

## 6-Axis Miniature Hexapod

Fast, Compact, and Highly Precise



### H-811.I2/I2V

- Travel ranges to  $\pm 17$  mm /  $\pm 21^\circ$
- Load capacity to 5 kg
- Repeatability to  $\pm 0.06$   $\mu$ m
- Velocity to 20 mm/s
- Superior lifetime
- Vacuum-compatible versions available

### Reference-class 6-axis positioning system

Parallel-kinematic design for six degrees of freedom making it significantly more compact and stiff than serial-kinematic systems, higher dynamic range, no moved cables: Higher reliability, reduced friction. Vacuum-compatible version to  $10^{-6}$  hPa available

### Brushless DC motor (BLDC)

Brushless DC motors are particularly suitable for high rotational speeds. They can be controlled very accurately and ensure high precision. Because they dispense with sliding contacts, they run smoothly, are wear-free and therefore achieve a long lifetime.

### PI Hexapod Simulation Tool

The simulation software simulates the limits of the workspace and load capacity of a hexapod. Therefore, even before making a purchase, you can check whether a particular hexapod model can handle the loads, forces, and torques occurring in an application. For this purpose, the simulation tool takes into account the position and motion of the hexapod as well as the pivot point and several reference coordinate systems.

### Fields of application

Research and industry, standard and vacuum environments. For micromanufacturing, medical technology, tool inspection.

## Specifications

Motion and positioning	H-811.I2 / .I2V**	Unit	Tolerance
Active axes	X, Y, Z, $\theta_x$ , $\theta_y$ , $\theta_z$		
Travel range* in X, Y	$\pm 17$ , $\pm 16$	mm	
Travel range* in Z	$\pm 6.5$	mm	
Travel range* in $\theta_x$ , $\theta_y$	$\pm 10$ , $\pm 10$	°	
Travel range* in $\theta_z$	$\pm 21$	°	
Minimum incremental motion X, Y	0.2	$\mu\text{m}$	typ.
Minimum incremental motion Z	0.08	$\mu\text{m}$	typ.
Minimum incremental motion $\theta_x$ , $\theta_y$	2.5	$\mu\text{rad}$	typ.
Minimum incremental motion $\theta_z$	5	$\mu\text{rad}$	typ.
Backlash X, Y	0.2	$\mu\text{m}$	typ.
Backlash Z	0.06	$\mu\text{m}$	typ.
Backlash $\theta_x$ , $\theta_y$	2	$\mu\text{rad}$	typ.
Backlash $\theta_z$	4	$\mu\text{rad}$	typ.
Repeatability X, Y	$\pm 0.15$	$\mu\text{m}$	typ.
Repeatability Z	$\pm 0.06$	$\mu\text{m}$	typ.
Repeatability $\theta_x$ , $\theta_y$	$\pm 2$	$\mu\text{rad}$	typ.
Repeatability $\theta_z$	$\pm 3$	$\mu\text{rad}$	typ.
Max. velocity X, Y, Z	20 / 10	mm/s	
Max. velocity $\theta_x$ , $\theta_y$ , $\theta_z$	500 / 250	mrad/s	
Typ. Velocity X, Y, Z	10 / 5	mm/s	
Typ. Velocity $\theta_x$ , $\theta_y$ , $\theta_z$	240 / 120	mrad/s	

Mechanical properties	H-811.I2 / .I2V**	Unit	Tolerance
Stiffness X / Y	0.7	N/ $\mu\text{m}$	
Stiffness Z	8	N/ $\mu\text{m}$	
Load capacity, horizontal base plate	5	kg	max.
Load capacity, base plate in any orientation	2.5	kg	max.
Holding force, power off, horizontal base plate	15	N	max.
Holding force, power off, base plate in any orientation	2.5	N	max.
Motor type	BLDC motor		

Miscellaneous	H-811.I2 / .I2V**	Unit	Tolerance
Operating temperature range	0 to 50	°C	
Material	Stainless steel, aluminum		
Mass	2.2	kg	±5 %
Cable length	0.5 + 3 / 3 (air) + 2 (vacuum)	m	±10 mm
Recommended controller	C-887.5x		

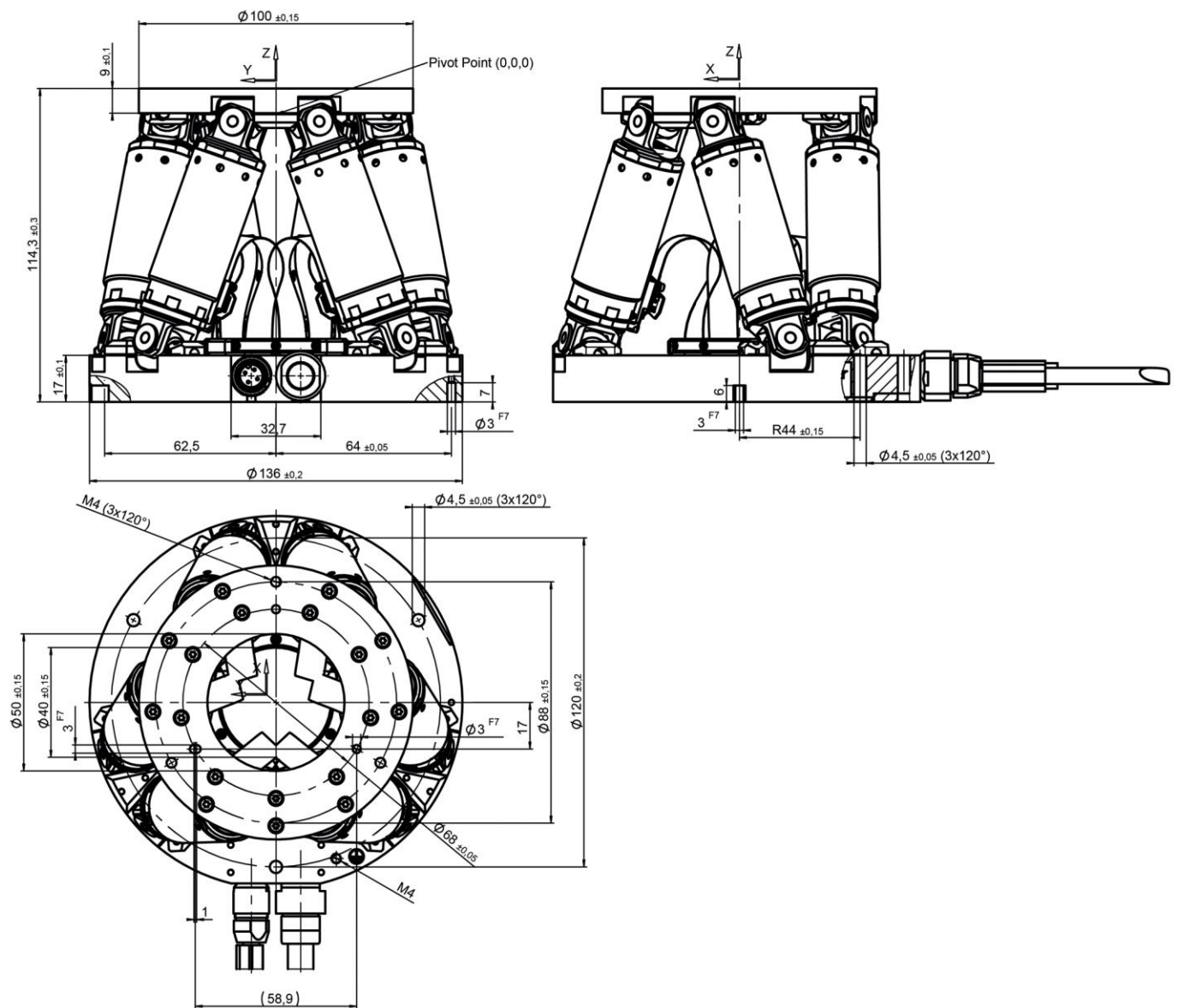
Technical data specified at 20±3 °C.

\* The travel ranges of the individual coordinates (X, Y, Z,  $\theta_x$ ,  $\theta_y$ ,  $\theta_z$ ) are interdependent. The data for each axis in this table shows its maximum travel range, where all other axes and the pivot point are at the reference position.

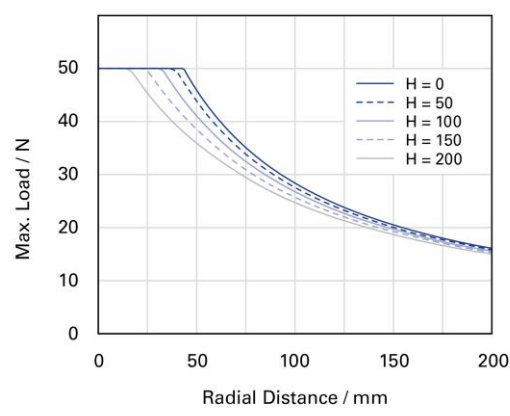
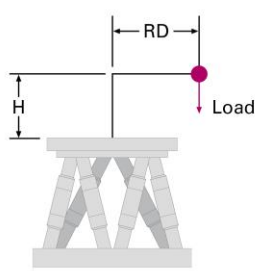
\*\* For continuous operation in a vacuum, restrictions on operating parameters may be necessary due to heat generation.

Ask about customized versions.

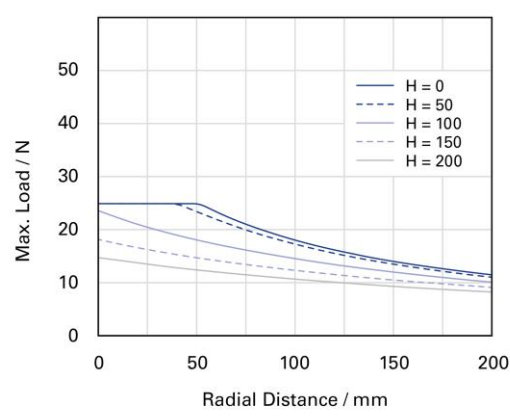
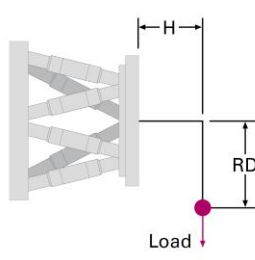
## Drawings / Images



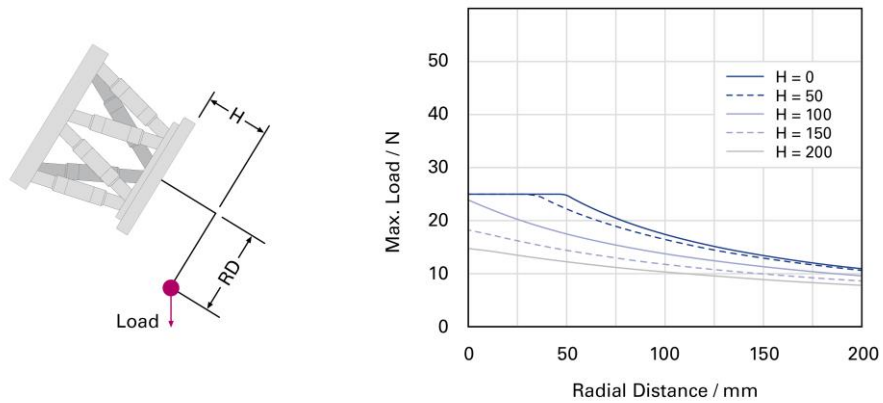
H-811.I2, dimensions in mm



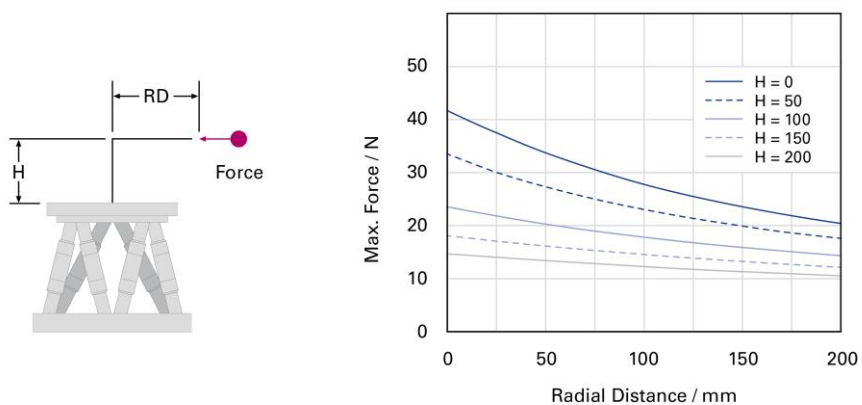
Load limits for horizontal mounting



Load limits for vertical mounting



*Load limits for mounting at the most unfavorable angle*



*Maximum admissible force on the hexapod with horizontal mounting*

## Ordering Information

### H-811.I2

Miniature hexapod microrobot, brushless DC motor, 5 kg load capacity, 20 mm/s velocity, 0.5 m cable length, including 3 m cable set

**H-811.I2V**

Miniature hexapod microrobot, brushless DC motor, vacuum compatible to  $10^{-6}$  hPa, 5 kg load capacity, 10 mm/s velocity, 2 m cable length, including 3 m cable set and feedthrough