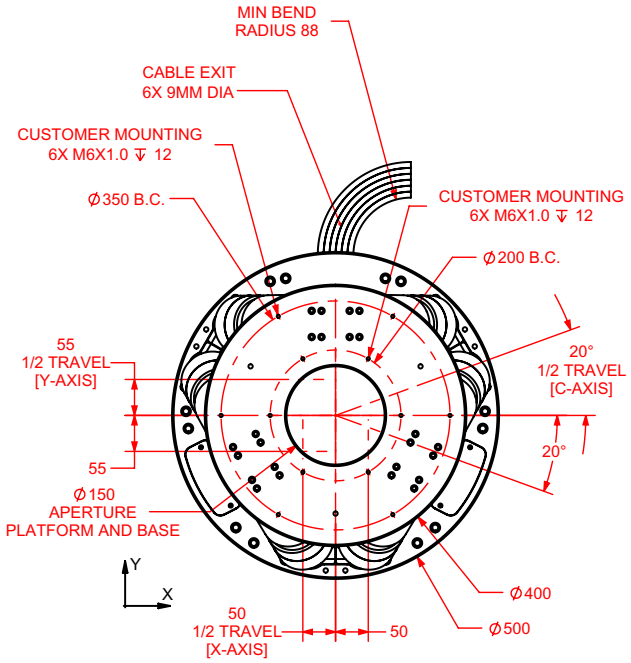
HEX500-350HL inverted load capacity.

HEX500-350HL DIMENSIONS

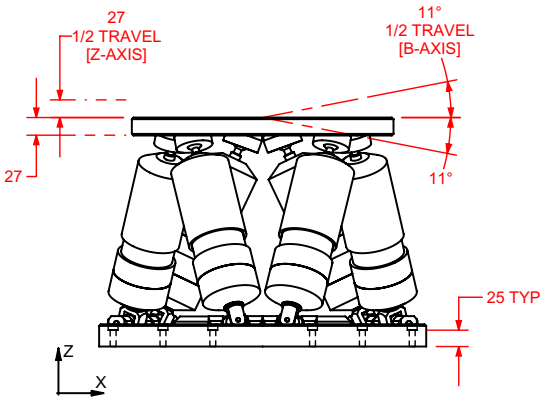


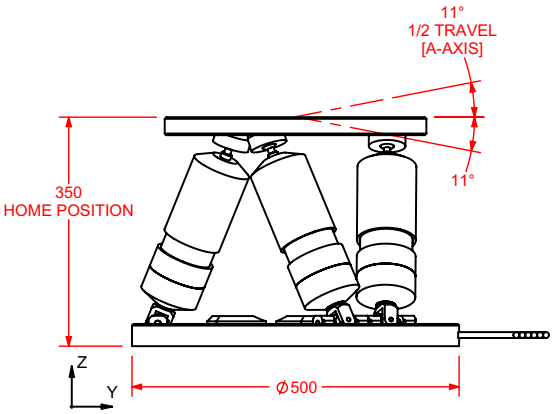






NOTE: ALL TRAVELS SPECIFIED AS
SINGLE-AXIS MOVES FROM HOME POSITION





DIMENSIONS: MILLIMETERS [INCHES]