

# 6-Axis Hexapod

For Loads up to 250 kg



## H-850

- Load capacity to 250 kg
- Repeatability to  $\pm 0.2 \mu\text{m}$
- Travel ranges to  $\pm 50 \text{ mm} / \pm 30^\circ$
- Works in any orientation

The H-850 series hexapods position loads of up to 250 kg with high precision and reliability. Heavy-duty precision bearings allow applications with long duty cycles.

The parallel-kinematic design for six degrees of freedom makes it significantly more compact and stiffer than comparable serial kinematic systems. The advantages over serial, i.e., stacked systems, are mainly the much better path accuracy and repeatability. In addition, the moved mass is lower and allows improved dynamics performance and is the same for all motion axes. Cable management is not a problem because cables are not moved.

### Use of brushless DC motors (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.

### Absolute encoder

Absolute encoders supply explicit position information that enables immediate determination of the position. Therefore, no referencing is necessary when switching on and this increases efficiency and safety during operation.

### PI Hexapod Simulation Tool

The simulation software simulates the limits of the workspace and load capacity of a hexapod. Therefore, even before purchasing, 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 the position and motion of the hexapod as well as the pivot point and several reference coordinate systems into account.

### Application fields

Industry and research. For astronomy, optics positioning, aerospace.

Motion	Unit		H-850.G2A	H-850.H2A
Active axes			X, Y, Z, $\theta$ X, $\theta$ Y, $\theta$ Z	X, Y, Z, $\theta$ X, $\theta$ Y, $\theta$ Z
Travel range in X	mm		$\pm 50$	$\pm 50$
Travel range in Y	mm		$\pm 50$	$\pm 50$
Travel range in Z	mm		$\pm 25$	$\pm 25$
Rotation range in $\theta$ X	$^{\circ}$		$\pm 15$	$\pm 15$
Rotation range in $\theta$ Y	$^{\circ}$		$\pm 15$	$\pm 15$
Rotation range in $\theta$ Z	$^{\circ}$		$\pm 30$	$\pm 30$
Maximum velocity in X, unloaded	mm/s		8	0.5
Maximum velocity in Y, unloaded	mm/s		8	0.5
Maximum velocity in Z, unloaded	mm/s		8	0.5
Maximum angular velocity in $\theta$ X, unloaded	mrad/s		120	6
Maximum angular velocity in $\theta$ Y, unloaded	mrad/s		120	6
Maximum angular velocity in $\theta$ Z, unloaded	mrad/s		120	6
Typical velocity in X, unloaded	mm/s		5	0.3
Typical velocity in Y, unloaded	mm/s		5	0.3
Typical velocity in Z, unloaded	mm/s		5	0.3
Typical angular velocity in $\theta$ X, unloaded	mrad/s		75	3
Typical angular velocity in $\theta$ Y, unloaded	mrad/s		75	3
Typical angular velocity in $\theta$ Z, unloaded	mrad/s		75	3

Positioning	Unit	Tolerance	H-850.G2A	H-850.H2A
Integrated sensor			Absolute rotary encoder, multi-turn	Absolute rotary encoder, multi-turn
Unidirectional repeatability in X	$\mu$ m	Typ.	$\pm 0.5$	$\pm 0.6$
Unidirectional repeatability in Y	$\mu$ m	Typ.	$\pm 0.5$	$\pm 0.6$
Unidirectional repeatability in Z	$\mu$ m	Typ.	$\pm 0.2$	$\pm 0.2$
Unidirectional repeatability in $\theta$ X	$\mu$ rad	Typ.	$\pm 3$	$\pm 3$
Unidirectional repeatability in $\theta$ Y	$\mu$ rad	Typ.	$\pm 3$	$\pm 3$
Unidirectional repeatability in $\theta$ Z	$\mu$ rad	Typ.	$\pm 7.5$	$\pm 9$
Minimum incremental motion in X	$\mu$ m	Typ.	1	0.3
Minimum incremental motion in Y	$\mu$ m	Typ.	1	0.3
Minimum incremental motion in Z	$\mu$ m	Typ.	0.5	0.2
Minimum incremental motion in $\theta$ X	$\mu$ rad	Typ.	7.5	3
Minimum incremental motion in $\theta$ Y	$\mu$ rad	Typ.	7.5	3
Minimum incremental motion in $\theta$ Z	$\mu$ rad	Typ.	15	5
Backlash in X	$\mu$ m	Typ.	6	4
Backlash in Y	$\mu$ m	Typ.	6	4
Backlash in Z	$\mu$ m	Typ.	1.5	0.5
Backlash in $\theta$ X	$\mu$ rad	Typ.	25	7.5
Backlash in $\theta$ Y	$\mu$ rad	Typ.	25	7.5
Backlash in $\theta$ Z	$\mu$ rad	Typ.	90	60

Drive Properties		H-850.G2A	H-850.H2A
Drive type		Brushless DC gear motor	Brushless DC gear motor

Mechanical Properties	Unit	H-850.G2A	H-850.H2A
Stiffness in X	N/ $\mu$ m	7	7
Stiffness in Y	N/ $\mu$ m	7	7
Stiffness in Z	N/ $\mu$ m	100	100
Maximum holding force, base plate in any orientation	N	85	500
Maximum holding force, base plate horizontal	N	250	2000
Maximum load capacity, base plate in any orientation	kg	20	50
Maximum load capacity, base plate horizontal	kg	50	250
Overall mass	kg	17	17
Material		Aluminum	Aluminum

Miscellaneous	Unit	H-850.G2A	H-850.H2A
Connector for supply voltage		M12 4-pin (m)	M12 4-pin (m)
Recommended controllers / drivers		C-887.5xx	C-887.5xx
Operating temperature range	$^{\circ}$ C	-10 to 50	-10 to 50
Connector for data transmission		HD D-sub 78-pin (m)	HD D-sub 78-pin (m)

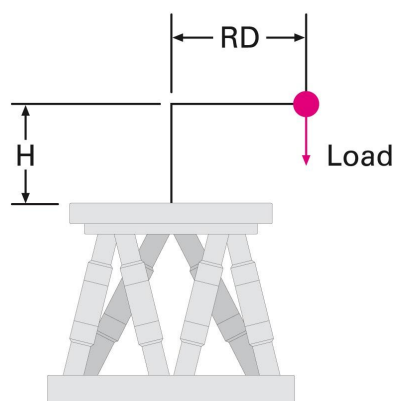
Technical data specified at 22 $\pm$ 3  $^{\circ}$ C.

The maximum 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.

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

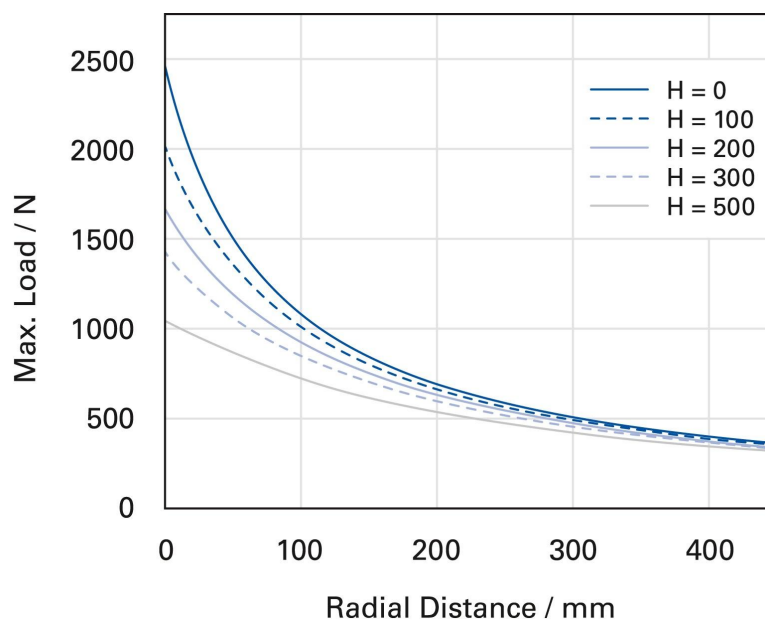
Ask about customized versions.

## Drawings / Images

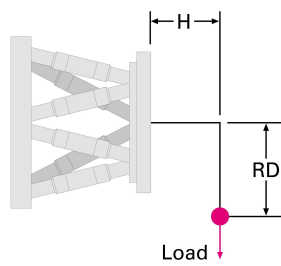


H-850.H2A

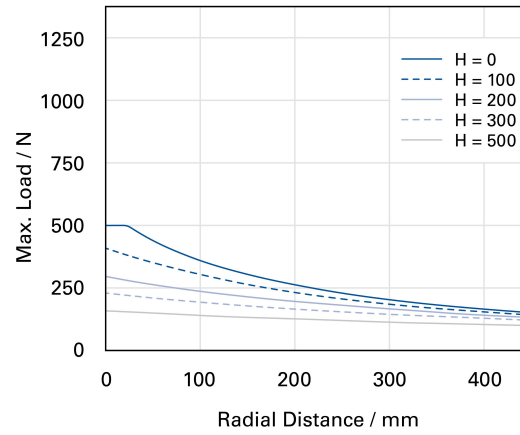
Maximum loads on the H-850.H2A when mounted horizontally



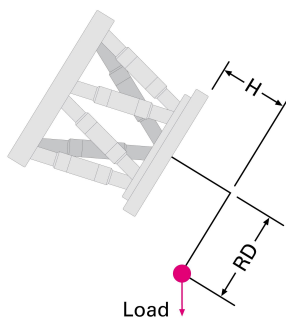
## Drawings / Images



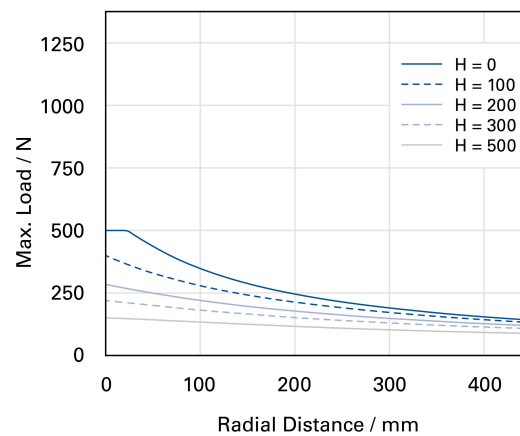
H-850.H2A



Maximum loads on the H-850.H2A when mounted vertically

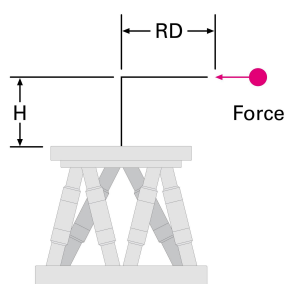


H-850.H2A

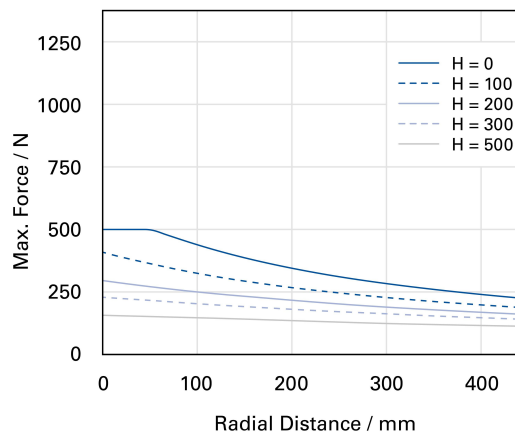


Maximum loads on the H-850.H2A when mounted at the most unfavorable angle

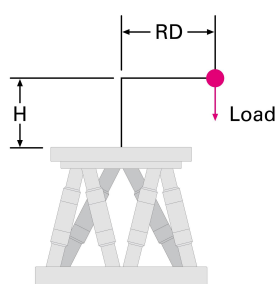
## Drawings / Images



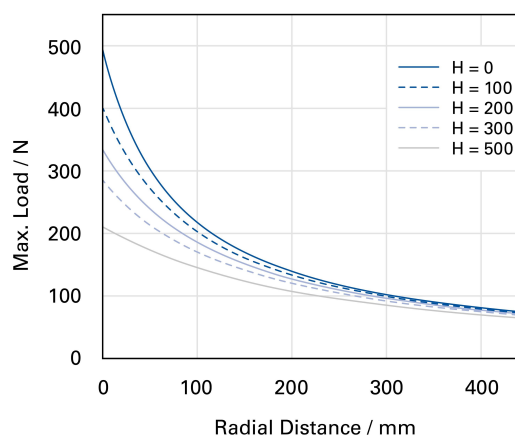
H-850.H2A



Maximum permissible force acting on the H-850.H2A when mounted horizontally

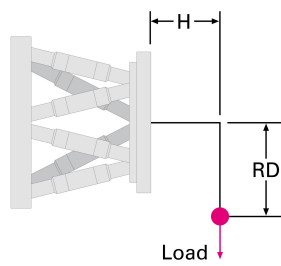


H-850.G2A

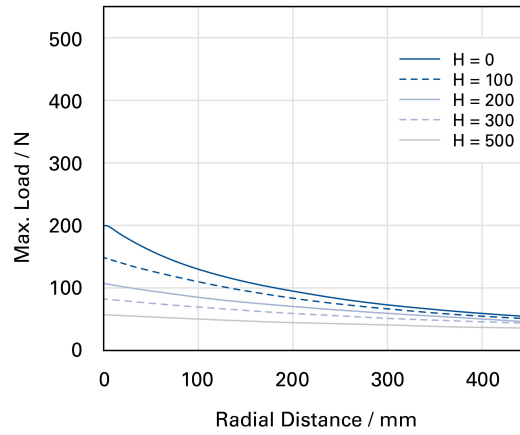


Maximum loads on the H-850.G2A when mounted horizontally

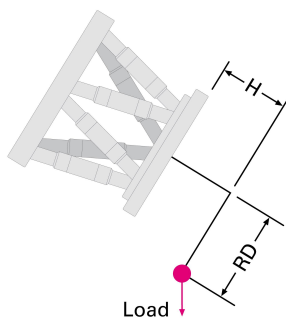
## Drawings / Images



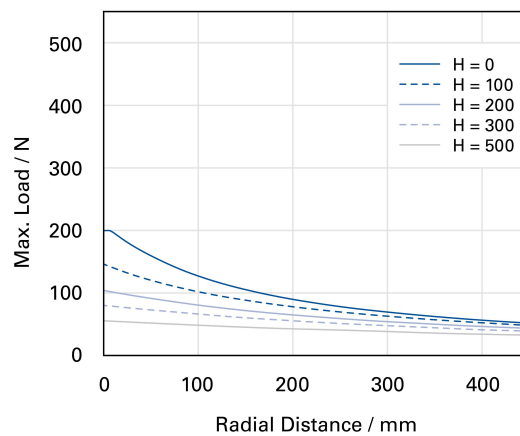
H-850.G2A



Maximum loads on the H-850.G2A when mounted vertically

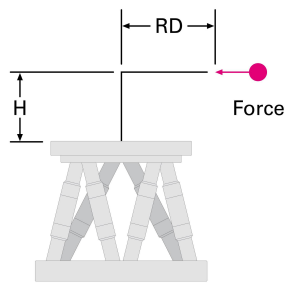


H-850.G2A

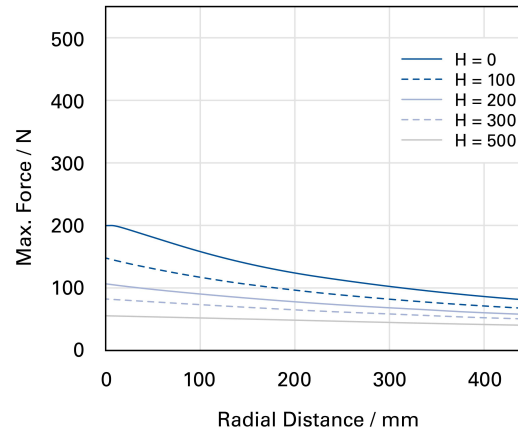


Maximum loads on the H-850.G2A when mounted at the most unfavorable angle

## Drawings / Images

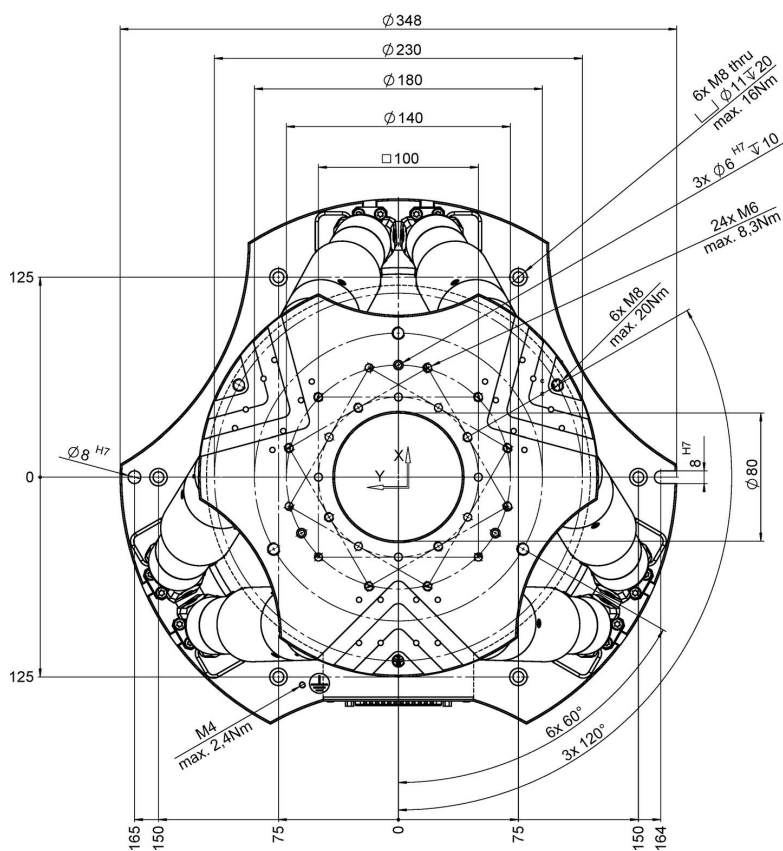
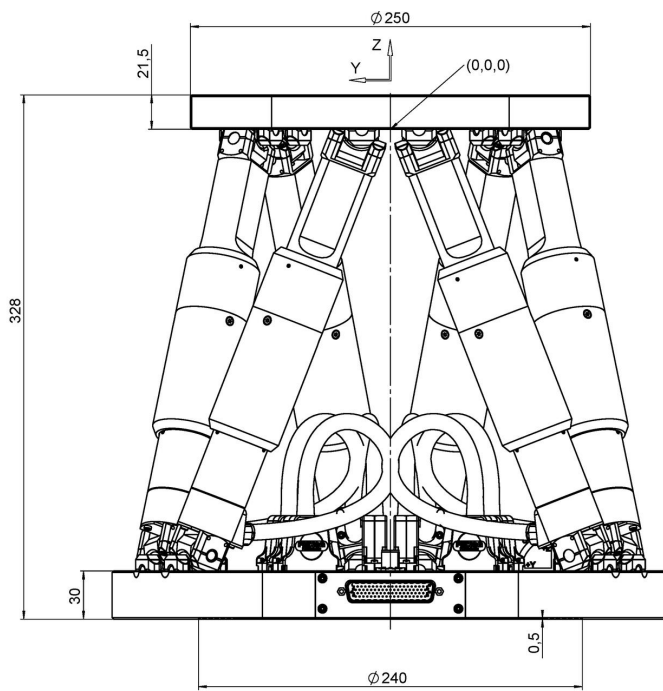


H-850.G2A



Maximum permissible force acting on the H-850.G2A when mounted horizontally

## Drawings / Images



H-850.x2A, dimensions in mm



## Order Information

### **H-850.G2A**

Precision Hexapod microrobot, brushless DC gear motor, absolute encoder, 50 kg load capacity, 8 mm/s velocity. Connecting cables are not in the scope of delivery and must be ordered separately.

### **H-850.H2A**

Precision Hexapod microrobot, brushless DC gear motor, absolute encoder, 250 kg load capacity, 0.5 mm/s velocity. Connecting cables are not in the scope of delivery and must be ordered separately.