6-Axis-Parallel Kinematic Positioning Systems

HXP 200 Hexapods

The HXP200-MECA and HXP200S-MECA high load Hexapods are parallel kinematic motion devices that provide six degrees of freedom: X, Y, Z, pitch, roll, and yaw.

• The HXP200-MECA is an effective solution to complex motion applications that demand a high load capacity of up to 50 kg centered and offset loads of at least 5 kg.

• The HXP200S-MECA is a wider and stiffer version of the HXP200-MECA, capable of handling 85 kg centered and offset loads of at least 11 kg.

Both Hexapods also feature long travel ranges, fast speeds, high stiffness and stability. They are driven by six DC servo motor actuators which provide precise MIM. A brake on the actuator eliminates drift at power-off conditions. A critical design feature that enhances the overall motion performance is the joints with which the actuators are attached to the base and the moving top plate. The preloaded and backlash-free, cardan joints enhance not only the repeatability and positioning performance of both HXP200-MECA and HXP200S-MECA, but are also key to its position stability and stiffness.

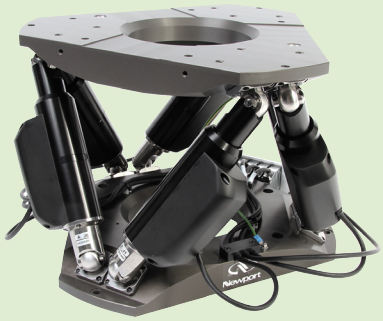
Coupled with the HXP200-ELEC-D or HXP200S-ELEC-D, a pair of flexible and programmable coordinate systems or pivot points are available. Other features include RightPath™, trajectory control for low run out and constant velocity trajectories along lines, arcs or rotations. Two additional single-axis stages can also be added, as well as remote joystick control. A free simulation software can be downloaded to determine the limits of position and load for specific applications. For easy programming and automation, the controller also includes instrument grade I/O's, hardware based input triggers, event triggers, high speed on-thefly data acquisition, fast TCP/IP communication, and integrated TCL programming language for on-board processes.

Features

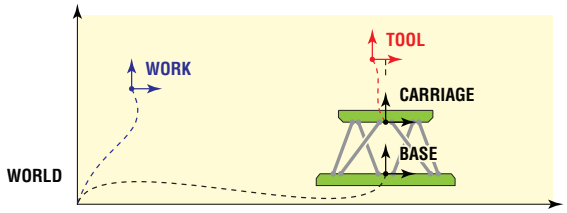
- Integrated 6-axis positioner
- No moving cables
- High stiffness
- No accumulation of motion errors
- Virtual center of rotation, set by software
- RightPath™ trajectory control

Applications

- Optics and satellite assembly and testing
- AED simulation
- Astronomy
- Biotechnology, surgery
- X-Ray diffraction
- Micromachining, micro-manipulation

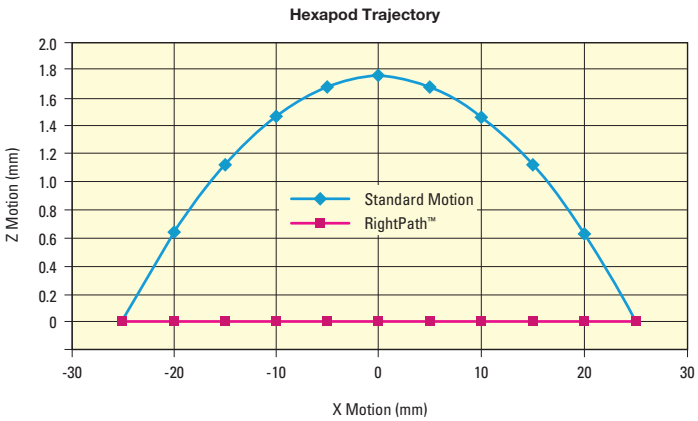


A requirement for many Hexapod motion applications is a virtual pivot point, allowing the user to freely choose the pivot point in space for all rotations. Newport has taken this a step further by providing two pivot points. The two userdefinable coordinate systems provided, called tool (moves with the Hexapod) and work (stationary coordinate system) are programmable and flexible. Imagine a machine tool where one can adjust the orientation of both the cutting tool and workpiece or in photonics, the optical beam and the sample. Incremental displacements are possible in either one in user-friendly Cartesian coordinates, and positions can be easily switched from one system to the other by a function call. These powerful functions are a completely new way of mastering Hexapod motions without the need for complex external coordinate transformations



Absolute moves and positions are defined in the work coordinate system. Incremental moves can be done in the tool or in the work coordinate systems.

As a standard feature, the HXP200-ELEC-D and HXP200S-ELEC-D controllers allow the user to choose a virtual pivot point in space for all rotations.



RightPath™ Trajectory Control enables minimal runout in linear and arc trajectories.

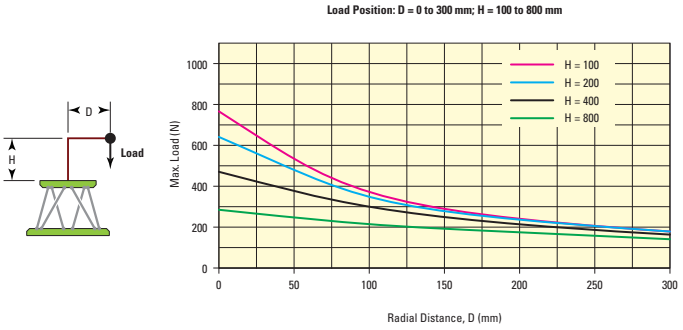
Specifications

	HX200-MECA	HXP200S-MECA
Travel Range X, Y, Z [1]	±59, ±54, ±25 mm	±40, ±45, ±27 mm
Travel Range ΘX, ΘY,ΘZ	±15, ±14.5, ±30°	±9, ±8, ±15°
Minimum Incremental Motion X, Y, Z [2]	0.2, 0.2, 0.1 µm	0.15, 0.15, 0.15 µm
Minimum Incremental Motion ΘX, ΘY, ΘZ	0.1, 0.1, 0.2 mdeg	±0.1, 0.1 0.1 mdeg
Uni-directional Repeatability X, Y, Z, Typical	±0.125, ±0.125, ±0.1 µm	±0.1, ±0.1, ±0.1 µm
Uni-directional Repeatability ΘX, ΘY, ΘZ, Typical	±0.1, ±0.1, ±0.125 mdeg	±0.1, ±0.1, ±0.1 mdeg
Maximum Speed X, Y, Z	81, 70, 26 mm/s	47, 54, 29 mm/s
Maximum Speed ΘX, ΘY, ΘZ	16, 15, 41 °/s	10, 9.3, 16.5 °/s
Rigidity X, Y, Z [3]	3, 3, 40 N/µm	6, 6, 30 N/µm
Centered Load Capacity (4)	500 N	850 N
Weight	15.5 kg	24.9 kg

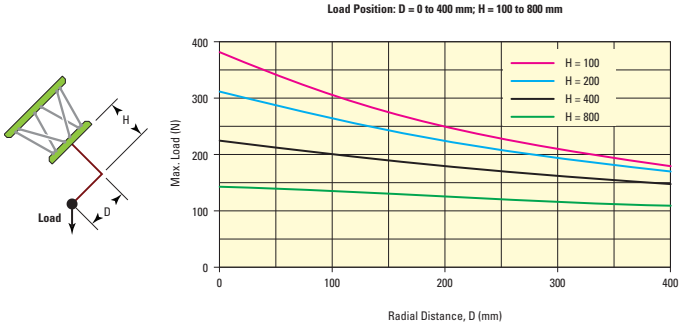
[1] Travel ranges are interdependent. The listed values aremax. travels per axis when all other axis are in their centered position.
[2] Open loop values shown.
[3] Stiffness depends on Hexapod position. Values are given for all axis in their centered position.
[4] For Value shown for horizontal base plate. See graphs for maximum payload height and cantilever distance on next page

Max. Cantilever Distance of the Load

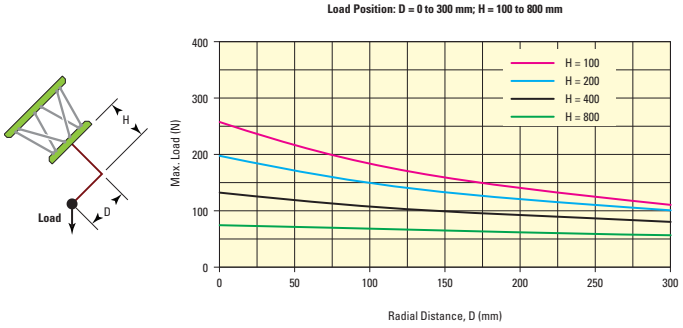
HXP200 Horizontal Base Plate



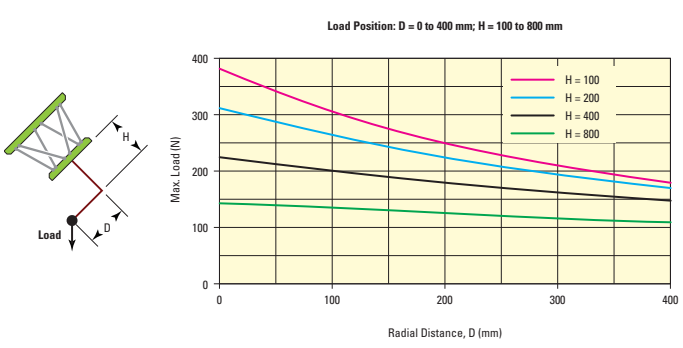
HXP200S Horizontal Base Plate



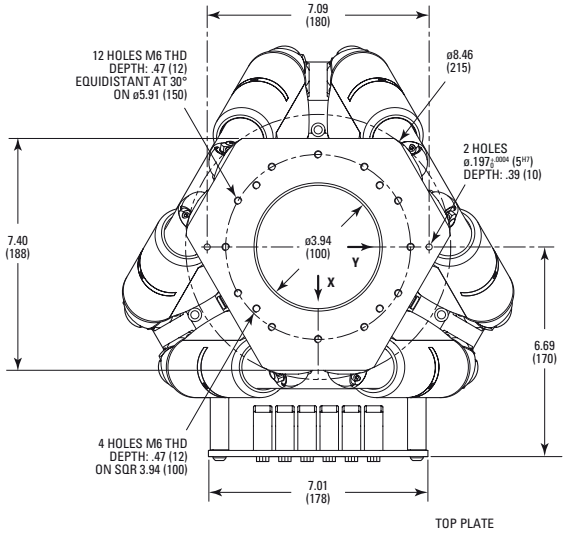
HXP200 Base Plate at Any Position



HXP200S Base Plate at Any Position

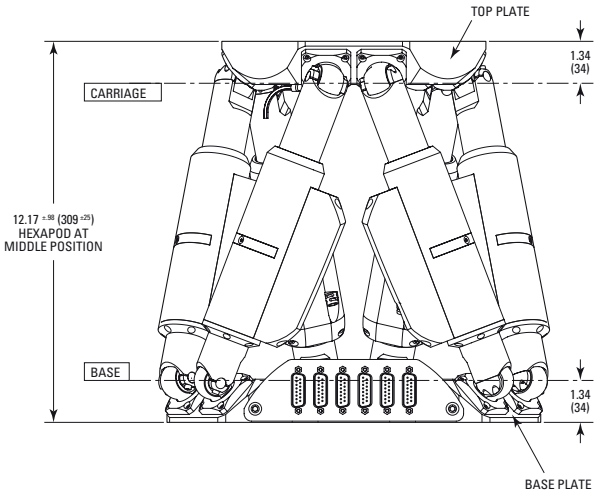


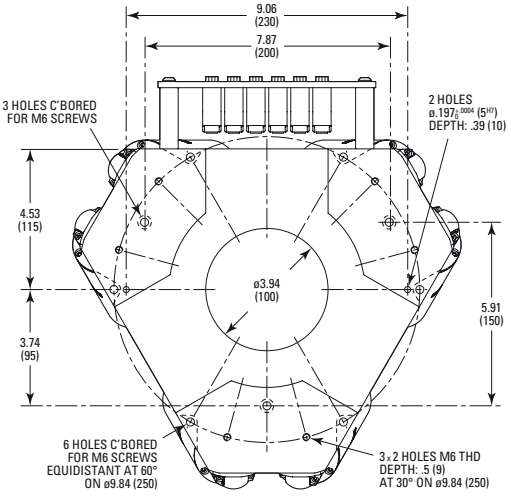
Dimensional Drawings HXP200-MECA



MODEL SHOW: HXP200-MECA

DIMENSIONS IN INCHES (AND MILLIMETERS)





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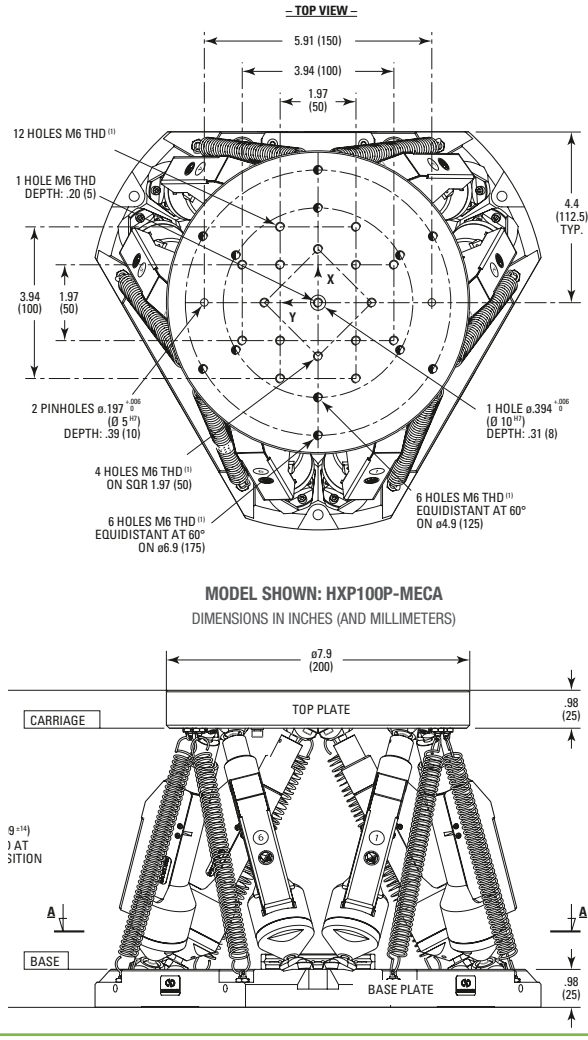
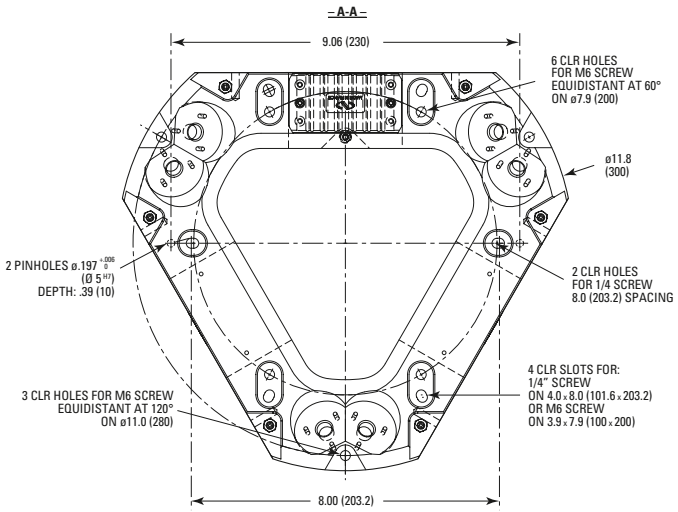


HXP100P-MECA and HXP100P-MECA



Note: Other top plate hole patterns or a center aperture are available upon request.

Ordering Information

Model	Description
HXP100-MECA	Hexapod, 200 N load capacity
HXP100-ELEC-D(1)	Hexapod controller for HXP100-MECA
HXP100P-MECA	Hexapod Precision, 60 N load capacity
HXP100P-ELEC-D (1)	Hexapod controller for HXP100P-MECA

1) Contact Newport for the two additional SingleAxis drive capability

Model	Description
HXP100HA-MECA	Hexapod with guaranteed specifications, 200 N load capacity
HXP100HA-ELEC-D(1)	Hexapod controller for HXP100HA-MECA
HXP100PHA-MECA	Hexapod Precision with guaranteed specifications, 60 N load capacity
HXP100PHA-ELEC-D (1)	Hexapod controller for HXP100PHA-MECA

1) Contact Newport for the two additional SingleAxis drive capability

Note: Call Newport for quotes on the 10-6 hPa vacuum version.

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