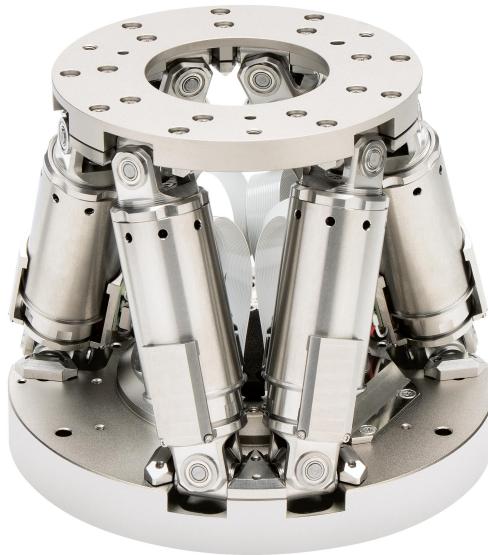


# Miniature Hexapod

Fast, Compact, and Highly Precise



## H-811.x2IHP

- Travel ranges to  $\pm 17$  mm /  $\pm 21^\circ$
- Payload to 2.5 kg
- Repeatability to  $\pm 0.1$   $\mu$ m
- Velocity to 20 mm/s

### Application fields

Its outstanding precision makes the H-811.x2IHP an ideal positioning system in processes involving submicron levels of precision. Thanks to its small footprint and its proven reliability in applications with high numbers of cycles, the H-811 is typically employed in photonics and in precision assembly. In such areas, it makes a significant contribution to boosting the productivity of complex manufacturing processes and measuring procedures.

### High dynamics combined with extreme reliability

The parallel-kinematic arrangement enables the hexapod to perform motion in 6 axes in an extremely compact design. Thanks to the use of brushless DC motors and its stiff mechanical design, the H-811 offers the dynamics required for active alignment applications, even if external interference (e.g., in the case of gluing processes) occurs. Extensive software tools provide support by simplifying the system tuning and making automatic routines available for alignment to an external analog control signal.

### Motion simulation for protecting the overall system

The PIVirtualMove software, which can be downloaded free of charge, simulates the travel range, the alignment, and the permissible forces and torques of the H-811 to facilitate an optimum system configuration. In this context, both the chosen center of rotation and the center of gravity of the load are taken into consideration.

Work and tool coordinate systems and an emulation tool are included in the free software package belonging to the scope of delivery of the hexapod controller. The tools provided help to protect critical components such as optical or photonic parts.

Motion	Unit	Tolerance	H-811.S2IHP
Active axes			X   Y   Z   $\theta$ X   $\theta$ Y   $\theta$ Z
Travel range in X	mm		$\pm 17$
Travel range in Y	mm		$\pm 16$
Travel range in Z	mm		$\pm 6.5$
Rotation range in $\theta$ X	$^{\circ}$		$\pm 10$
Rotation range in $\theta$ Y	$^{\circ}$		$\pm 10$
Rotation range in $\theta$ Z	$^{\circ}$		$\pm 21$
Maximum velocity in X	mm/s		20
Recommended velocity in X	mm/s		10
Maximum velocity in Y	mm/s		20
Recommended velocity in Y	mm/s		10
Maximum velocity in Z	mm/s		20
Recommended velocity in Z	mm/s		10
Maximum angular velocity in $\theta$ X	mrad/s		500
Recommended angular velocity in $\theta$ X	mrad/s		240
Maximum angular velocity in $\theta$ Y	mrad/s		500
Recommended angular velocity in $\theta$ Y	mrad/s		240
Maximum angular velocity in $\theta$ Z	mrad/s		500
Recommended angular velocity in $\theta$ Z	mrad/s		240
Amplitude-frequency product in X	mm·Hz		9.35
Amplitude-frequency product in Y	mm·Hz		9.12
Amplitude-frequency product in Z	mm·Hz		3.45
Amplitude-frequency product in $\theta$ X	$^{\circ} \cdot$ Hz		5
Amplitude-frequency product in $\theta$ Y	$^{\circ} \cdot$ Hz		5
Amplitude-frequency product in $\theta$ Z	$^{\circ} \cdot$ Hz		12.6
Amplitude-frequency <sup>2</sup> product in X	mm·Hz <sup>2</sup>		152
Amplitude-frequency <sup>2</sup> product in Y	mm·Hz <sup>2</sup>		106
Amplitude-frequency <sup>2</sup> product in Z	mm·Hz <sup>2</sup>		—
Amplitude-frequency <sup>2</sup> product in $\theta$ X	$^{\circ} \cdot$ Hz <sup>2</sup>		—
Amplitude-frequency <sup>2</sup> product in $\theta$ Y	$^{\circ} \cdot$ Hz <sup>2</sup>		—
Amplitude-frequency <sup>2</sup> product in $\theta$ Z	$^{\circ} \cdot$ Hz <sup>2</sup>		—
Amplitude error	%	Max.	10
Phase error	$^{\circ}$	Max.	60
Maximum frequency	Hz		30

Positioning	Unit	Tolerance	H-811.S2IHP
Minimum incremental motion in X	µm		0.04
Minimum incremental motion in Y	µm		0.04
Minimum incremental motion in Z	µm		0.02
Minimum incremental motion in $\theta$ X	µrad		0.5
Minimum incremental motion in $\theta$ Y	µrad		0.5
Minimum incremental motion in $\theta$ Z	µrad		0.75
Unidirectional repeatability in X	µm		$\pm 0.2$
Unidirectional repeatability in Y	µm		$\pm 0.2$
Unidirectional repeatability in Z	µm		$\pm 0.1$
Unidirectional repeatability in $\theta$ X	µrad		$\pm 2$
Unidirectional repeatability in $\theta$ Y	µrad		$\pm 2$
Unidirectional repeatability in $\theta$ Z	µrad		$\pm 3$
Backlash in X	µm	Typ.	0.2
Backlash in Y	µm	Typ.	0.2
Backlash in Z	µm	Typ.	0.06
Backlash in $\theta$ X	µrad	Typ.	2
Backlash in $\theta$ Y	µrad	Typ.	2
Backlash in $\theta$ Z	µrad	Typ.	4

Drive Properties		H-811.S2IHP
Drive type		Brushless DC motor

Mechanical Properties	Unit	H-811.S2IHP
Stiffness in X	N/µm	0.7
Stiffness in Y	N/µm	0.7
Stiffness in Z	N/µm	8
Maximum load capacity, base plate in any orientation	kg	1
Maximum load capacity, base plate horizontal	kg	2.5
Maximum holding force, base plate horizontal	N	7.5
Overall mass	kg	2.3
Material		Stainless steel, aluminum

Miscellaneous	Unit	H-811.S2IHP
Operating temperature range	°C	0 to 40
Connector for data transmission		HD D-sub 78 (m)
Connector for supply voltage		M12 4-pole (m)
Cable length	m	0.5
Outer diameter power supply cable	mm	4.95
Minimum bending radius for fixed installation, power supply	mm	25
Outer diameter data transmission cable	mm	9.5
Minimum bending radius for fixed installation, data transmission	mm	95
Recommended controllers/drivers		C-887.5x with BISS communication

Note on amplitude-frequency<sup>2</sup> product in Z, X, Y, Z: no limitations  
 The cables fixed to the H-811.S2IHP are 0.5 m long respectively.

The cables fixed to the H-811.S2IHP are not drag chain compatible.

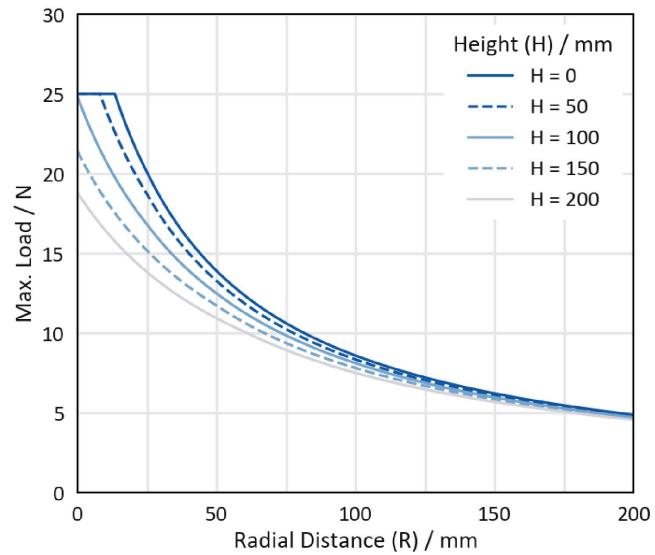
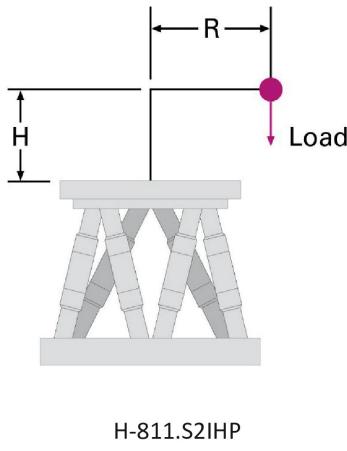
Connecting cables are not included in the scope of delivery and must be ordered separately.

Ask about customized versions.

When measuring position specifications, typical velocity is used. The data is included in the delivery of the product in the form of a measurement report and is stored at PI. The maximum travel ranges of the individual coordinates (X, Y, Z,  $\theta$ X,  $\theta$ Y,  $\theta$ Z) are interdependent. The data for each axis shows its maximum travel range when all other axes are in the zero position of the nominal travel range and the default coordinate system is in use, or rather when the pivot point is set to 0,0,0.

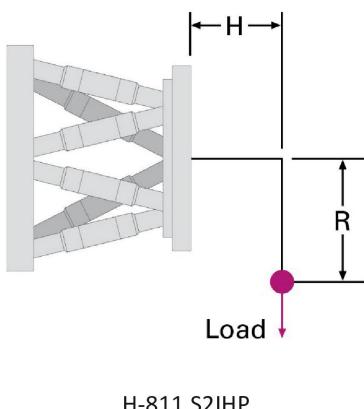
At PI, technical data is specified at  $22 \pm 3$  °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

## Drawings / Images

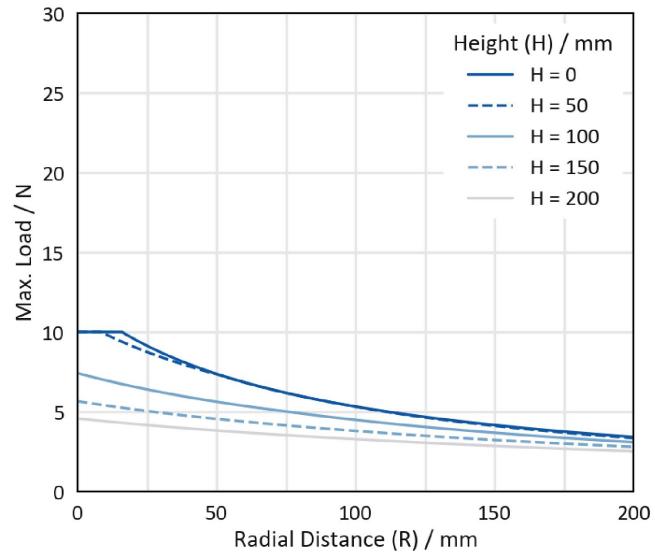


Maximum loads on the H-811.S2IHP when mounted horizontally

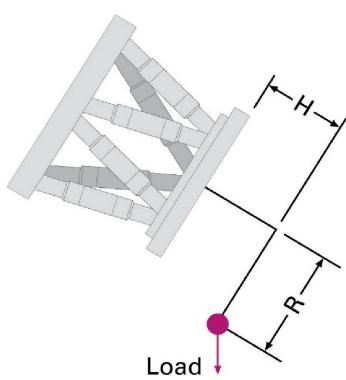
## Drawings / Images



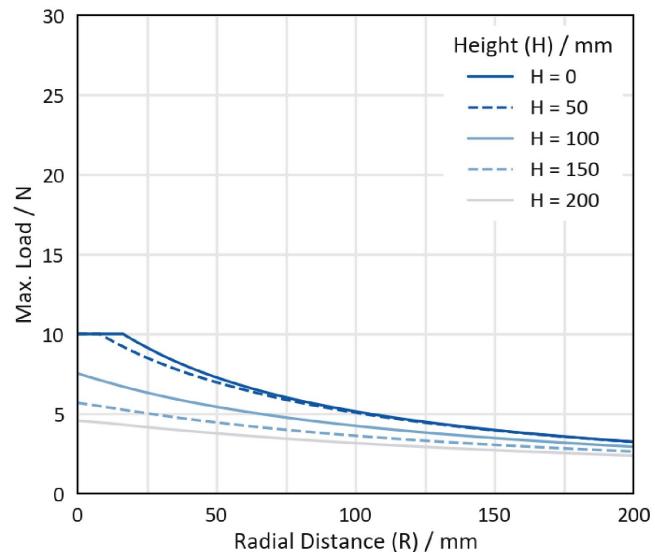
H-811.S2IHP



Maximum loads on the H-811.S2IHP when mounted vertically

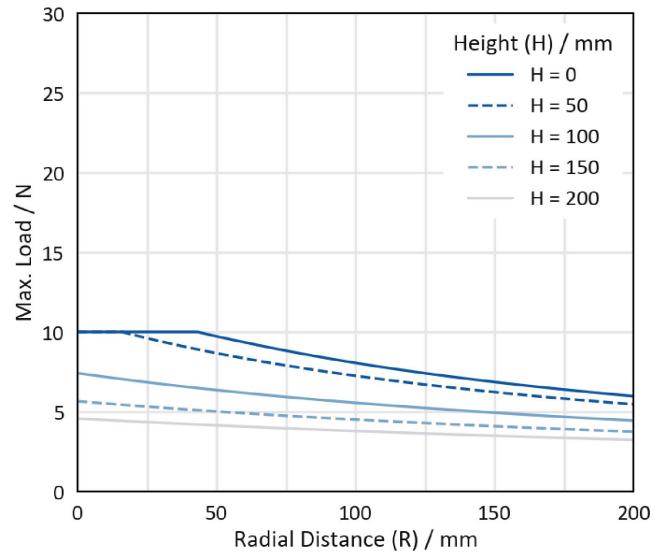
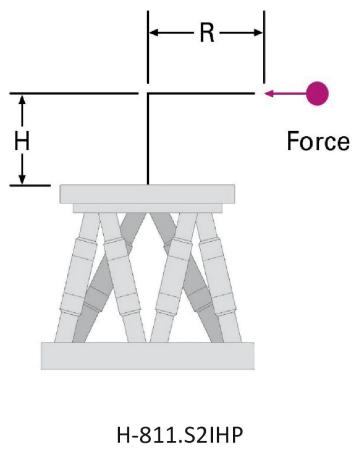


H-811.S2IHP

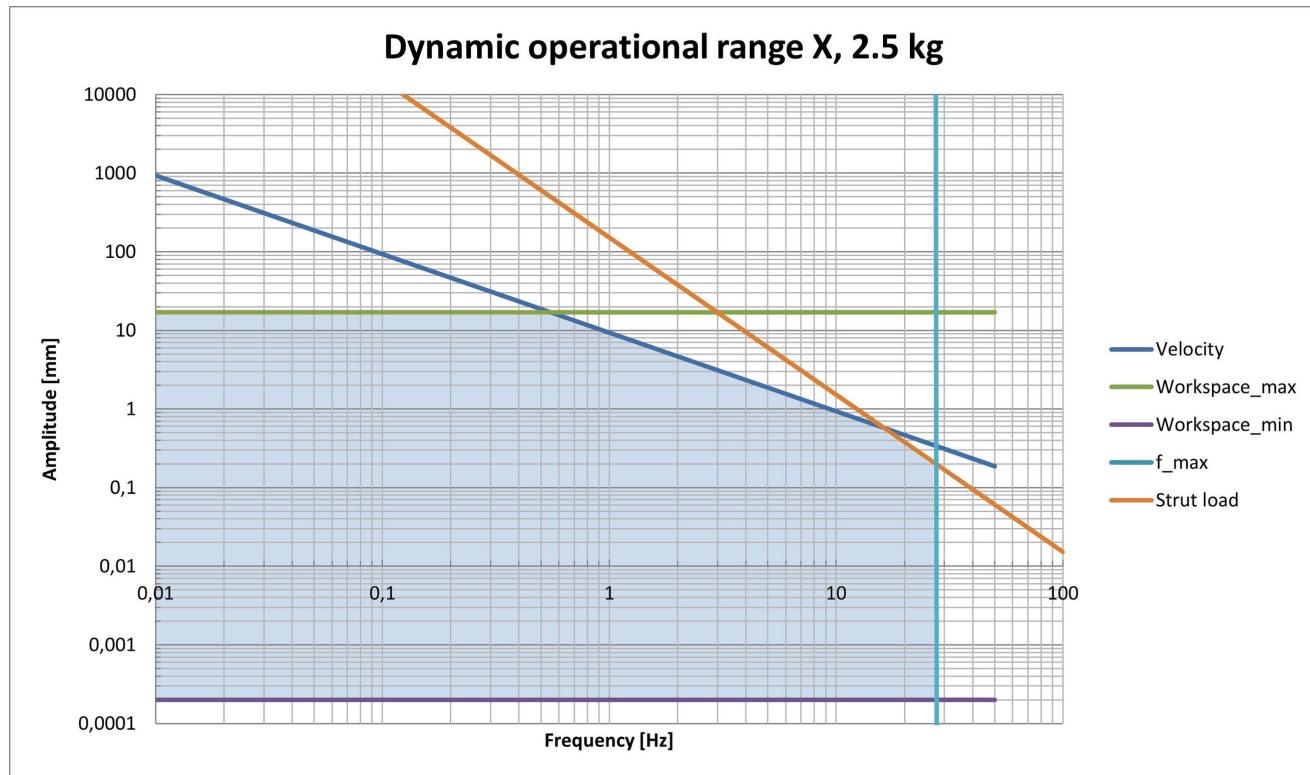


Maximum loads on the H-811.S2IHP when mounted at the most unfavorable angle

## Drawings / Images

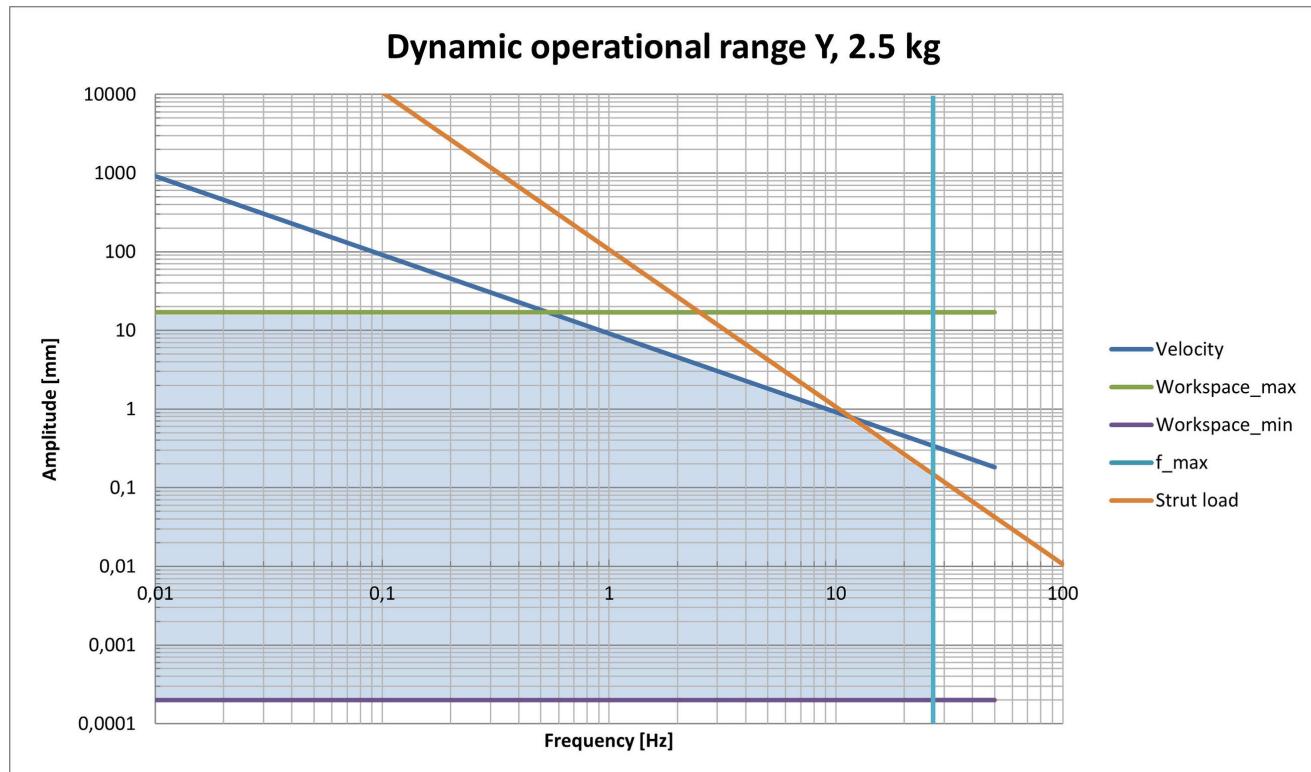


Maximum permissible force acting on the H-811.S2IHP when mounted horizontally

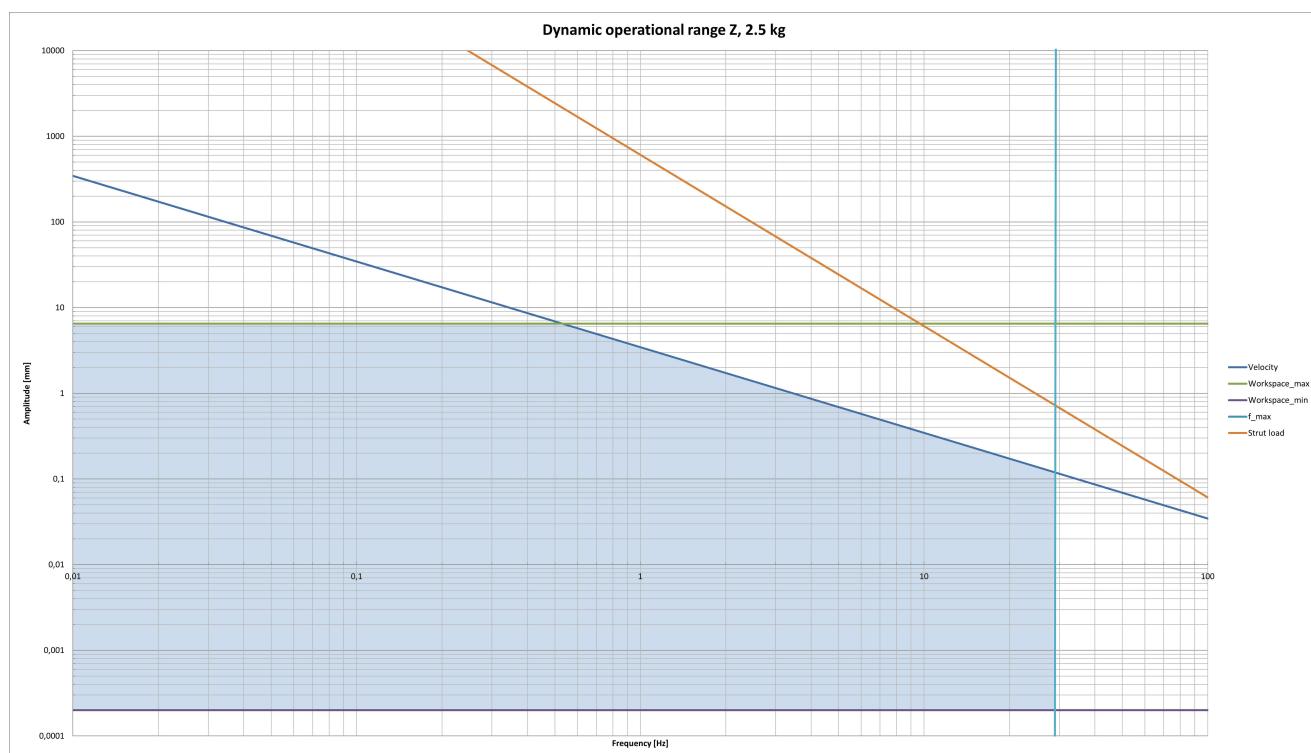


Dynamic working range of the H-811.S2IHP, X, 2.5 kg

## Drawings / Images

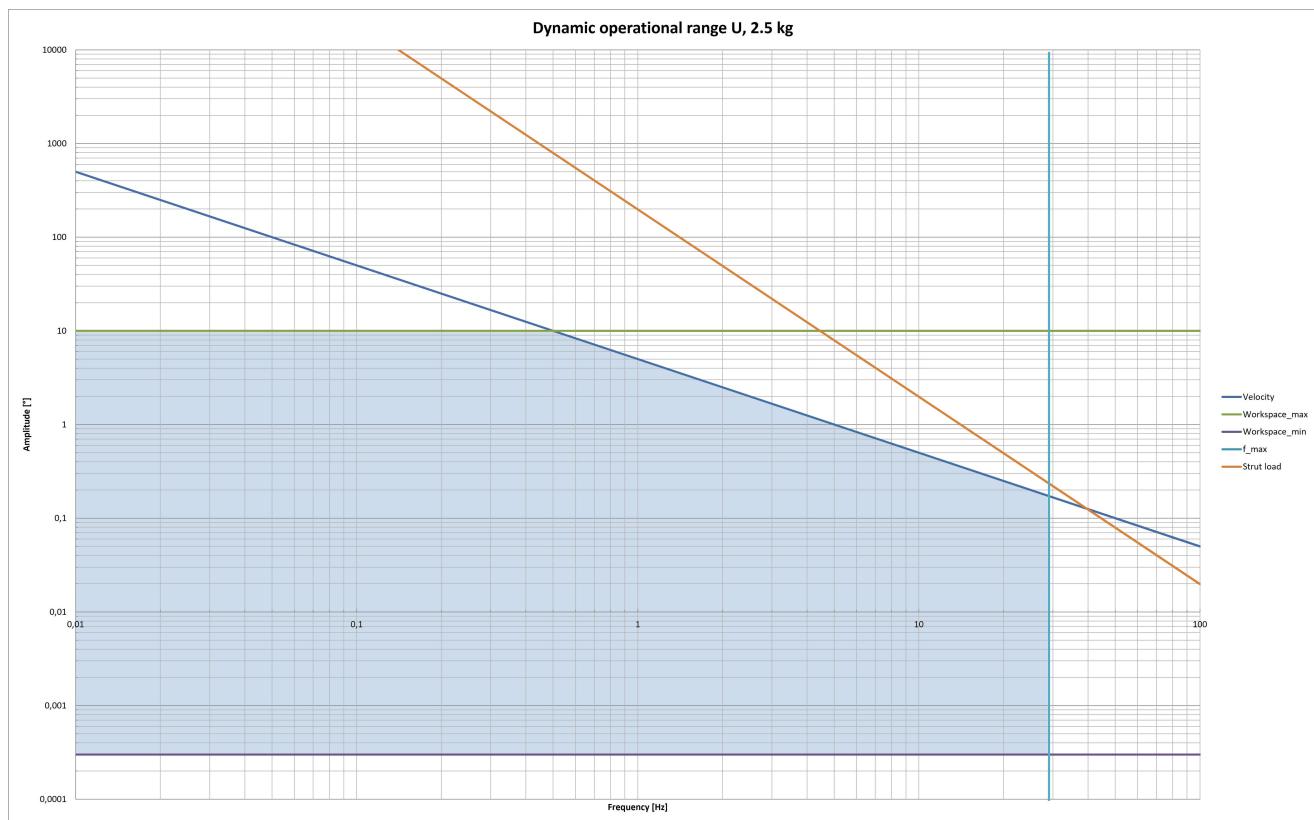


Dynamic working range of the H-811.S2IHP, Y, 2.5 kg

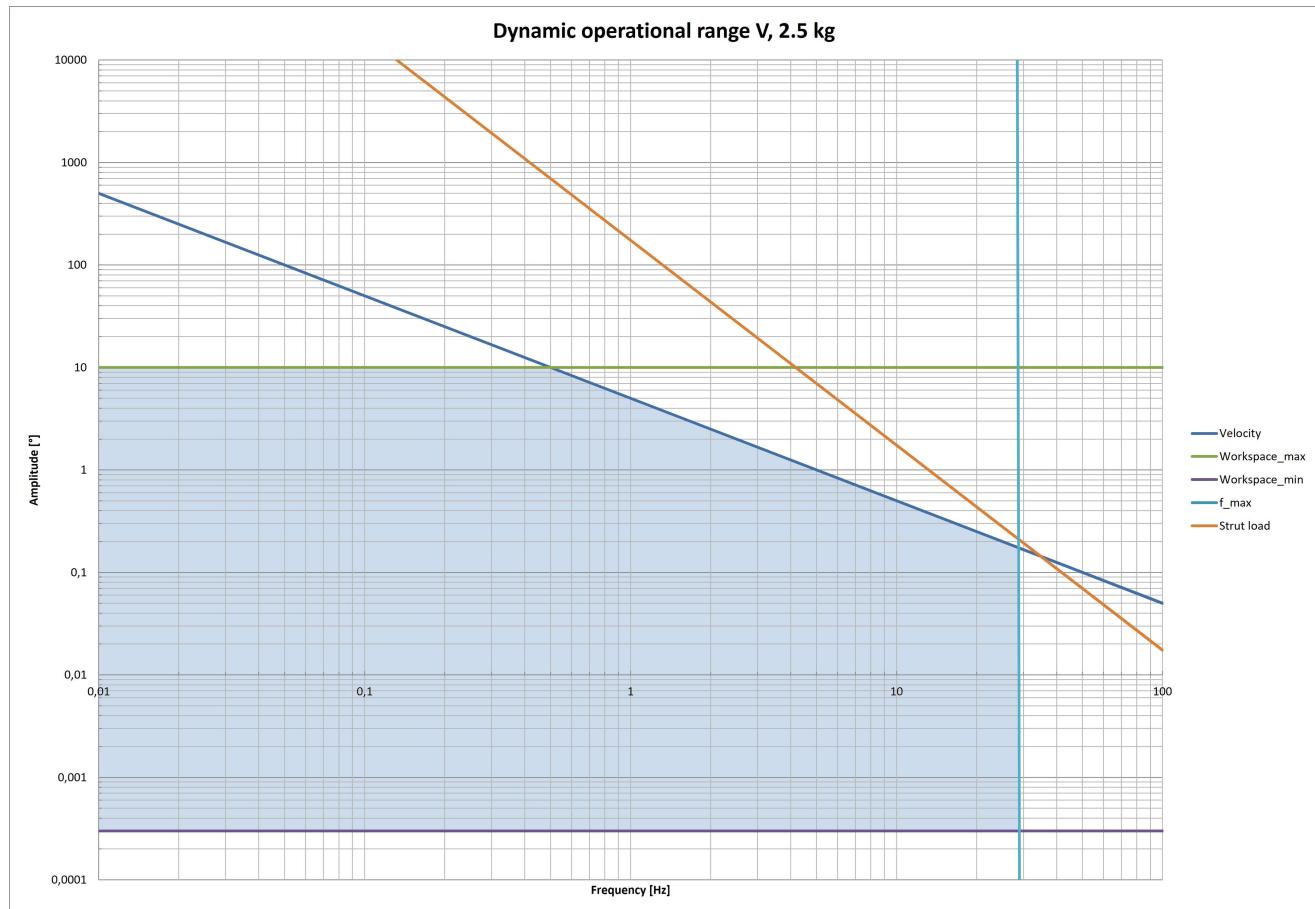


Dynamic working range of the H-811.S2IHP, Z, 2.5 kg

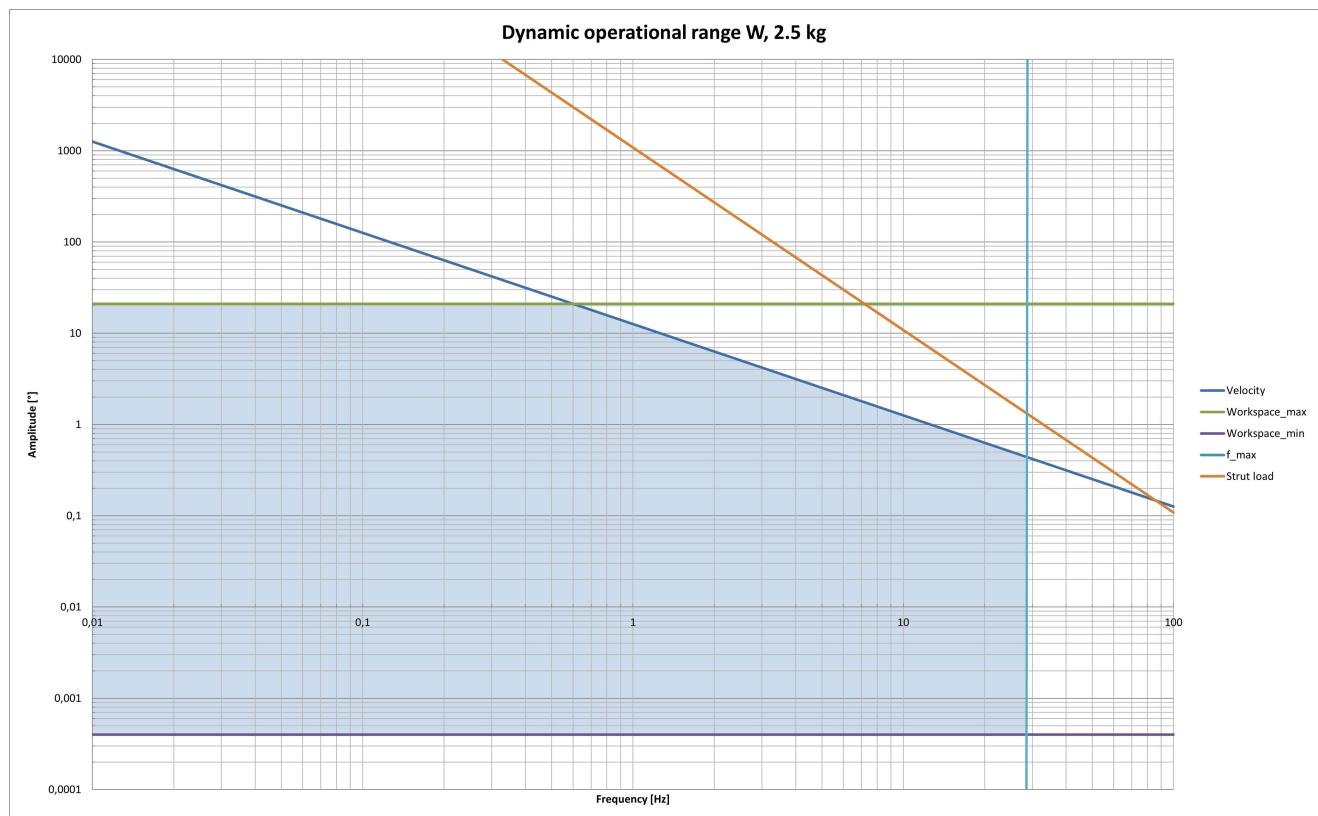
## Drawings / Images

Dynamic working range of the H-811.S2IHP, U ( $\theta$ X), 2.5 kg

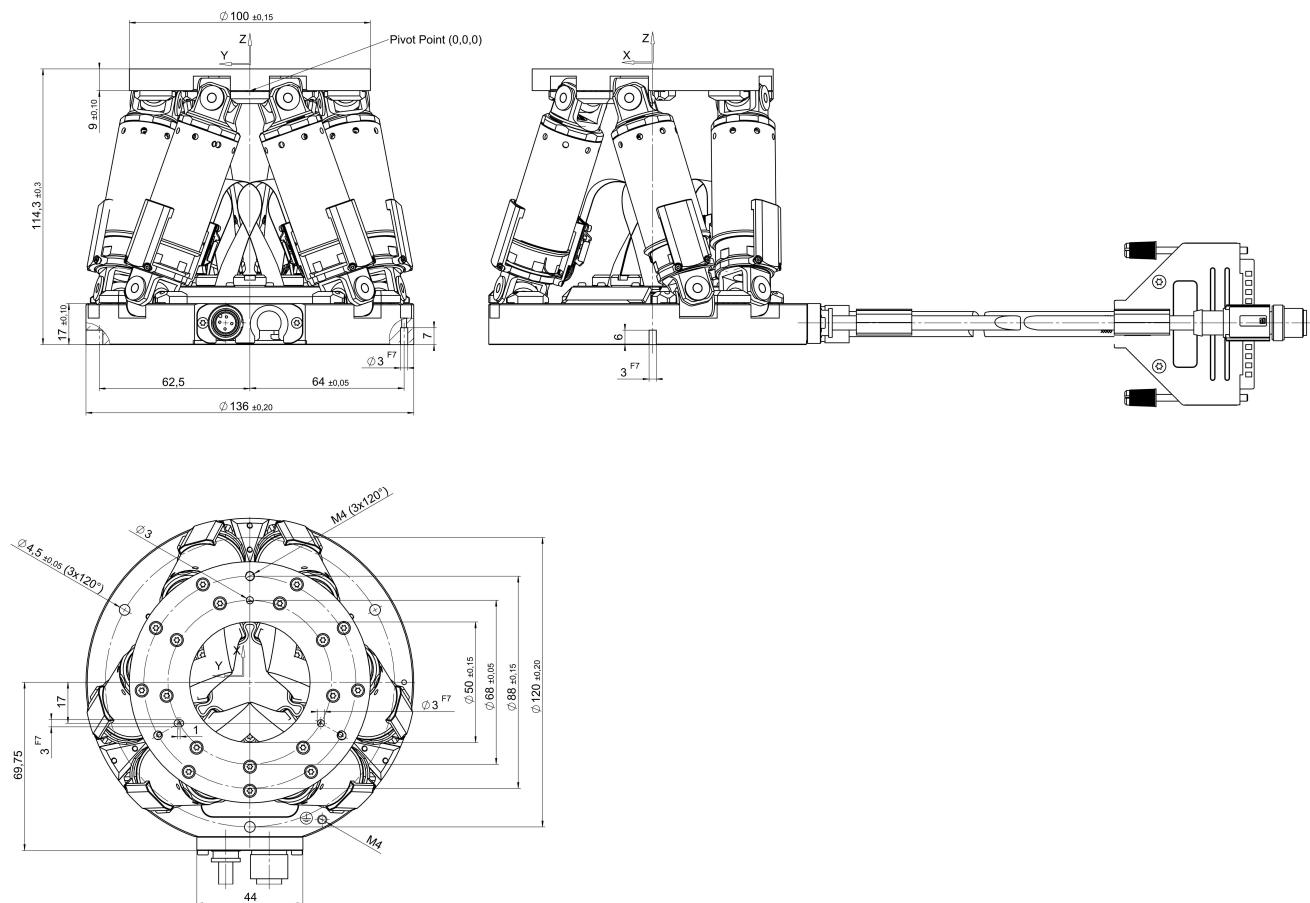
## Drawings / Images

Dynamic working range of the H-811.S2IHP, V ( $\Theta Y$ ), 2.5 kg

## Drawings / Images



## Drawings / Images



H-811.S2IHP, dimensions in mm, at zero position of nominal travel range

## Order Information

### H-811.S2IHP

Miniature hexapod; BLDC motor; 2.5 kg payload; 20 mm/s maximum velocity; 0.5 m cable length. Connecting cables are not included in the scope of delivery and must be ordered separately.