

6-Axis Parallel Kinematic Positioning System

Hexapod



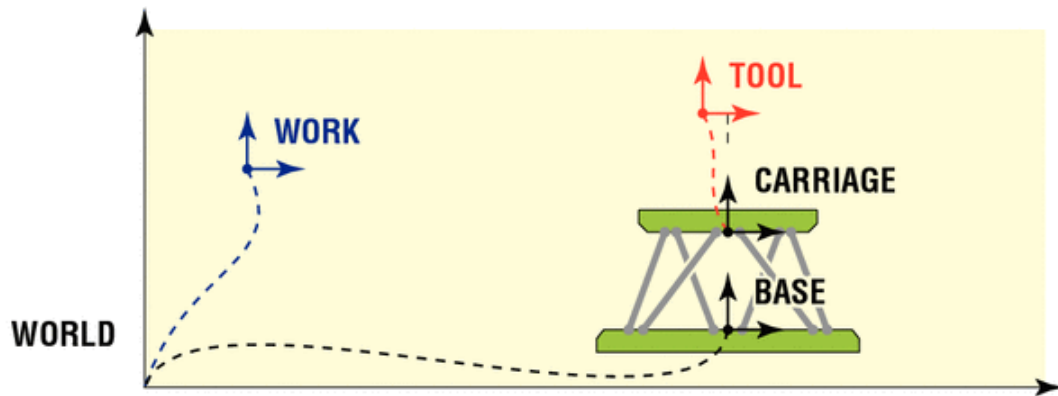
A Hexapod is a parallel kinematic motion device that provides six degrees of freedom: X, Y, Z, pitch, roll, and yaw. Hexapods are ingenious and effective solutions to complex motion applications that require high load capacity and accuracy in up to six independent axes. Hexapods having the image of being complex and highly priced, Newport Hexapods, on the contrary, are not only affordable but extremely easy to use. Newport Hexapods are driven by six, industry-proven, high performance actuators using designs that leverage Newport's expertise in actuators. The quality of the actuators has obviously a strong impact on the overall motion performance of a Hexapod, but of almost equal importance are the joints connecting the actuators to the base and the moving top plate. Embracing this challenge our engineers came up with a unique design of special anti-friction coated spherical joints that are not only simple, but also provide significantly higher rigidity than ordinary universal joints. The result is a Newport Hexapod that provides more than five-times higher rigidity and twice the load capacity of other hexapods of similar size.

HPX100-MECA 6-Axis Hexapod

The [HXP100-MECA](#) 6-Axis Hexapod offers a 20 kg centered load capacity and is controlled by the dedicated [HXP100-ELEC](#) hexapod controller/driver which is sold. This controller accurately masters the synchronized transformations from Cartesian input coordinates to the motion of the Hexapod legs. In addition, the [HXP100-ELEC](#) includes instrument grade I/O's, hardware based input triggers, event triggers, high-speed on-the-fly data acquisition, fast TCP/IP communication, and integrated TCL programming language for on-board processes. All these features improve accuracy and throughput, making the programmer's life much easier. A common requirement for many Hexapod motion applications is a virtual pivot point for all rotations. The HXP-ELEC controller provides this as a standard feature and at Newport, we have taken this a step further. Not only can the Newport Hexapod relocate the pivot point, but through our advanced technology, the entire coordinate system can be relocated. In addition, two user-definable coordinate systems are provided, called Tool (moves with the Hexapod's top plate) and Work (stationary coordinate system). Incremental displacements are possible in either one of these Cartesian coordinate systems, and positions can be easily calculated from one system to the other by a function call. These powerful functions provide a completely new way of mastering Hexapod motions without the need for complex external coordinate transformations.

HPX1000-MECA 6-Axis Hexapod

The new [HXP1000-MECA](#) High Load 6-Axis Hexapod is a parallel kinematic motion device that provides six degrees of freedom: X, Y, Z, pitch, roll, and yaw. It offers a much higher centered load capacity of 500 kg compared to the [HXP100-MECA](#). It also offers extended travel, faster speed, and better repeatability than our 20 kg hexapod. The [HXP1000-MECA](#) is an effective solution to complex motion applications that demand high load capacity and accuracy in up to six independent axes. Contrary to the image of being complex and highly priced, the HXP1000 hexapod is not only affordable but extremely easy to use. The model [HXP1000-ELEC](#) Hexapod Controller/Driver is used to control our high load hexapod, and offers the same features and functionality of our HPX100-ELEC controller.



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.

Model	HXP100-MECA	HXP1000-MECA
Size	Ø 300 mm x H 200	Ø 500 mm x H 390
Travel, X ⁽¹⁾	±29 mm	±60 mm
Travel, Y ⁽¹⁾	±26 mm	±60 mm
Travel, Z ⁽¹⁾	28 mm	±39 mm
Travel, θ_x ⁽¹⁾	±12°	±11°
Travel, θ_y ⁽¹⁾	±10°	±11°
Travel, θ_z ⁽¹⁾	±20°	±20°
Minimum Incremental Motion, Linear (X, Y, Z)	0.5 μm	0.3 μm
Minimum Incremental Motion, Linear($\theta_x, \theta_y, \theta_z$)	5 μrad	1 μrad
Repeatability (X, Y, Z) ⁽²⁾	0.5 μm	0.3 μm
Repeatability ($\theta_x, \theta_y, \theta_z$) ⁽²⁾	0.001° (17 μrad)	0.00006° (1 μrad)
Maximum Speed (X, Y, Z), mm/s	1	9
Maximum Speed ($\theta_x, \theta_y, \theta_z$), °/s	1	1.4
Centered Load Capacity, Cz, kg	20	500
Rigidity (Z), N/ μm	40 N/ μm	100 N/ μm

1) Travel ranges are interdependent.

The listed values are max. travels per axis when all other axis are in their centered position (Height = 208 mm for Z).

2) Six-axis move.