6- Axis Hexapod

LOW- PROFILE, PRECISION PARALLEL- KINEMATIC SYSTEM

H-824

- Load capacity to 10 kg, self- locking version
- Travel ranges to 45 mm / 25°
- Actuator resolution to 7 nm
- Min. incremental motion to 0.3 µm
- Repeatability to ±0.1 µm / ±2.5 µrad
- Velocity to 25 mm/ s
- Vacuum- compatible versions available
- Sophisticated controller using vector algorithms, virtual pivot point
- Comprehensive software package

Precision- 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 versions to 10^{-6} hPa are available

Compact due to folded drive design

H-824.Gxx with DC gear motors
H-824.Dxx with powerful DC motors for higher velocity

Powerful digital controller, open software architecture

User- defined, stable pivot point, software- selectable. Positions commanded in Cartesian coordinates. Macro programming. Open source LabVIEW driver set. Work space simulation software. Virtual Hexapod machine software. Optional: Collision avoidance software (external obstacles).
Hexapods are by default configured and delivered as a system including a controller

- C-887.52 compact bench- top controller for a lower system price. Digital I/ O interfaces, e.g. for external triggering
- C-887.11 19" controller, comprises the control for two additional single axes with servo motors. Options: Control of piezo axes, photometer cards for visible light or infrared light range

Upgrades for C-887.11 (order separately)

- Analog interface/ photometer cards for visible light (F-206.VVU) or the infrared light range (F-206.iiU)
- F-206.NCU fast piezo nano- alignment system for alignment with nanometer precision

Accessories

- C-887.MC manual control unit for Hexapods, USB, 3 m cable
- C-887.VM1 PIVeriMove software for collision checking

Fields of application

Research and industry, standard and vacuum environments. For micromanipulation, biotechnology, semiconductor manufacturing

Specifications

	H-824.Gxx	H-824.Dxx	Unit	Tolerance
	for higher resolution and load	for higher velocity		
Active axes	X, Y, Z, θ_X, θ_Y, θ_Z	X, Y, Z, θ_X, θ_Y, θ_Z		
Motion and positioning				
Travel range* X, Y	±22.5	±22.5	mm	
Travel range* Z	±12.5	±12.5	mm	
Travel range* θ_X, θ_Y	±7.5	±7.5	°	
Travel range* θ_Z	±12.5	±12.5	°	
Single- actuator design resolution	0.007	0.5	µm	
Min. incremental motion X, Y, Z	0.3	1	µm	typ.
Min. incremental motion θ_X, θ_Y, θ_Z	3.5	12	µrad	typ.
Backlash X, Y	3	1	µm	typ.
Backlash Z	1	1	µm	typ.
Backlash θ_X, θ_Y	20	15	µrad	typ.
Backlash θ_Z	25	25	µrad	typ.
Repeatability X, Y	±0.5	±0.5	µm	typ.
Repeatability Z	±0.1	±0.1	µm	typ.
Repeatability θ_X, θ_Y	±2	±2	µrad	typ.
Repeatability θ_Z	±2.5	±2.5	µrad	typ.
Max. velocity X, Y, Z	1	25	mm/ s	
Max. velocity θ_X, θ_Y, θ_Z	11	270	mrad/ s	
Typ. Velocity X, Y, Z	0.5	10	mm/ s	
Typ. Velocity θ_X, θ_Y, θ_Z	5.5	55	mrad/ s	
Mechanical properties				
Stiffness X, Y	1.7	1.7	N/ µm	
Stiffness Z	7	7	N/ µm	
Load (base plate horizontal / any orientation)	10 / 5	5 / 2.5	kg	max.
Holding force, de- energized (base plate horizontal / any orientation)	100 / 50	15 / 5	N	max.
Motor type	DC gear motor	DC motor		
Miscellaneous				
Operating temperature range	-10 to 50	-10 to 50	°C	
Material	Aluminum	Aluminum		
Mass	8	8	kg	±5 %
Cable length	3	3	m	±10 mm

Vacuum versions to 10^{-6} hPa are available under the following ordering number: H-824.xVx. Specifications for vacuum versions can differ.
Technical data specified at 20 ±3 °C.
Ask about custom designs!
* The travel ranges of the individual coordinates (X, Y, Z, θ_X, θ_Y, θ_Z) are interdependent. The data for each axis in this table shows its maximum travel, where all other axes are at their zero positions. If the other linear or rotational coordinates are not zero, the available travel may be less.

Order Information

H-824.G2
Compact Hexapod Microrobot, DC Motor Gearhead, 1 mm/ s, 10 kg Load, Sub- D Connector, Cable Set 3 m
H-824.D2
Compact Hexapod Microrobot, Direct Drive, 25 mm/ s, 5 kg Load, Sub- D Connector, Cable Set 3 m

Vacuum versions

H-824.G2V
Compact Hexapod Microrobot, DC Motor Gearhead, 0.5 mm/ s, 5 kg Load, Vacuum- Compatible to 10^{-6} hPa, Sub- D Connector, 2 m Vacuum-Side Cable, Feedthrough, 3 m Air- Side Cable
H-824.D2V
Compact Hexapod Microrobot, Direct Drive, 12.5 mm/ s, 2.5 kg Load, Vacuum- Compatible to 10^{-6} hPa, Sub- D Connector(s), 2 m Vacuum- Side Cable, Feedthrough, 3 m Air- Side Cable

Recommended controller

C-887.52
6D Hexapod Controller, TCP/ IP, RS-232, Bench- Top Device, Control of Two Additional Servo- Motor Axes Included

Accessories

C-887.MC
Hexapod Control Unit, USB Connector, 3 m Cable
C-887.VM1
PIVeriMove Software for the Collision Check

Hexapod systems with fieldbus interface

H-824.D31
Compact Hexapod Microrobot, Direct Drive, 25 mm/ s, 5 kg Load, Cable Set 3 m, with 6- D Hexapod Controller, EtherCAT® Interface

Configuration options (to be ordered as a system)

H-824.G11
Compact Hexapod Microrobot, DC Motor Gearhead, 1 mm/ s, 10 kg Load, Cable Set 3 m, with 6- D Hexapod Controller, Control of 2 Additional Servo- Motor Axes Included, TCP/ IP and RS-232 Interface, 19" Chassis
H-824.D11
Compact Hexapod Microrobot, Direct Drive, 25 mm/ s, 5 kg Load, Cable Set 3 m, with 6- D Hexapod Controller, Control of 2 Additional Servo-Motor Axes Included, TCP/ IP and RS-232 Interface, 19" Chassis

Vacuum versions

H-824.GV1
Compact Hexapod Microrobot, DC Motor Gearhead, 0.5 mm/ s, 5 kg Load, Vacuum- Compatible to 10^{-6} hPa, 2 m Vacuum- Side Cable, Feedthrough, 3 m Air- Side Cable, with 6- D Hexapod Controller, Control of 2 Additional Servo- Motor Axes Included, TCP/ IP and RS-232 Interface, 19" Chassis
H-824.DV1
Compact Hexapod Microrobot, Direct Drive, 12.5 mm/ s, 2.5 kg Load, Vacuum- Compatible to 10^{-6} hPa, 2 m Vacuum- Side Cable, Feedthrough, 3 m Air- Side Cable, with 6- D Hexapod Controller, Control of 2 Additional Servo- Motor Axes Included, TCP/ IP and RS-232 Interface, 19" Chassis

Upgrades (to be ordered separately)

F-206.NCU
Rapid 3- Axis Piezo Nanopositioning System for Use in Combination with Hexapod Systems. Consists of P-611.3SF NanoCube® XYZ Nanopositioning System, 100 µm × 100 µm × 100 µm, Strain Gauge Sensors with Integrated Fiber Adapter Interface and E-760.3S0 NanoCube® Piezo Controller Board, ISA Bus
F-206.iiU
Photometer Card, IR Range, 2 Channels
F-206.VVU
Photometer Card, Visible Range, 2 Channels
Ask about custom designs!

Controllers / Drivers / Amplifiers

C-887 Controller for Hexapod Positioning Systems

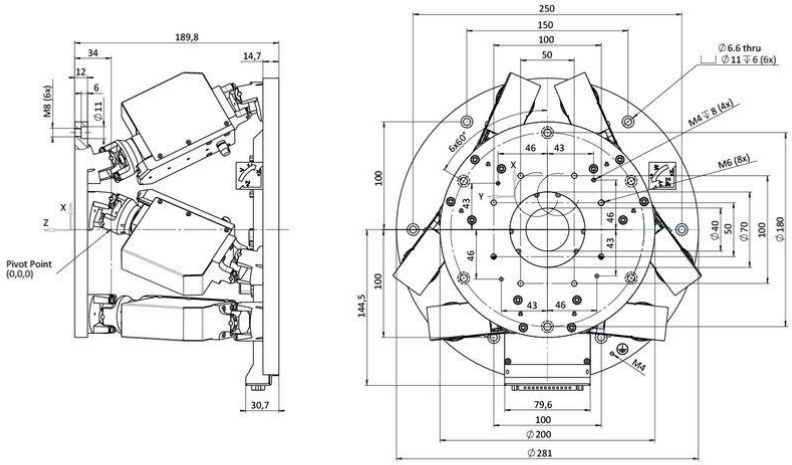
Related Products

P-587 6- Axis Precision Piezo Stage
H-206 6- Axis Precision Alignment System
H-810 6- Axis Miniature Hexapod
H-811 6- Axis Miniature Hexapod
H-840 6- Axis Hexapod
H-850 6- Axis Hexapod
H-820 6- Axis Positioner with Controller

Technology

Hexapod- Specific Software from PI | Due to their parallel kinematic structure, Hexapods necessitate a particularly complex control system. Learn more ...
Hexapods – Parallel- Kinematics Positioning Systems | Hexapod platforms are used for precision positioning and alignment of loads in all six degrees of freedom, three linear axes, and three rotational axes. Learn more ...

Drawings / Images



H-824, dimensions in mm