

PIglide Air Bearing Technology

NANOMETER PRECISION, MULTI-AXIS MOTION, STANDARD & CUSTOM DESIGNS

PIglide

The Step Ahead with Air Bearing Technology

Frictionless High-Precision Positioning

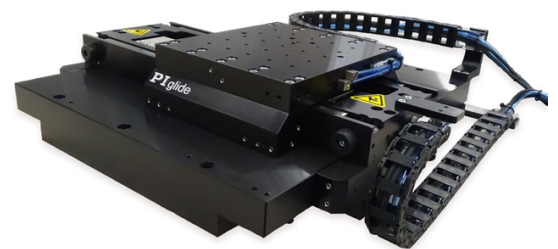
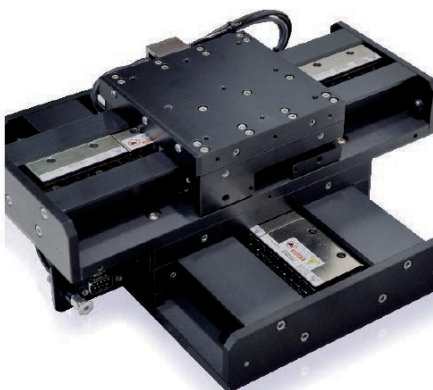
A direct-drive motor and high-resolution encoder can position a moving carriage supported by an air bearing to within nanometers in a linear application or within tenths of arc-seconds in rotational applications. The lack of friction and mechanical contact means there is minimal hysteresis or reversal error, making it highly repeatable and ideal for many inspection and manufacturing operations. Stiction is virtually eliminated, improving resolution capabilities, position repeatability can be obtained within a few fundamental encoder counts. Similar precision can be obtained by piezo flexure guided stages, however over much smaller travel ranges.

Velocity Stability and Scanning

The lack of mechanical bearing elements means there is nothing to get in the way of smooth, controlled velocity (stability to better than 0.01%). Experiments and processes like inertial sensor testing, tomography, wafer scanning, and surface profiling require continuous motion at a tightly controlled speeds are best served by air bearing systems.

High Guiding Accuracy

Linear air bearing stages have incredibly straight and flat travels, measured in the 100's or 10's of nanometers and sub-arc-second pitch, roll, and yaw errors. Rotary stages have tilt (wobble) errors less than 1 arc-second. Additionally, the angular performance of an air bearing is remarkably repeatable. This guarantees optimal part quality and measurement reliability for applications such as optics inspection, semiconductor inspection, and medical device manufacturing.



Air Bearing Technology

The Step Ahead with the Full Range of PI Technologies

Experience with Air Bearing Technology

PI is building on over 200 man-years of in-house air bearing experience and offers comprehensive precision air bearing motion control and positioning products and systems.

With 4 decades of experience in piezo nanopositioning systems design and motorized precision positioning equipment, the new air bearing systems capabilities are a natural and logical extension of PI's precision motion offerings.

Core Technology Inhouse

Having all the core technologies available in-house allows PI to design and manufacture excellent products. Optimum performance is achieved by extensive simulations of relevant components, from the magnetic field for the motor layout, the FEM simulations of stages, to the control algorithm design. Keeping the number of parts low secures high reliability of the system.

Flexible Axis Configuration

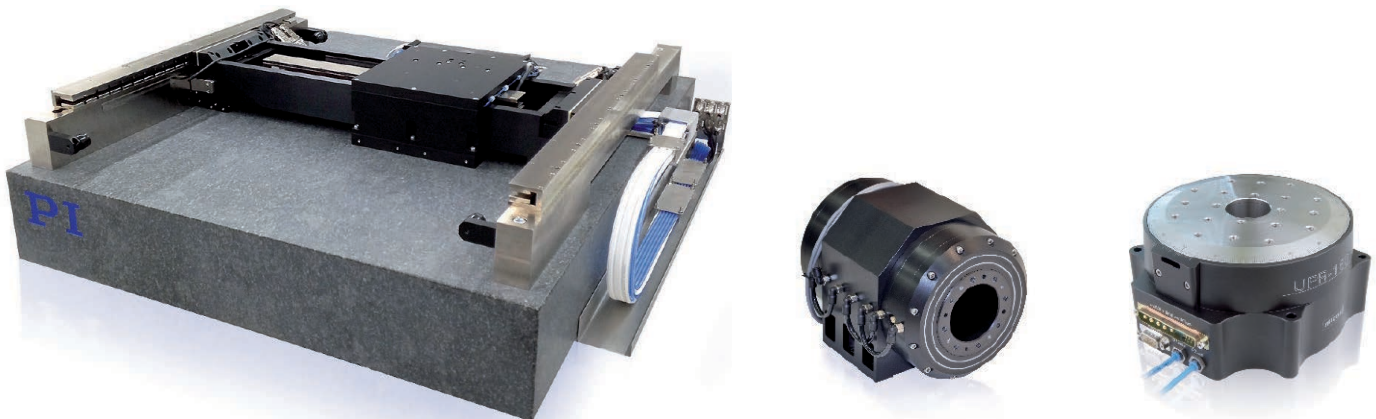
- Single axis linear stages
- Rotary stages
- XY Planar Scanners
- Non-motorized linear and rotary bearings
- Hemispherical bearings
- Rotary air bearing spindles

PI serves both the research and industrial markets.

Customization

PI is in the unique position to cover the whole motion range from finger-tip sized nano-positioners to large scale stages with long travel ranges, through a plethora of different drive and guiding systems tailored exactly to the customer's needs.

By combining extremely responsive engineering consultative support and lean manufacturing techniques, PI is able to provide the highest quality customer service. Maximum performance of precision systems is achieved thru extensive design and analysis expertise, using equipment built in-house with proprietary techniques.



PIglide MB: Miniature Linear Air Bearing Stage

HIGH PERFORMANCE, CLEANROOM COMPATIBLE, CUSTOMIZABLE



A-141 Series

- Table size 57mm x 83mm
- Overall height 38mm
- Travel lengths to 40mm
- 3.5kg max payload
- ~~##~~ Non-contact fully preloaded air bearings
- ~~##~~ Frictionless cog-free linear motor
- ~~##~~ Integral optical linear encoder
- ~~#~~ Resolutions to 20nm
- ~~#~~ Velocity to 0.5m/sec
- ~~#~~ Acceleration to 0.75g

Overview

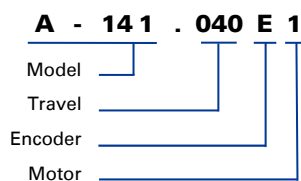
The PIglide MB air bearing stage is linear servo motor driven with fully preloaded air bearings and an integral optical linear encoder. This stage offers ultra-precision in a miniature package. The combination of non-contact components results in a frictionless motion platform that offers the highest performance, quality, and life. This stage is ideally suited for many high precision applications, such as metrology, photonics alignment, optics positioning, and scanning. The non-contact design also makes these stages ideal for cleanroom applications. There are no moving electrical cables to manage. The air bearing offers a locking design for the ultimate in position stability.

Accessories and Options

- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- ~~##~~ X, Y stacks and custom configurations with precision alignment
- Counterbalance options for vertical (Z) orientations
- Customizations available
- ~~##~~ Granite bases and vibration isolation systems

Model	A-141.040B1
Travel	40 mm
Drive System	Brushless ironless linear servo motor, 3-phase
Feedback System	Non-contact optical linear encoder with travel limits and home index
Motor Bus Voltage	48 VDC nominal, 80 VDC max
Motor Force Constant	2.1 N/A
Continuous Force	0.58 N
Peak Force	2.3 N
Motor Back EMF	0.7 V/m/sec
Motor Resistance (phase-to-phase)	22.4 ohms
Motor Inductance (phase-to-phase)	1.0 mH
Maximum Velocity (1)	Up to 0.5 m/sec
Maximum Acceleration (1) (Unloaded)	Up to 0.75 g
Maximum Payload (2)	3.5 kg
Accuracy (3) (uncompensated)	+/-2.0 µm
Accuracy (3) (with error compensation)	+/-0.5 µm
Repeatability	+/-0.2 µm
Encoder Resolution (4)	20 nm
Straightness & Flatness (5)	< 1µm TIR over full travel
Pitch & Yaw (5)	< 1 arc-sec TIR over full travel
Stage Mass	0.6 kg
Moving Mass	0.3 kg
Cabling	Internal, non-moving
Operating Pressure (6)	65 +/-5 psi (450 +/-35 kPa)
Air Consumption	< 1.0 SCFM (28 SLPM)
Air Quality	Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3
Construction	Hardcoat Aluminum SS Fasteners

- Maximum velocity and acceleration based on unloaded stage capability may be limited by payload, controller, or drive performance.
- Assumes payload CG is centered no more than 50mm above the stage table. Stage is designed for horizontal operation only.
- Improved accuracy can be obtained with controller-based error compensation. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
- Encoder resolution depends on encoder option chosen. Resolution will impact repeatability specification.
- Dependent on the flatness of the surface to which the stage is mounted.
- To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.



Model	Travel	Encoder ⁽¹⁾	Motor Wiring
A-141	040 = 40 mm	E = 20 nm/count TTL A-quad-B output	1 = Standard motor option, 48 VDC

- Alternate encoder resolutions available on request.

Ordering Example

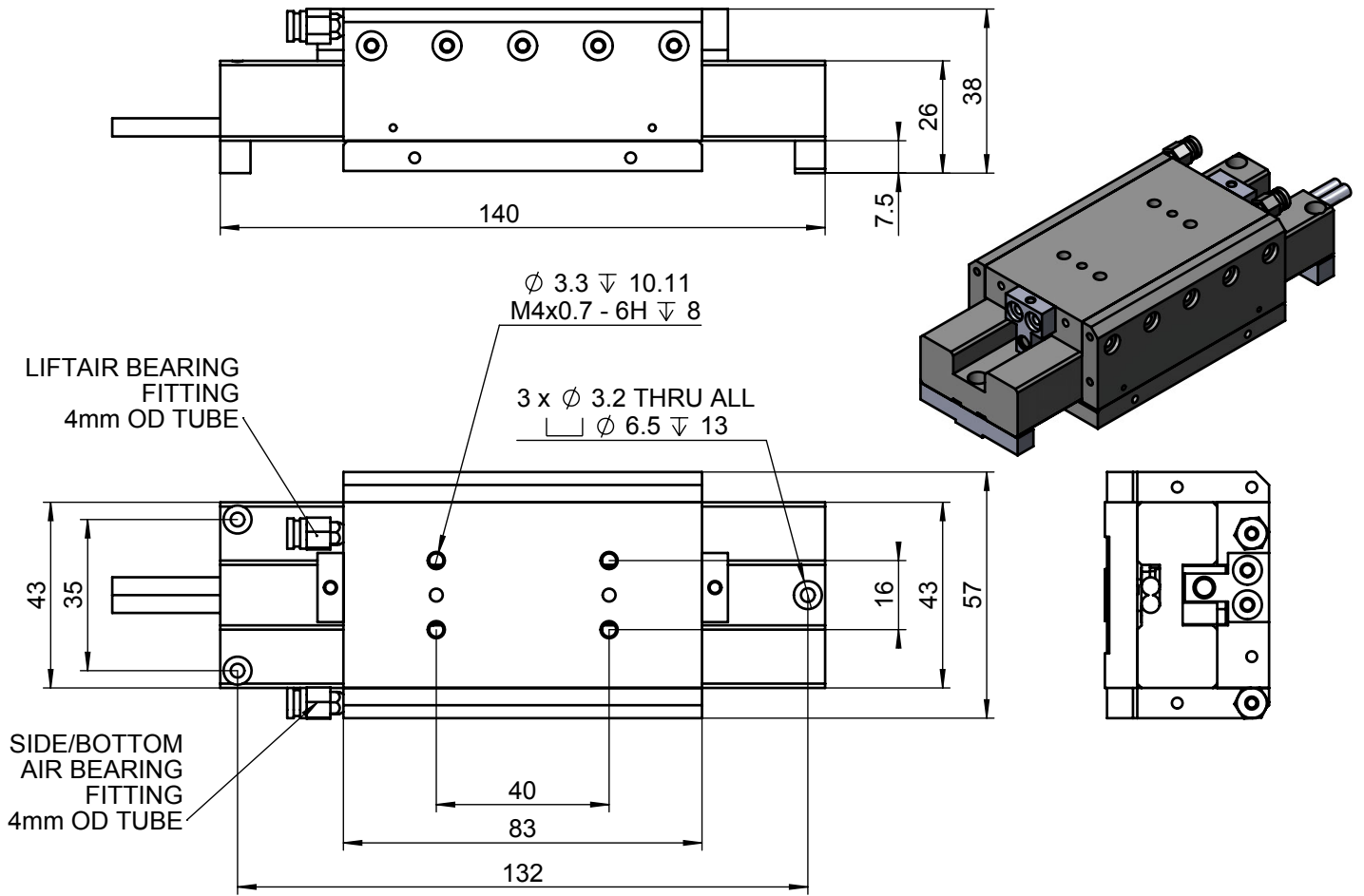
Part# **A-141.040E1** is a

Model: A-141 (PIglide MB miniature linear motorized air bearing stage)

Travel: 40 mm

Encoder: E (20 nm/count TTL A-quad-B output)

Motor Wiring: 1 (48 VDC)



Model A-141.040, in mm

PIglide LC Linear Air Bearing Stage

HIGH PERFORMANCE AFFORDABLE NANOPositionING SYSTEM



A-110 Series

- Ideal for scanning or high-resolution positioning
- Cleanroom compatible
- Customizable
- Table size 160mm x 200mm
- Travel lengths to 400mm
- 10kg max payload
- Non-contact fully preloaded air bearings
- Ironless cog-free linear motor
- Integral optical linear encoder
- Resolutions to 1nm
- Velocity to 1m/sec
- Acceleration to 3g

Overview

The PIglide LC series of stages are linear servo motor driven with magnetically preloaded air bearings and an integral optical linear encoder. The combination of these non-contact components results in a frictionless motion platform that offers the highest performance, quality and life. These stages are ideally suited for many high precision applications, such as metrology, photonics alignment, semiconductor, flat panel display and precision scanning applications. The non-contact design also makes these stages perfect for cleanroom applications.

Accessories and Options

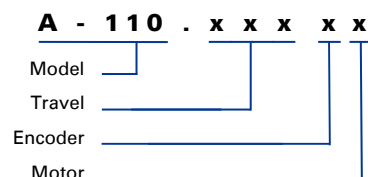
- Multiple encoder options
- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- XY stacks and custom configurations
- Granite bases and vibration isolation systems

Model	A-110.050	A-110.100	A-110.200	A-110.300	A-110.400
Travel	50 mm	100 mm	200 mm	300 mm	400 mm
Drive System	Brushless ironless linear servo motor, 3-phase				
Feedback System	Non-contact optical linear encoder with travel limits and home index				
Motor Bus Voltage	48 VDC nominal, 60 VDC max				
Motor Force Constant	4.2 N/A		12.3 N/A		
Continuous Force	9.2 N		39 N		
Peak Force	25 N		85 N		
Motor Back EMF (phase-to-phase)	4.2 V/m/sec		10.1 V/m/sec		
Motor Resistance (phase-to-phase)	8.2 ohms		3.6 ohms		
Motor Inductance (phase-to-phase)	2.7 mH		1.24 mH		
Maximum Velocity (1)	0.5 m/sec		1 m/sec		
Maximum Acceleration (1) (Unloaded)	1 g		3 g		
Maximum Payload (2)	10 kg				
Accuracy (3) (uncompensated)	+/-1.0 µm	+/-1.5 µm	+/-2.0 µm	+/-3.0 µm	+/-4.0 µm
Accuracy (3) (with error compensation)	+/-1.0 µm			+/-1.5 µm	
Repeatability (4)	+/-0.5 µm				
Encoder Resolution (4)	up to 1 nm				
Straightness & Flatness (5)	< +/- 10 nm / 10mm				
	< 2 µm TIR		< 3 µm TIR	< 4 µm TIR	< 5 µm TIR
Pitch & Yaw TIR (5)	< 2 arc-sec	< 4 arc-sec	< 6 arc-sec	< 8 arc-sec	< 10 arc-sec
Stage Mass	6.3 g	7.5 kg	11 kg	12 kg	14 kg
Moving Mass	2.5 kg		2.6 kg		
Cabling	Internal, non-moving		External, moving loop		
Operating Pressure (6)	65 (+/-5) psi (450 +/-35 kPa)				
Air Consumption	< 1.0 SCFM (28 SLPM)				
Air Quality	Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1				
	Oil-free -ISO 8573-1 Class 1				
	Dry (-15 °C dew point) - ISO 8573-1 Class 3				
Construction	Hardcoat Aluminum SS Fasteners				

1. Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
2. Assumes payload CG is centered no more than 50mm above the stage table. Stage is only designed for horizontal operation.
3. Improved accuracy can be obtained with controller-based error compensation. Specs listed are for encoder options A & C. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
4. Encoder resolution depends on encoder option chosen and interpolation used if sine encoders are chosen. Resolution will impact repeatability specification.
5. Dependent on the flatness of the surface to which the stage is mounted.
6. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.

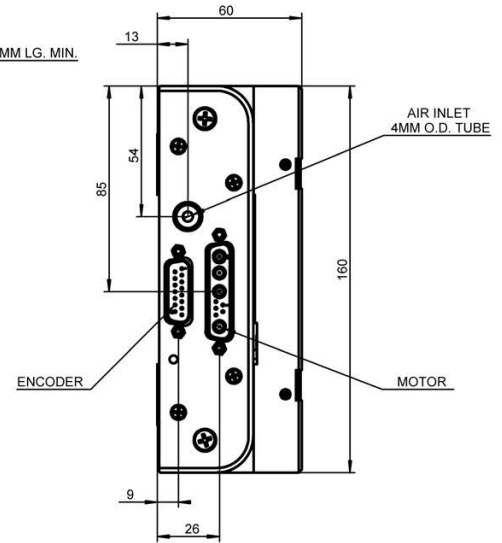
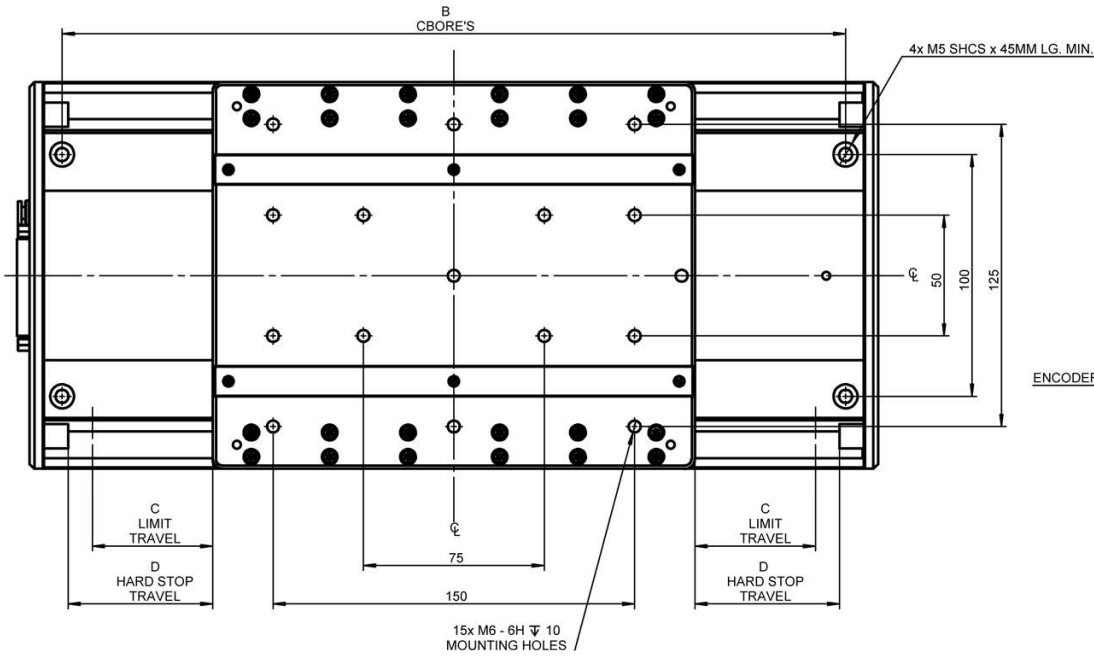
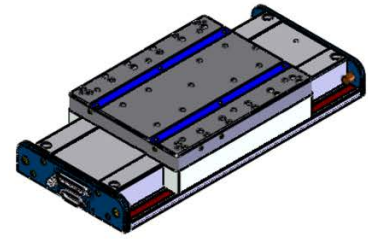
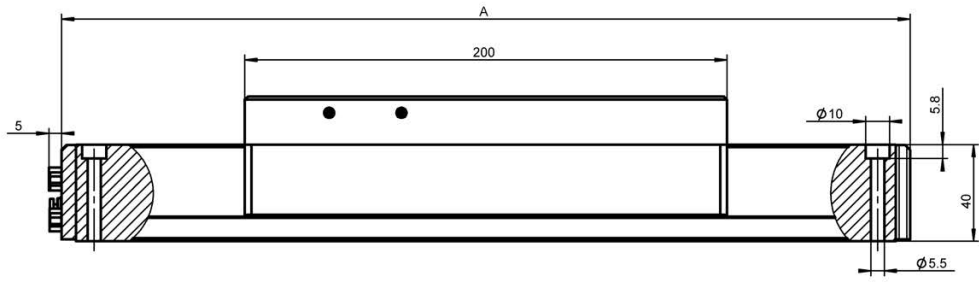
Model	Travel	Encoder (1)	Motor Wiring
A-110	050 = 50mm	A = 20µm grating pitch incremental, sine (1 Vp-p) output	1 = Standard motor, 48 VDC buss
	100 = 100mm	B = 1nm resolution absolute, BiSS-C serial output	
	200 = 200mm	C = 50nm resolution incremental, A-quad-B (TTL) output	
	300 = 300mm		
	400 = 400mm		

1. Alternate TTL encoder resolutions are available on request.



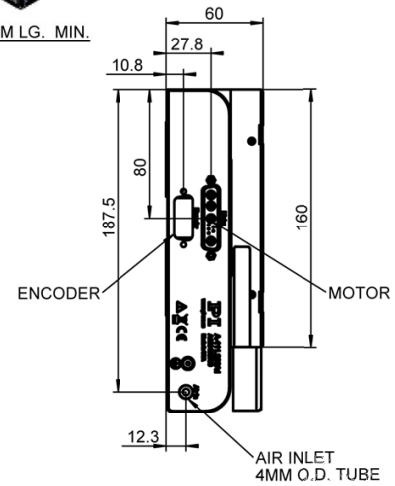
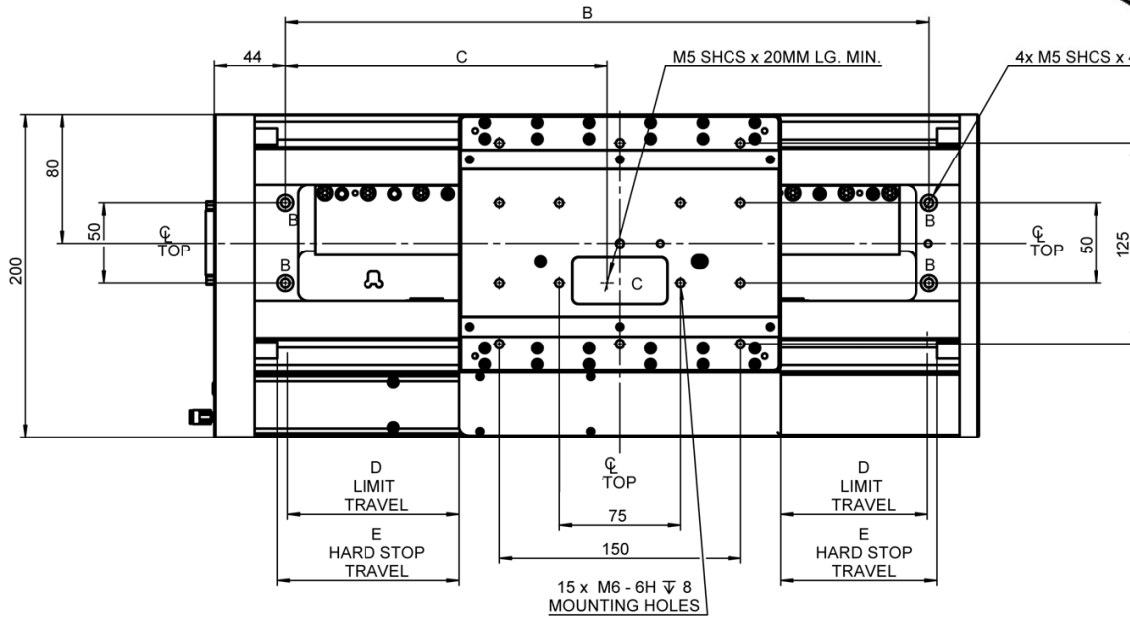
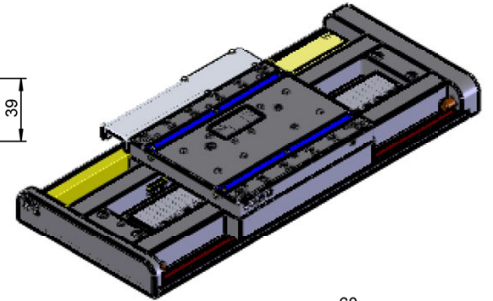
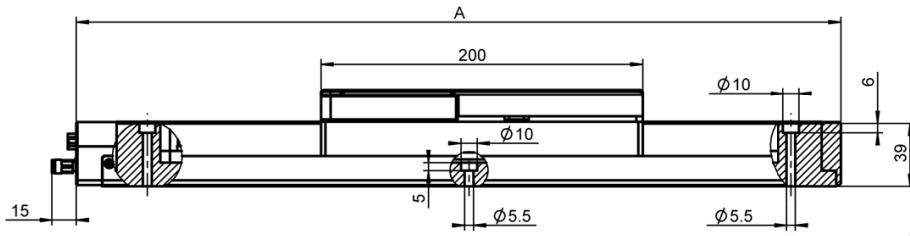
Ordering Example

Part# A-110.300A1 is a
Model: A-110 (PIglide LC linear motorized air bearing stage)
Travel: 300 mm
Encoder: A (20 µm/line sine output, 1 Vp-p)
Motor Wiring: 1 (48 VDC)



Model A-110.50, .100, in mm

Model	A	B	C	D
A-110.050	302	275	25	35
A-110.100	352	325	50	60

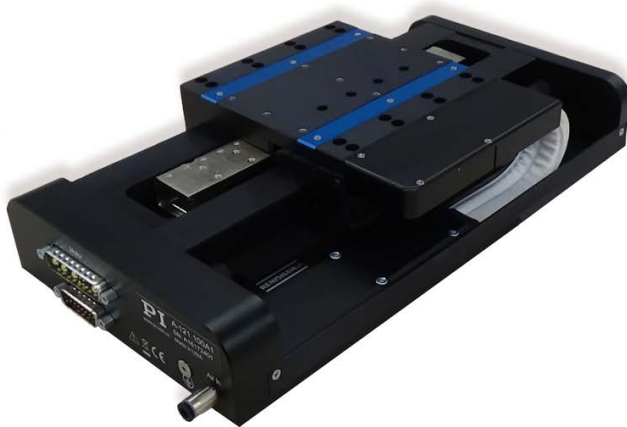


Model A-110.200, .300, .400, in mm

Model	A	B	C	D	E
A-110.200	475	400	200	102	105
A-110.300	575	500	250	152	155
A-110.400	675	600	300	202	205

Pliglide AT1: Linear Air Bearing Stage

HIGH PERFORMANCE SMALL FOOTPRINT NANOPositionING STAGE



A-121 Series

- Ideal for scanning or ultra-precise positioning
- Cleanroom compatible
- Customizable
- Table size 115 mm x 115 mm
- Low profile 60 mm height
- Travel lengths to 350mm
- 10 kg max payload
- Non-contact fully preloaded air bearings
- Ironless cog-free linear motor
- Integral optical linear encoder
- Resolutions to 1nm
- Velocity to 1 m/sec
- Acceleration to 2 g
- Maintenance-free

Overview

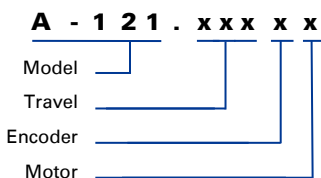
The Pliglide AT1 series of compact stages are linear servo motor driven with fully preloaded air bearings and an integral optical linear encoder. The combination of these non-contact components results in a frictionless motion platform that offers the highest performance, quality and life. These stages are ideally suited for many high precision applications, such as metrology, photonics alignment, semiconductor inspection, flat panel display, laser machining, and precision scanning applications. The non-contact design also makes these stages ideal for cleanroom applications. A high-force linear motor can drive the stage to top speed within a few milliseconds. The dovetail preloaded air bearing design in this model will support normal, vertical, and side-mounted orientations.

Accessories and Options

- Multiple encoder options
- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- XY stacks and custom configurations with precision alignment
- Cable track variations
- Counterbalance options for vertical orientation
- Customizations available
- Granite bases and vibration isolation systems

Model	A-121.050	A-121.100	A-121.150	A-121.200	A-121.250	A-121.350
Travel	50 mm	100 mm	150 mm	200 mm	250 mm	350 mm
Drive System	Brushless ironless linear servo motor, 3-phase					
Feedback System	Non-contact optical linear encoder with travel limits and home index					
Motor Bus Voltage	48 VDC nominal, 80 VDC max					
Motor Force Constant	6.67 N/A					
Continuous Force	11.1 N					
Peak Force	33.2 N					
Motor Back EMF	7.7 V/m/sec					
Motor Resistance (phase-to-phase)	6.3 Ω					
Motor Inductance (phase-to-phase)	1.0 mH					
Maximum Velocity (1)	1 m/sec					
Maximum Acceleration (1) (Unloaded)	2 g					
Maximum Payload (2)	10 kg normal, 4 kg lateral					
Accuracy (3) (Uncompensated)	+/-1.0 μm	+/-1.5 μm	+/-2.0 μm	+/-3.0 μm		
Accuracy (3) (with error compensation)	+/-0.50 μm				+/-1.0 μm	
Repeatability (4)	+/-0.25 μm				+/-0.50 μm	
Encoder Resolution (4)	up to 1 nm (see encoder options table)					
Straightness & Flatness (5)	< 0.1 μm / 25mm					
	< 1 μm TIR		< 1.5 μm TIR		< 2.5 μm TIR	
Pitch & Yaw TIR (5)	1 arc-sec	2 arc-sec	3 arc-sec	4 arc-sec	5 arc-sec	7 arc-sec
Stage Mass	3.5 kg	4.2 kg	4.5 kg	5.2 kg	5.7 kg	6.8 kg
Moving Mass	1.2 kg					
Cabling	External, moving loop					
Operating Pressure (6)	70 (+/-5) psi (485 +/-35 kPa)					
Air Consumption	< 1.0 SCFM (28 SLPM)					
Air Quality	Clean (filtered to 1.0 μm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3					
Construction	Hardcoat Aluminum with SS Fasteners					

- Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
- Assumes payload CG is centered no more than 50mm above the stage table.
- Improved accuracy can be obtained with controller-based error compensation. Specs listed are for encoder options A & C. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
- Encoder resolution depends on encoder option chosen and interpolation used if sine encoders are chosen. Resolution will impact repeatability specification.
- Dependent on the flatness of the surface to which the stage is mounted.
- To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.



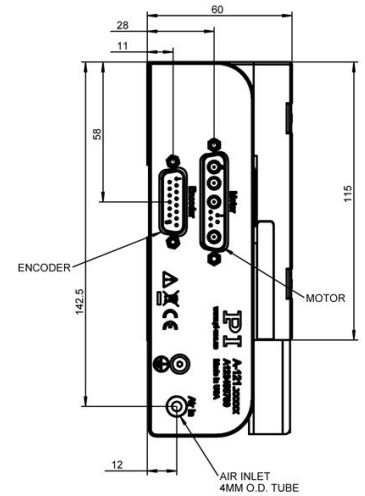
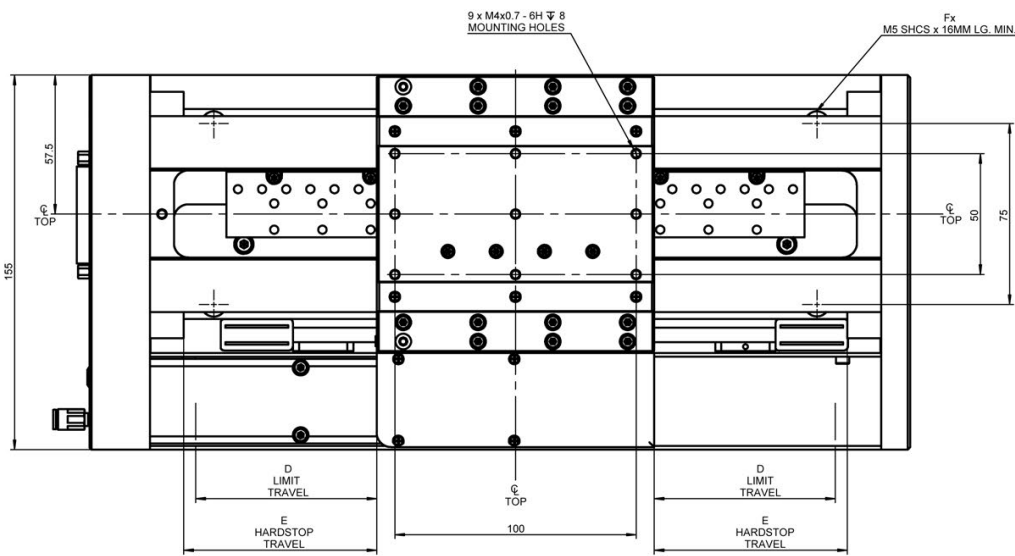
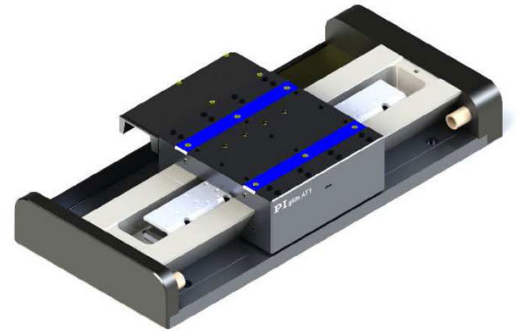
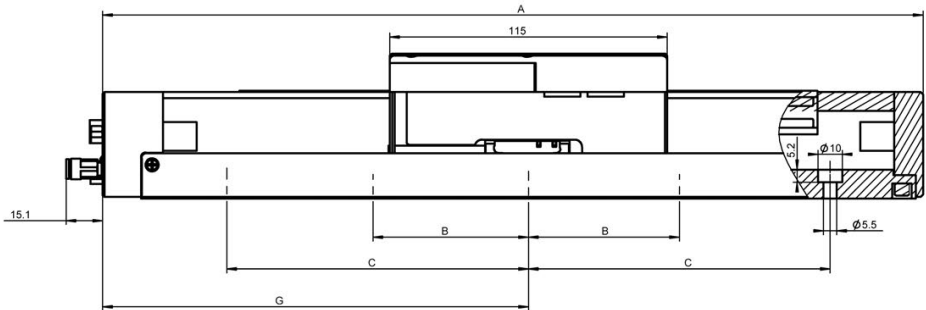
Ordering Example

Part# A-121.150A1 is a

Model: A-121 (PIglide AT1 linear motorized air bearing stage)
Travel: 150 mm
Encoder: A (20 μm/line incremental encoder, sine (1 Vp-p) output)
Motor Wiring: 1 (48 VDC)

Model	Travel	Encoder (1)	Motor Wiring
A-121	050 = 50mm	A = 20μm grating pitch incremental, sine (1 Vp-p) output	1 = Standard motor, 48 VDC buss
	100 = 100mm	B = 1nm resolution absolute, high accuracy, BiSS-C serial output	
	150 = 150mm	C = 50nm resolution incremental, A-quad-B (TTL) output	
	200 = 200mm		
	250 = 250mm		
	350 = 350mm		

1. Alternate TTL encoder resolutions are available on request.



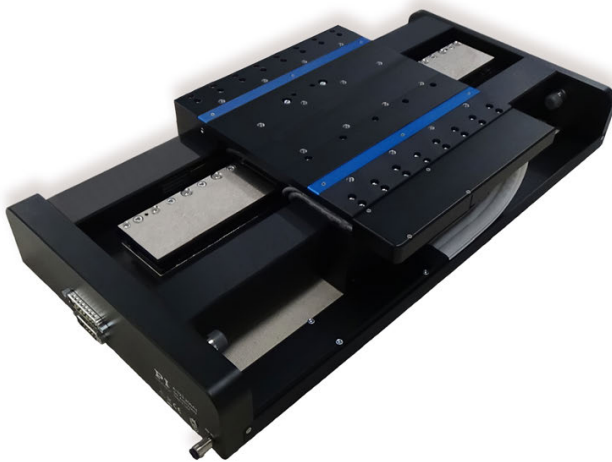
Model A-121.xxx, in mm

Model	A	B	C	D	E	F	G
A-121.050	240	-	75	25	30	4	126.5
A-121.100	290	-	100	50	55	4	151.5
A-121.150	340	-	125	75	80	6	175.5
A-121.200	390	-	150	100	105	6	201.5
A-121.250	440	-	150	125	130	6	226.5
A-121.350	540	100	200	175	180	10	276.5



Pliglide AT3 Linear Air Bearing Stage

HIGH PERFORMANCE NANOPOSITIONING STAGE



A-123 Series

- Ideal for scanning or ultra-precise positioning
- Cleanroom compatible
- Customizable
- Table size 210 mm x 210 mm
- Travel lengths 50 mm to 750 mm
- 35 kg max payload
- Non-contact fully preloaded air bearings
- Ironless cog-free linear motor
- Integral optical linear encoder
- Resolutions to 1nm
- Velocity to 1 m/sec
- Acceleration to 3 g
- Maintenance-free

Overview

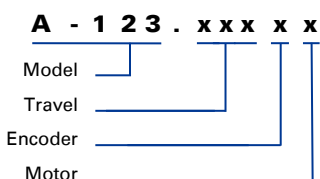
The Pliglide AT3 series of stages are linear servo motor driven with fully preloaded air bearings and an integral optical linear encoder. The combination of these non-contact components results in a frictionless motion platform that offers the highest performance, quality, and life. These stages are ideally suited for many high precision applications, such as metrology, photonics alignment, semiconductor inspection, flat panel display, laser machining, and precision scanning applications. The non-contact design also makes these stages ideal for cleanroom applications. A high-force linear motor can drive the stage to top speed within a few milliseconds, and the large capacity bearings can support payloads up to 35 kg. The laterally opposed, actively preloaded air bearing design in this model will support normal, vertical, and side-mounted orientations.

Accessories and Options

- Multiple encoder options
- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- XY stacks and custom configurations with precision alignment
- Cable track variations
- Counterbalance options for vertical (Z) orientations
- Customizations available
- Granite bases and vibration isolation systems

Model	A-123.050	A-123.100	A-123.150	A-123.200	A-123.350	A-123.500	A-123.750
Travel	50 mm	100 mm	150 mm	200 mm	350 mm	500 mm	750 mm
Drive System	Brushless ironless linear servo motor, 3-phase						
Feedback System	Non-contact optical linear encoder with travel limits and home index						
Motor Bus Voltage	48 VDC nominal, 80 VDC max						
Motor Force Constant	19.9 N/A						
Continuous Force	87.5 N						
Peak Force	298 N						
Motor Back EMF	16 V/m/sec						
Motor Resistance (phase-to-phase)	3.6 Ohms						
Motor Inductance (phase-to-phase)	1.2 mH						
Maximum Velocity (1)	1 m/sec						
Maximum Acceleration (1) (Unloaded)	3 g						
Maximum Payload (2)	35 kg normal, 25 kg lateral						
Accuracy (3) (uncompensated)	+/-1.0 µm	+/-1.0 µm	+/-1.5 µm	+/-2.0 µm	+/-3.0 µm	+/-3.5 µm	+/-5.0 µm
Accuracy (3) (with error compensation)	+/-0.5 µm				+/- 1.0 µm		+/- 1.5 µm
Repeatability (4)	+/-0.25 µm				+/-0.5 µm		+/-0.75 µm
Encoder Resolution (4)	up to 1 nm (see encoder options table)						
Straightness & Flatness (5)	< 0.1 µm / 25 mm						
	< 1 µm TIR			< 2 µm TIR	< 3 µm TIR		< 5 µm TIR
Pitch & Yaw TIR (5)	1 arc-sec	2 arc-sec	3 arc-sec	3 arc-sec	4 arc-sec	5 arc-sec	7 arc-sec
Stage Mass	14 kg	15.5 kg	16.5 kg	18 kg	21.5 kg	25 kg	32 kg
Moving Mass	5 kg						
Cabling	External, moving loop						
Operating Pressure (6)	80 (+/-) psi (550 +/-35 kPa)						
Air Consumption	< 1.0 SCFM (28 SLPM)						
Air Quality	Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3						
Construction	Hardcoat Aluminum / SS Fasteners						

- Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
- Assumes payload CG is centered no more than 50mm above the stage table.
- Improved accuracy can be obtained with controller-based error compensation. Specs listed are for encoder options A & C. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
- Encoder resolution depends on encoder option chosen and interpolation used if sine encoders are chosen. Resolution will impact repeatability specification.
- Dependent on the flatness of the surface to which the stage is mounted.
- To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.



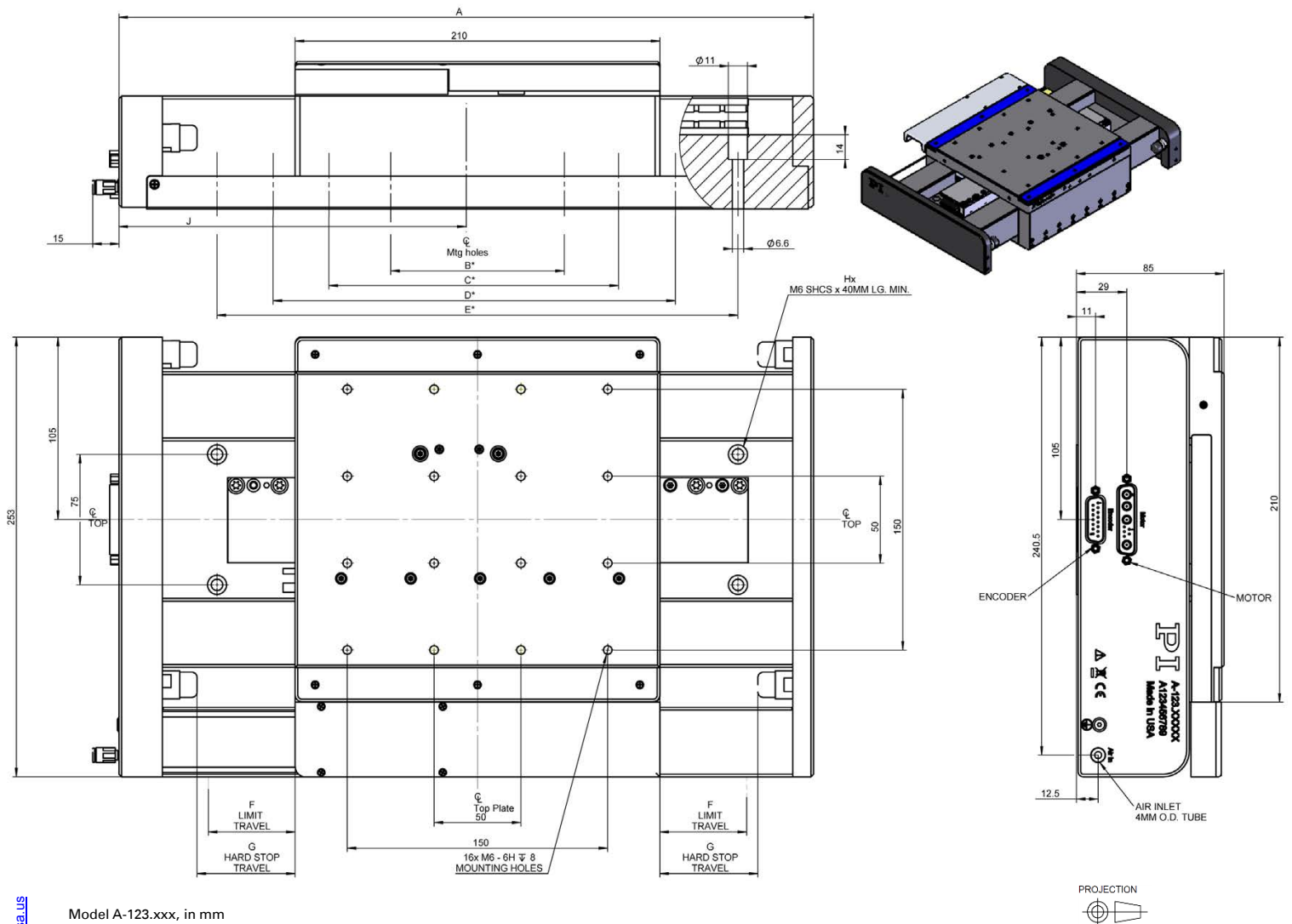
Ordering Example

Part# **A-123.200C1** is a

Model: A-123 (Pliglide AT3 linear motorized air bearing stage)
Travel: 200 mm
Encoder: C (50 nm resolution incremental A-quad-B(TTL) output)
Motor Wiring: 1 (48 VDC)

Model	Travel	Encoder (1)	Motor Wiring
A-123	050 = 50mm	A = 20µm grating pitch incremental, sine (1 Vp-p) output	1 = Standard motor, 48 VDC buss
	100 = 100mm	B = 1nm resolution absolute, BiSS-C serial output	
	150 = 150mm	C = 50nm resolution incremental, A-quad-B (TTL) output	
	200 = 200mm		
	350 = 350mm		
	750 = 750mm		

1. Alternate TTL encoder resolutions are available on request.



Model A-123.xxx, in mm

Model	A	B*	C*	D*	E*	F	G	H	J
A-123.050	350	-	-	-	250	25	31.5	4	181.5
A-123.100	400	100	-	-	300	50	56.5	8	206.5
A-123.150	450	100	-	-	350	75	81.5	8	231.5
A-123.200	500	100	-	-	400	100	106.5	8	265.5
A-123.350	650	100	325	-	550	175	181.5	12	331.5
A-123.500	800	100	300	500	700	250	256.5	16	406.5
A-123.750	1050	100	400	700	1000	375	381.5	16	531.5

*Mounting holes symmetric about C located at "J"

PIglide VC: Linear Air Bearing Voice Coil Stage

HIGH PERFORMANCE MINIATURE NANOPositionING SYSTEM



A-131 Series

- Table face 50mm diameter
- Overall height 95mm
- Travel lengths to 25mm
- 10kg max payload
- Non-contact fully preloaded air bearings
- Ironless cog-free voice coil motor
- Integral optical linear encoder
- Resolutions to 100nm
- Velocity to 1.0m/sec
- Acceleration to 8.0g
- Cleanroom compatible
- Customizable
- Ideal for scanning or high-resolution positioning

Overview

The PIglide VC air bearing stage is voice coil driven with fully preloaded air bearings and an integral optical linear encoder. This stage offers high speed and high acceleration in a small package. The combination of non-contact components results in a frictionless motion platform that offers the highest performance, quality, and life. This stage is ideally suited for high speed scanning and machining applications. The non-contact design also makes this stage ideal for cleanroom applications. There are no moving electrical cables to manage. The stage offers optional bellows covers to protect the air bearing from dirty environments.

Accessories and Options

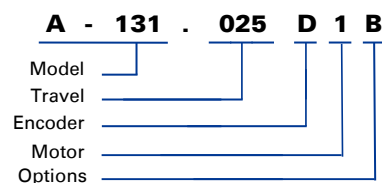
- Multiple encoder resolutions
- Bellows protection covers
- Air preparation kits
- Single or multi-axis motion controller and servo drives
- Additional accessories available on request

Model	A-131.025D1
Travel	25 mm
Drive System	Brushless DC voice coil motor, 1-phase
Feedback System	Non-contact optical linear encoder
Motor Bus Voltage	48 VDC nominal, 80 VDC max
Continuous Force	22.3 N
Peak Force	70.4 N
Motor Force Constant	6.9 N/A
Motor Back EMF	6.9 V/m/sec
Motor Resistance	2.7 ohms
Motor Inductance @ 1000 Hz	1.4 mH
Max Continuous Power	28 W
Home Index	Near center of travel, repeatable to +/- 1 encoder count
Maximum Velocity (1)	Up to 1.0 m/sec
Maximum Acceleration (1)	Up to 8.0 g
Maximum Payload (2)	10 kg
Accuracy (3)	+/-0.2 µm
Repeatability	+/-0.1 µm
Encoder Resolution (4)	100 nm
Straightness & Flatness (5)	< 0.25 µm TIR over full travel
Pitch & Yaw (5)	< 2 arc-sec TIR over full travel
Stage Mass	3.6 kg
Moving Mass	0.85 kg
Cabling	Internal, non-moving
Operating Pressure (6)	80 +/-5 psi (450 +/-35 kPa)
Air Consumption	< 1.0 SCFM (28 SLPM)
Air Quality	Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1 Oil-free - ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3
Construction	Hardcoat Aluminum / SS Fasteners

1. Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
2. Assumes payload CG is centered no more than 50mm from the stage table face.
3. Improved accuracy can be obtained with controller-based error compensation.
4. Encoder resolution can be changed upon request, please contact PI for a quote. Finer resolutions may limit maximum velocity.
5. Dependent on the flatness of the surface to which the stage is mounted.
6. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.

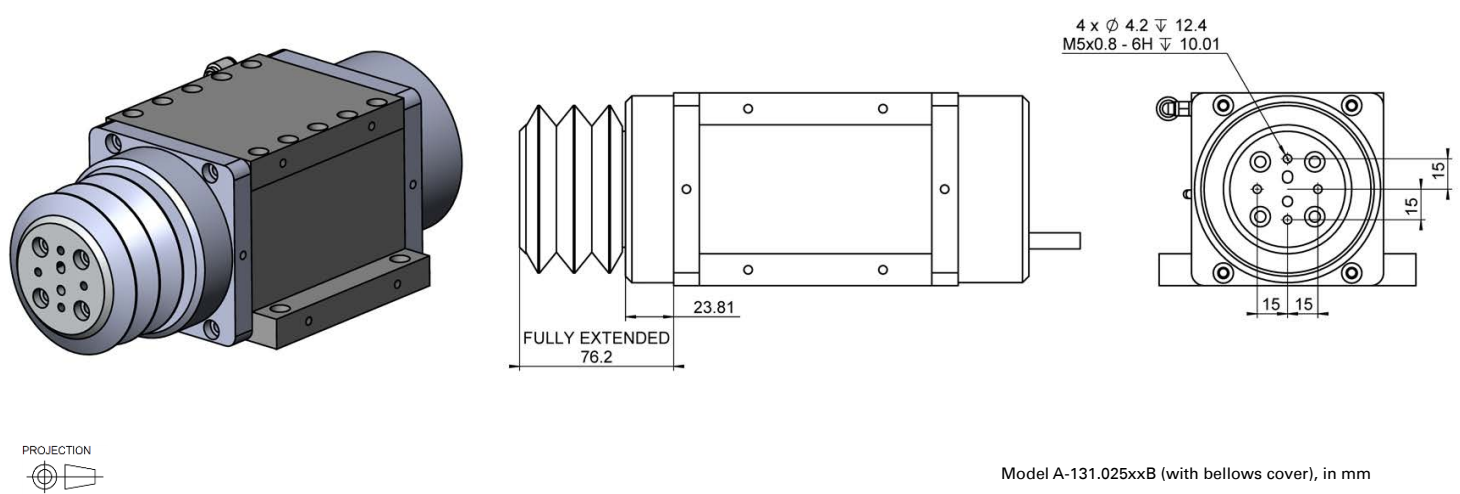
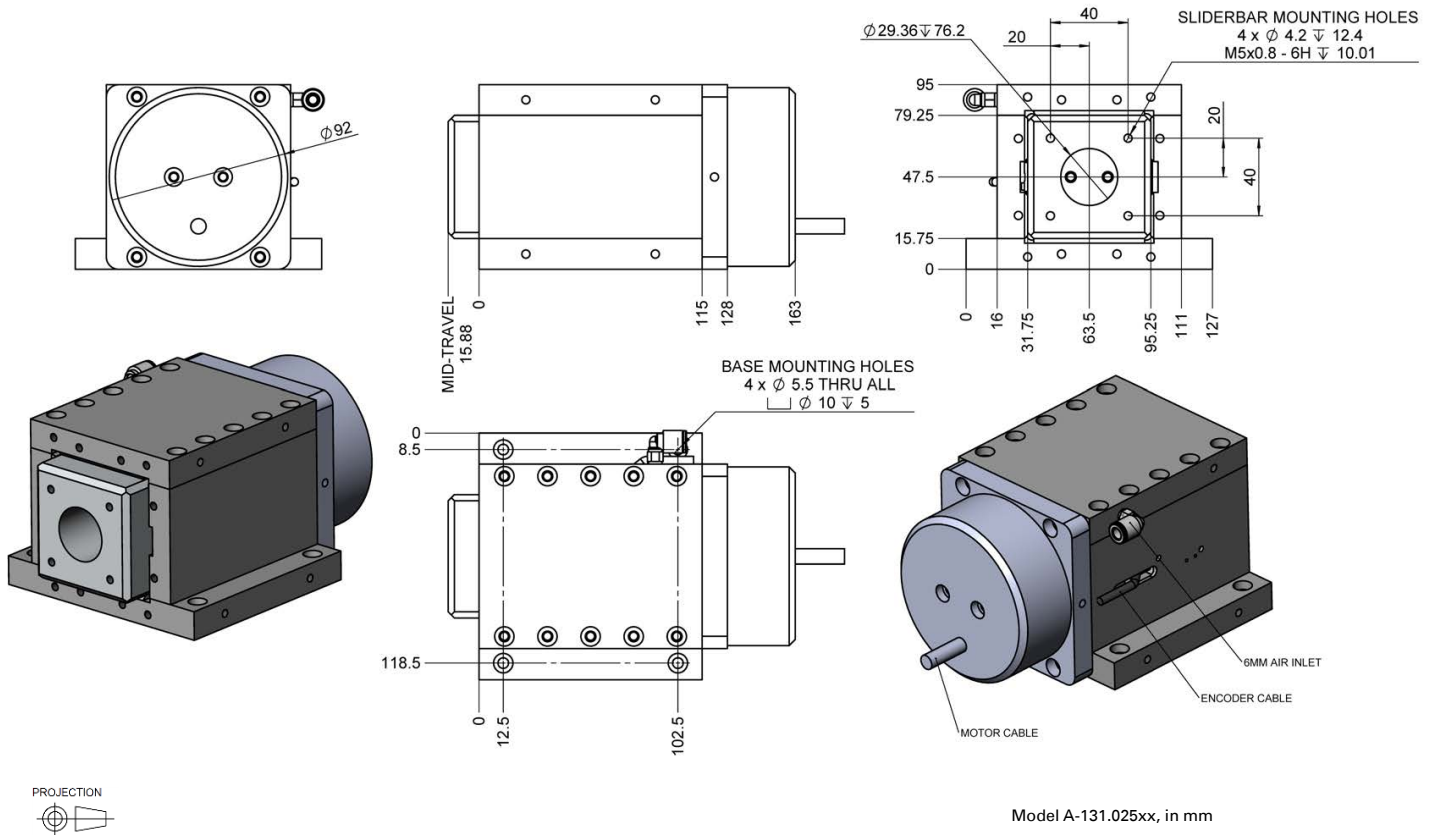
Model	Travel	Encoder (1)	Motor Wiring	Options
A-131	025 = 25 mm	A = 20 µm/line incremental, sine (1 Vp-p) output D = 100nm resolution incremental, A-quadr-B (TTL) output F = 500nm resolution incremental, A-quadr-B (TTL) output	1 = Standard motor option, 48 VDC	Blank = None B = Bellows cover

1. Alternate TTL encoder resolutions are available on request. Please contact PI for a quote.



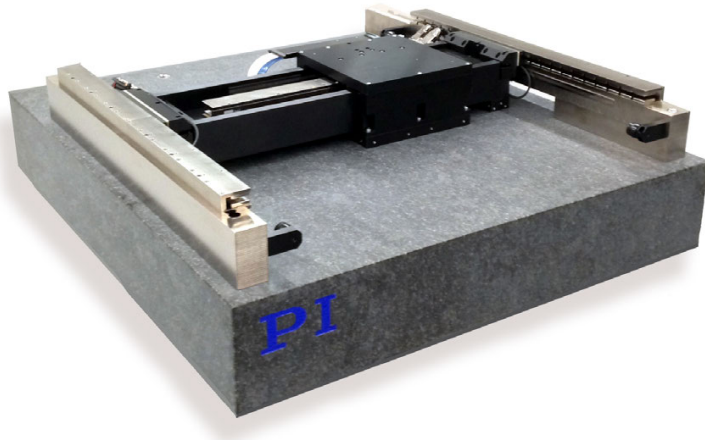
Ordering Example

Part# A-131.025D1B is a
Model: A-131 (PIglide VC linear air bearing voice coil stage)
Travel: 25 mm
Encoder: D (100nm resolution incremental, A-quadr-B TTL output)
Motor Wiring: 1 (48 VDC)
Options: Bellows cover



PIglide HS: Planar Air Bearing Stage

ULTRA PERFORMANCE XY NANOPositionING SYSTEM



A-322 Series

- Ideal for scanning and high-resolution positioning
- Clean room compatible design
- Travel lengths to 500 mm x 1000 mm
- Load to 25 kg
- Non-contact fully preloaded air bearings
- Resolution to 1 nm
- Velocity to 2 m/sec
- Acceleration to 2 g
- Active straightness and yaw control algorithms
- Dynamic 2-D mapping achieves near "laser" performance

Overview

The PIglide HS planar air-bearing stage has been designed to maximize throughput while providing the ultimate level of precision. This stage is ideal for wafer inspection and scribing applications, as well as other ultra-precision motion applications such as flat panel inspection.

Flexural coupling of the cross beam to the lower axis provides yaw-compliance without sacrificing system stiffness. The gantry axis incorporates dual linear motors and dual linear encoders, allowing for active control of the yaw motion of both axes of motion. Ironless linear motors provide smooth motion with no cogging or attractive forces. The PIglide HS incorporates three high-accuracy linear encoders, one for the bridge axis and two for the gantry axis.

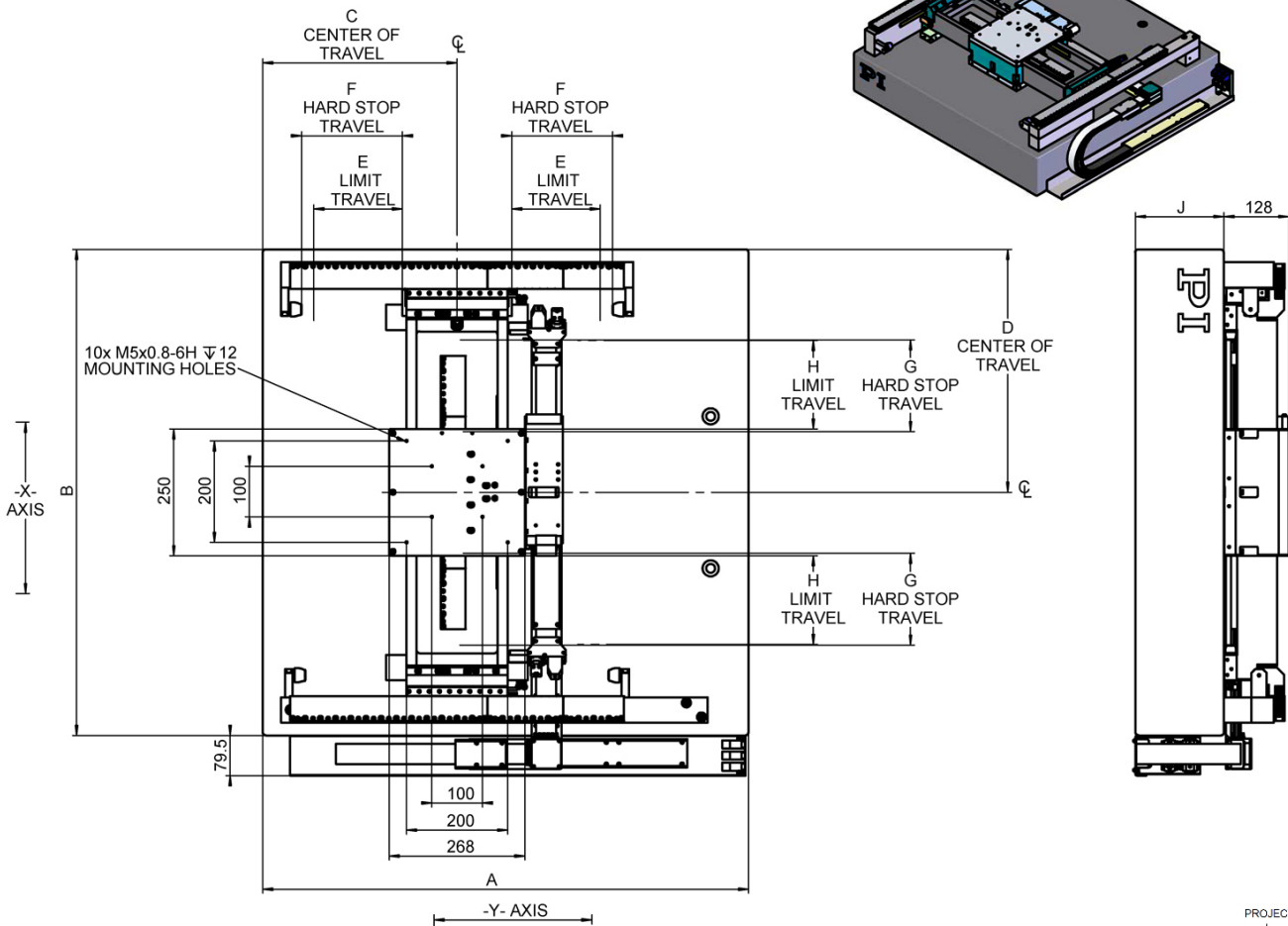
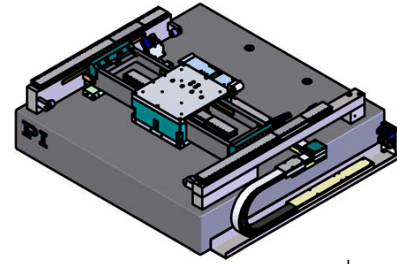
The PIglide HS is coupled with industry-leading digital controls and drives that offer advanced control algorithms to improve dynamic performance and error compensation, and a suite of software development tools.

Accessories and Options

- Machine bases
- Vibration isolation systems
- Overhead bridges with additional motion axes
- Additional accessories and customizations available on request

Model	A-322.Axx	A-322.Bxx	A-322.Cxx	A-322.Dxx
Travel (Bridge x Gantry)	350 mm x 350 mm	350 mm x 500 mm	500 mm x 500 mm	500 mm x 1000 mm
Drive System	Brushless ironless linear servo motor, 3-phase 1x on Bridge Axis, 2x on Gantry Axis			
Feedback System	Non-contact optical linear encoder 1x on Bridge Axis, 2x on Gantry Axis			
Motor Bus Voltage	48 VDC nominal, 80 VDC max			
Motor Force Constant ⁽¹⁾	19.9 N/A			
Continuous Force ⁽¹⁾	87 N			
Peak Force ⁽¹⁾	298 N			
Motor Back EMF ⁽¹⁾	16 V/m/sec			
Motor Resistance ⁽¹⁾ (phase-to-phase)	3.6 Ω			
Motor Inductance ⁽¹⁾ (phase-to-phase)	1.2 mH			
Maximum Velocity ⁽²⁾ (Unloaded)	2 m/sec			
Maximum Acceleration ⁽²⁾ (Unloaded)	Bridge Axis	2 g		
	Gantry Axis	1.5 g	1.2 g	
Maximum Payload ⁽³⁾	25 kg			
Accuracy ⁽⁴⁾	< +/- 0.5 μm			
Repeatability	< +/- 0.08 μm			
Encoder Resolution	1 nm			
Straightness ⁽⁴⁾	< +/- 10 nm / 10mm			
	< +/- 0.5 μm		< +/- 1.0 μm	
Flatness	< +/- 10 nm / 10mm			
	< +/- 0.5 μm	< +/- 1.0 μm	< +/- 1.5 μm	< +/- 2.5 μm
Pitch	< 3 arc-sec	< 4 arc-sec	< 6 arc-sec	< 8 arc-sec
Yaw ⁽⁴⁾	< 1 arc-sec		< 1.5 arc-sec	
XY Orthogonality	< 5 arc-sec			
Stage Mass	610 kg	700 kg	1075 kg	1525 kg
Moving Mass	Bridge Axis	14 kg		
	Gantry Axis	40 kg	43 kg	
Cabling	Flat flex moving loops, cleanroom-grade			
Operating Pressure ⁽⁵⁾	552 kPa (80 psi)			
Air Consumption	< 56 liters/min (2 SCFM) if used with external vacuum supply < 100 liters/min (3.2 SCFM) if used with self-generated vacuum supply			
Vacuum	560mm (22 inches) of mercury, < 14 liters/min (0.5 SCFM)			
Air Quality	Clean (filtered to 1.0 μm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3			
Construction	Hardcoat Aluminum and Nickel-plated Steel with SS Fasteners Granite Base			

1. Motor specs are per coil. Note there are 2x coils on the gantry axis.
2. Maximum velocity and acceleration based on stage capability, may be limited by payload, isolation system, or controller/drive performance.
3. Assumes payload CG is centered no more than 50mm above the stage moving table.
4. Values shown obtained using controller-based error compensation. Stage must be purchased with controller. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
5. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.
6. All specifications are per axis unless noted otherwise.

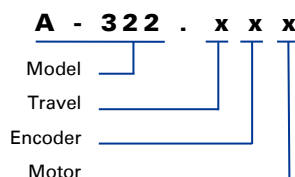


Model A-322.Bxx, in mm



Model	A	B	C	D	E	F	G	H	J
A-322.Axx	960	960	384	480	175	200	182	175	175
A-322.Bxx	1110	960	459	480	250	275	182	175	175
A-322.Cxx	1110	1110	459	555	250	275	257	250	250
A-322.Dxx	1610	1110	709	555	500	525	257	250	250

Model	Travel (X-Axis x Y-Axis)	Encoder	Motor Wiring
A-322	A = 350 mm x 350 mm	B = 1nm resolution absolute, high accuracy, BiSS-C serial output	1 = Standard motor option, 48 VDC buss
	B = 350 mm x 500 mm		
	C = 500 mm x 500 mm		
	D = 500 mm x 1000 mm		



Ordering Example

Part# A-322.BB1 is a

Model: A-322 (PIglide HS planar motorized XY air bearing stage)

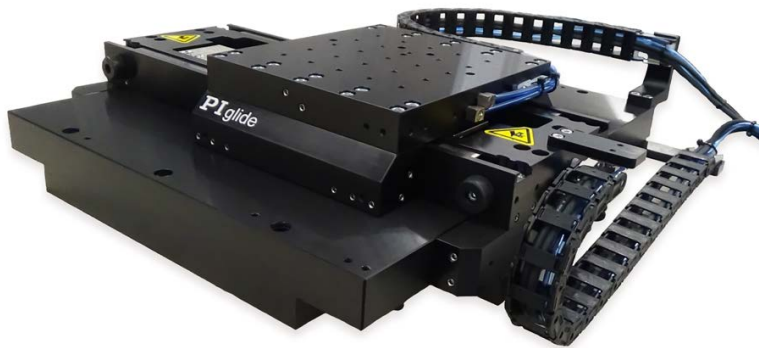
Travel: B (350 mm x 500 mm)

Encoder: B (1 nm absolute BiSS-C)

Motor Wiring: 1 (48 VDC)

PIglide IS Planar XY Air Bearing Stage

ULTRA PERFORMANCE, COMPACT XY NANOPositionING SYSTEM



A-311 Series

- Ideal for scanning or high-resolution positioning
- Clean room compatible
- Customizable
- Travel lengths to 200mm x 200mm
- Load to 15kg max
- Non-contact fully preloaded air bearings
- Low profile design
- Resolution to 1nm
- Velocity to 2m/sec
- Acceleration to 2.75g

Overview

The PIglide IS planar XY air-bearing stage is a low profile, high precision alternative to stacked XY stages. The fully preloaded air bearing puck floats in both X and Y directions on a common base, providing smooth, frictionless motion. Ideal for inspection, laser marking, microscopy, scanning, and other precision motion applications. The efficient, compact design saves space in tight machine designs. Ironless linear motors provide smooth motion with no cogging or attractive forces. Optical linear encoders provide position feedback information down to 1nm, depending on interpolation.

The PIglide IS can be coupled with a variety of industry-leading digital controls and drives that offer advanced algorithms to improve dynamic performance and error compensation and a wide suite of software development tools.

Accessories and Options

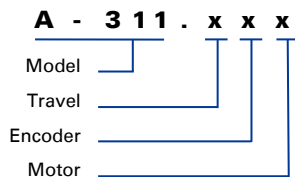
- Multiple encoder options
- Air preparation kits
- Multi-axis motion controller and servo drives
- Granite surface plates
- Machine bases
- Vibration isolation systems
- Additional accessories and customizations available

Model	A-311.Dxx	A-311.Axx	A-311.Bxx	A-311.Cxx
Travel	50 mm x 50 mm	100 mm x 100 mm	150 mm x 150 mm	200 mm x 200 mm
Drive System	Brushless ironless linear servo motor, 3-phase			
Feedback System	Non-contact optical linear encoder with travel limits and home index			
Motor Bus Voltage	48 VDC nominal, 80 VDC max			
Motor Force Constant	12.3 N/A			
Continuous Force	39 N			
Peak Force	85 N			
Motor Back EMF	10.1 V/m/sec			
Motor Resistance (phase-to-phase)	3.6 Ω			
Motor Inductance (phase-to-phase)	1.24 mH			
Maximum Velocity ⁽¹⁾ (Unloaded)	2 m/sec			
Maximum Acceleration ⁽¹⁾ (Unloaded)	Upper (X) Axis	2.75 g		
	Lower (Y) Axis	1.5 g	1.3 g	1.1 g
Maximum Payload ⁽²⁾	15 kg			
Accuracy ⁽³⁾ (Uncompensated)	+/-1.0 μm	+/-1.5 μm	+/-2.0 μm	+/-2.5 μm
Accuracy ⁽³⁾ (with error compensation)	+/-0.5 μm			
Repeatability ⁽⁴⁾	+/-0.05 μm			
Encoder Resolution ⁽⁴⁾	Up to 1 nm (see encoder options table)			
Straightness ⁽⁵⁾	< +/- 10 nm / 10mm			
	< 0.50 μm TIR		< 1.0 μm TIR	
Flatness ⁽⁵⁾	< +/- 10 nm / 10mm			
	< 1.0 μm TIR		< 2.0 μm TIR	
Pitch ⁽⁵⁾	< 4 arc-sec TIR	< 6 arc-sec TIR	< 8 arc-sec TIR	< 10 arc-sec TIR
Yaw ⁽⁵⁾	< 1 arc-sec TIR	< 2 arc-sec TIR	< 3 arc-sec TIR	< 4 arc-sec TIR
XY Orthogonality	< 5 arc-sec			
Stage Mass	14.5 kg	18.5 kg	22.5 kg	27.5 kg
Moving Mass	Upper (X) Axis	3 kg		
	Lower (Y) Axis	5.5 kg	6.5 kg	7.5 kg
Cabling	External e-chain, moving loops			
Operating Pressure ⁽⁶⁾	65 (+/-5) psi			
Air Consumption	< 2.0 SCFM			
Air Quality	Clean (filtered to 1.0 μm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3			
Construction	Hardcoat Aluminum with SS Fasteners			

1. Maximum velocity and acceleration based on unloaded stage capability, may be limited by payload, controller, or drive performance.
2. Assumes payload CG is centered no more than 50mm above the stage table. Stage is only designed for horizontal operation.
3. Improved accuracy can be obtained with controller-based error compensation. Specs listed are for encoder options A & C. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
4. Encoder resolution depends on encoder option chosen and interpolation used if sine encoders are chosen. Resolution will impact repeatability specification.
5. Dependent on the flatness of the surface to which the stage is mounted.
6. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.
7. All specifications are per axis unless noted otherwise.

Model	Travel (X-Axis x Y-Axis)	Encoder (1)	Motor Wiring
A-311	D = 50 mm x 50 mm	A = 20µm grating pitch incremental, sine (1 Vp-p) output	1 = Standard motor option, 48 VDC buss
	A = 100 mm x 100 mm	B = 1nm resolution absolute, high accuracy, BiSS-C serial output	
	B = 150 mm x 150 mm	C = 50nm resolution incremental, A-quad-B (TTL) output	
	C = 200 mm x 200 mm		

1. Alternate TTL encoder resolutions are available on request.



Ordering Example

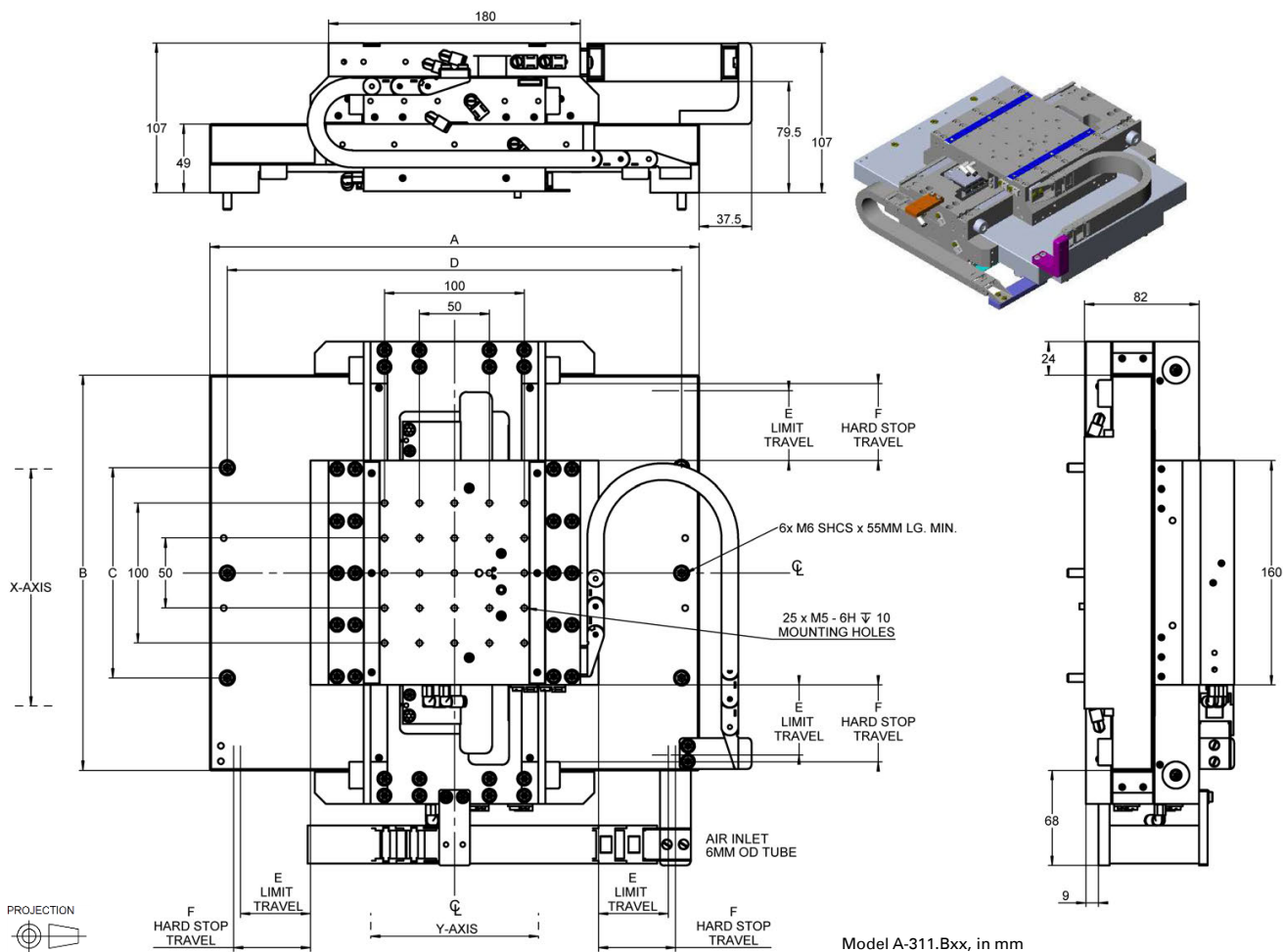
Part# A-311.BB1 is a

Model: A-311 (PIglide IS planar motorized air bearing stage)

Travel: B (150 mm x 150 mm)

Encoder: B (1nm absolute, high-accuracy, BiSS-C output)

Motor Wiring: 1 (48 VDC)



Model	A	B	C	D	E	F
A-311.Dxx	300	232	100	275	25	30
A-311.Axx	350	282	150	325	50	55
A-311.Bxx	400	332	200	375	75	80
A-311.Cxx	450	382	250	425	100	105

PIglide RM: Motorized Rotary Air Bearing Stage

FRICTIONLESS, IDEAL FOR INDEXING, POSITIONING, SCANNING, METROLOGY

A-62x Series



- Table Diameters from 50mm to 300mm
- 425kg Max Payload
- Radial/Axial Error Motion < 200nm
- Vertical or Horizontal Mounting
- Direct Drive Brushless Torque Motor
- Optical Encoder
- Completely Non-contact and Frictionless

Overview

The PIglide RM series of motorized rotary air bearing stages are a complete positioning solution designed for accuracy, precision, high stiffness, and ease of use. They can be used in any orientation. These stages feature high performance, low-cogging frameless slotless torque motors and optical encoders. Various options can be combined to create a solution ideal for point-to-point indexing or constant velocity scanning. Applications include optical alignment, metrology, inspection, calibration, and scanning. The RM stages offer superior runout, flatness, and wobble performance. Since they are completely frictionless, they exhibit no breakaway “stiction” or drag friction during operation. They are ideal for use in cleanrooms, require no maintenance or lubrication, and have unlimited life.

Options and Customizations

- Multiple encoder options
- Optional tip/tilt tabletops
- Custom mounting flanges
- Vacuum feed-thru
- Slip rings
- Air preparation kits
- Single or multi-axis motion controllers and servo drives
- Multi-axis stacks and custom configurations with precision alignment
- Granite bases and vibration isolation systems

Sizes and Capacities

Model	Table Diameter (mm)	Journal Length (mm)	Load Capacity (N [lbf])		Tilt Load Capacity (N-m [lbf-in])	Stiffness (N/μm [lbf/μin])	
			Axial	Radial		Axial	Radial
A-621.025	50	25	134 [30]	57 [13]	0.57 [5]	26 [0.15]	8 [0.05]
A-623.025	100	25	536 [121]	115 [26]	1.7 [15]	96 [0.55]	18 [0.10]
A-623.050	100	50	536 [121]	229 [51]	4.52 [40]	96 [0.55]	35 [0.20]
A-624.050	150	50	1206 [271]	344 [77]	22.6 [200]	210 [1.2]	64 [0.37]
A-627.075	300	75	4244 [954]	1203 [269]	141.3 [1250]	788 [4.5]	204 [1.17]

Note: Values listed assume supply pressure of 80 psi. Please contact PI if alternate pressures are required.

Model	Units	A-621.025	A-623.025	A-623.050	A-624.050	A-627.075
Drive System	-	Frameless, brushless, slotless, direct-drive torque motor				
Feedback System	-	Non-contact optical rotary encoder, see table below for options				
Travel	-	Unlimited, 360° continuous				
Motor Bus Voltage	VDC	48 VDC nominal, 80 VDC max				
Motor Torque Constant	N-m/A	0.03		0.26	0.59	0.61
Continuous Torque	N-m	0.07		0.7	1.57	2.82
Peak Torque	N-m	0.21		2.1	4.71	8.46
Motor Back EMF	V/kRPM	4.1		31.8	71	74
Motor Resistance (phase-to-phase)	Ω	2.7		4.2	6.7	4.5
Motor Inductance (phase-to-phase)	mH	0.1		0.4	0.9	0.6
Positioning Accuracy (1)	μrad (arc-sec)	< +/- 7.3 (1.5)				
Repeatability, Bi-directional	μrad (arc-sec)	< +/- 4.8 (1.0)				
Radial Error Motion (2)	nm	< +/- 200		< +/- 100	< +/- 50	< +/- 50
Axial Error Motion (2)	nm	< +/- 200		< +/- 100	< +/- 50	< +/- 50
Tilt Error Motion (2)	μrad (arc-sec)	< 9 (1.8)		< 4 (0.8)	< 2 (0.4)	< 1.5 (0.3)
Max Velocity (3)	RPM	2500		1200	600	500
Moment of Inertia	kg-mm ²	125	1485	1530	8790	210850
Rotating Mass	kg	0.4	1.2	1.4	3.2	21.5
Total Stage Weight	kg	1	3.5	4.5	10	50
Operating Pressure (4)		550 +/-35 kPa (80 +/-5 psi)				
Air Consumption		< 57 liters/minute (2.0 SCFM)				
Air Quality		Clean (filtered to 1.0 μm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3				
Construction (5)		Hardcoat Aluminum SS Fasteners				

1. Values shown obtained using controller-based error compensation. Stage must be purchased with a PI controller to achieve this performance. Accuracy values assume short-term time duration and do not consider the long-term effects of thermal drift on the stage.
2. Precision specifications are dependent on quality of mounting surfaces, payload, orientation, and external forces on the stage. Please consult PI for application-specific parameters. Values shown are static (zero rotational velocity during measurement) with no payload.
3. Velocity may be further limited by encoder options, payload imbalance, or controller and drive electronics.
4. To protect stage from damage, an under-pressure air sensor tied to the controller E-stop input is recommended.
5. Alternate custom tabletop materials, such as stainless steel, are available. Please contact PI for a quote.

Encoder Options

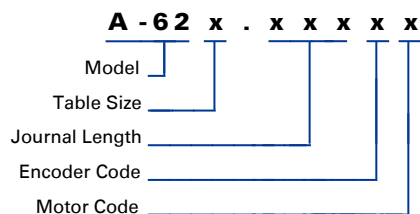
Model	Option	Units	A-621	A-623	A-624	A-627
Fundamental Lines/Rev	A, C	#	8192	15744	23600	47200
Resolution	A(1)	μrad (arc-sec)	0.19 (0.04)	0.1 (0.02)	0.06 (0.01)	0.03 (0.007)
	B		0.0015 (0.0003)			
	C(2)		1.94 (0.4)	1.02 (0.21)	0.68 (0.14)	0.33 (0.069)
Max Velocity	A	RPM	See max velocity in table above. Not limited by this encoder.			
	B					
	C(3)		550	300	175	75
Output Signal	A	-	Incremental Analog 1 Vp-p, Differential			
	B		Absolute, BiSS-C 32-bit serial			
	C		Incremental Digital RS-422 A-quad-B, Differential			
Index Mark	A	-	1 / rev, 1 signal cycle wide, Differential pulse, 1 Vp-p			
	B		None			
	C		1 / rev, 1 count wide, Synchronized to Output Signal			

- Resolution shown assumes 4096x interpolation. Please contact PI if other factors are to be used.
- Uses internal 400x interpolation. Alternate digital encoder resolutions are available on request. Please contact PI for a quote.
- Assumes 50 MHz clocked output. For alternate clock rates, please contact PI for specifications and a quote.

Ordering Information

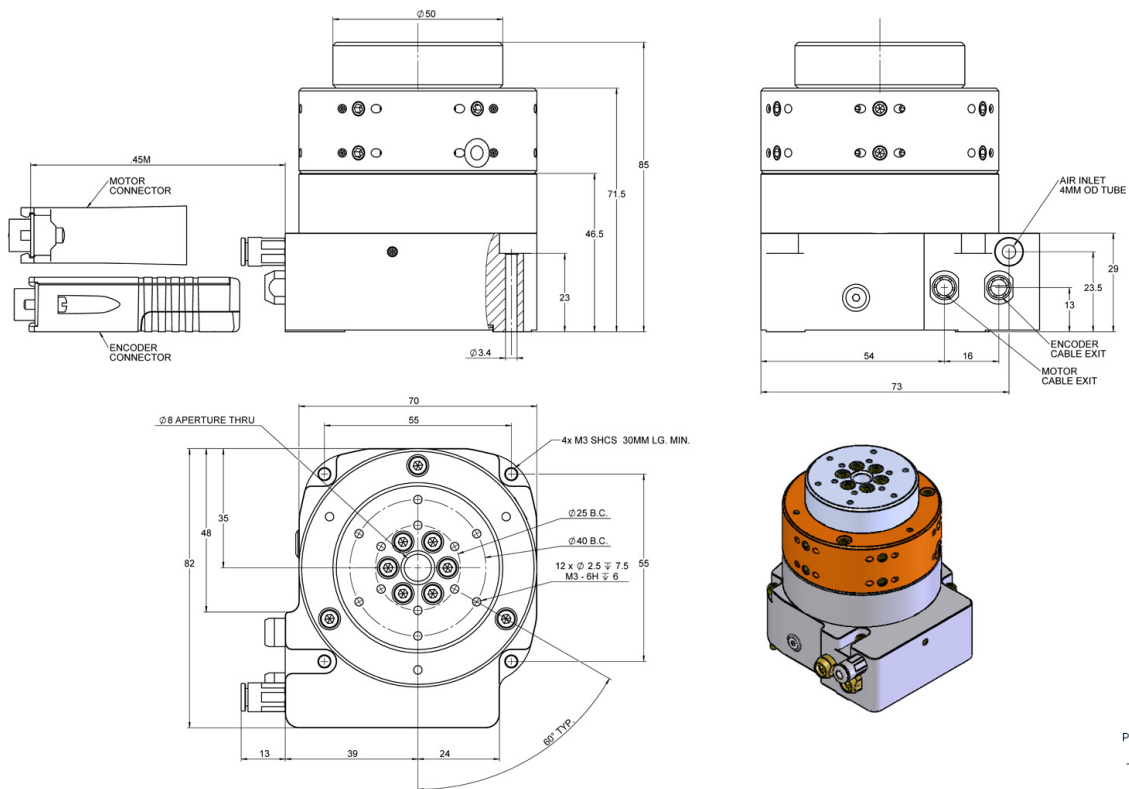
Model	Table Diameter	Journal Length	Encoder Option (1)	Motor
A-62	1 = 50mm	025 = 25mm	A = Incremental, sine (1 Vp-p) output	1 = Standard motor option, slotless
	3 = 100mm	025 = 25mm	B = Absolute BiSS-C serial output	
		050 = 50mm		
	4 = 150mm	050 = 50mm	C = Incremental, Digital A-quad-B (TTL) output, 400x Interpolation, 50 MHz max clock speed	
7 = 300mm	075 = 75mm			

- Alternate digital encoder interpolation factors and clock speeds are available on request, please contact PI for a quote.

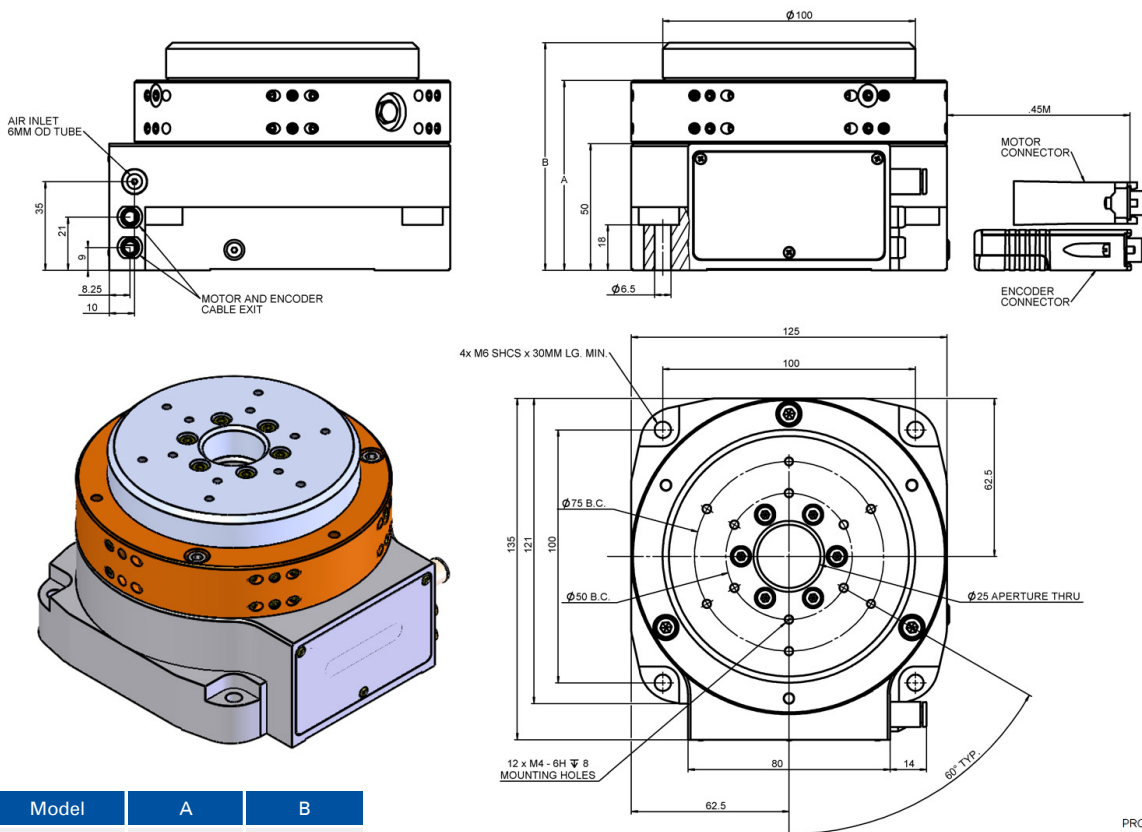


Ordering Example

Part# A-623.050C1 is a
 Model: A-62 (PIglide RM rotary motorized air bearing stage)
 Size: 3 (100mm diameter table)
 Journal Length: 50mm
 Encoder: C (Digital incremental, 400x interpolation)
 Motor: 1 = Standard slotless motor

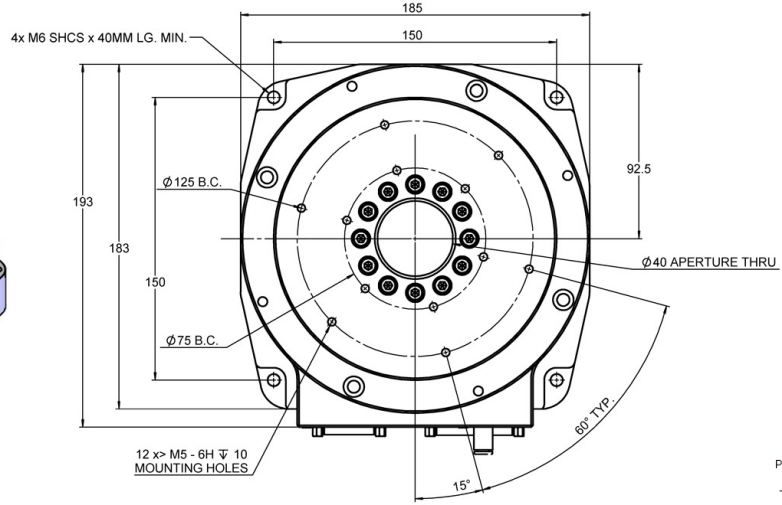
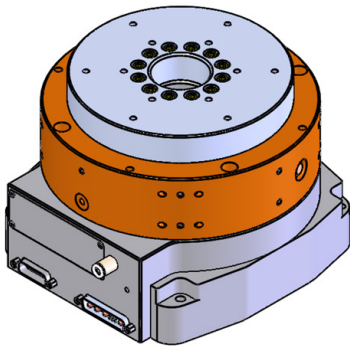
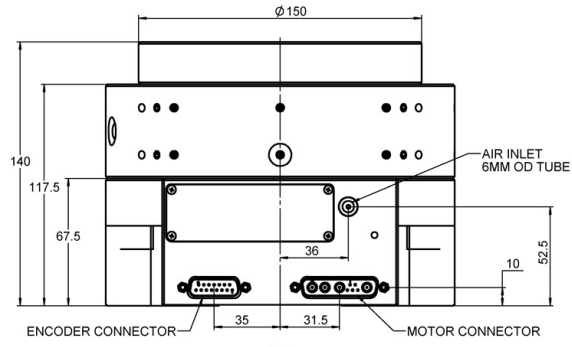
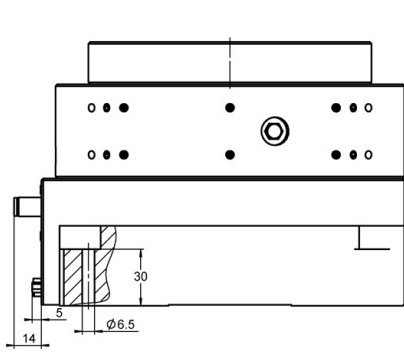


Model A-621.025xx, in mm

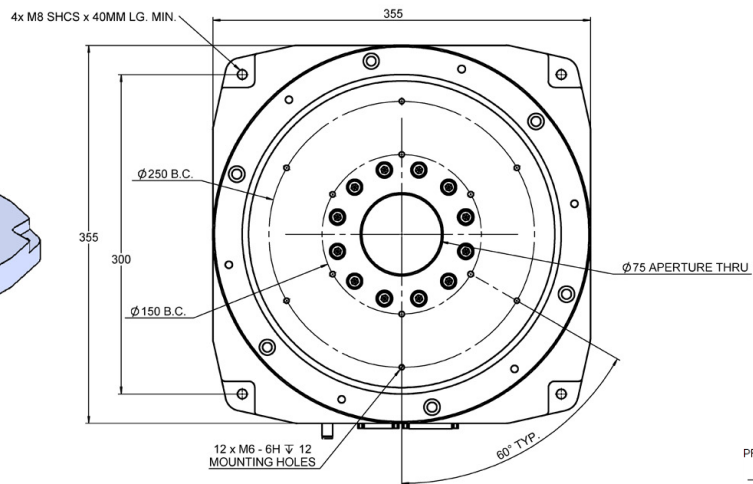
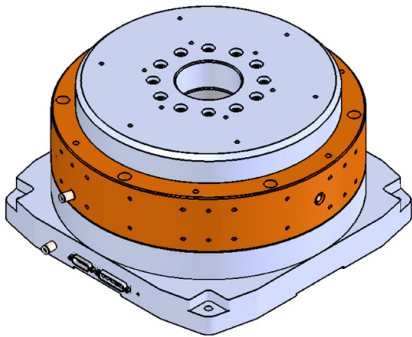
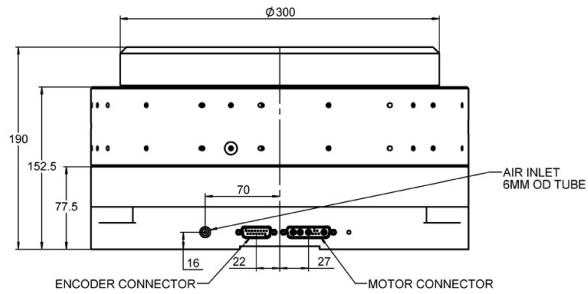
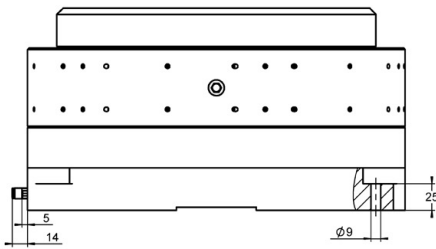


Model A-623.xxxxx, in mm

Model	A	B
A-623.025xx	75	90
A-623.050xx	100	115



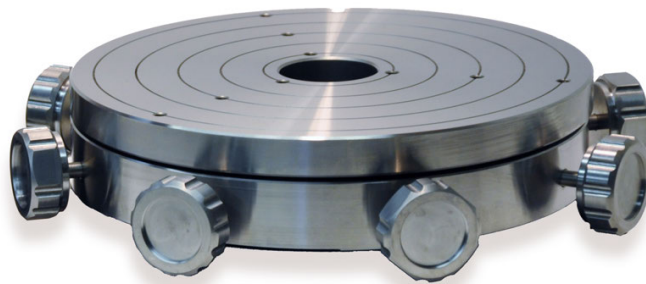
Model A-624.050xx, in mm



Model A-627.075xx, in mm

Pliglide MTT: Manual X-Y-Tip-Tilt Platform

ACCESSORY FOR A-60X AND A-62X SERIES ROTARY AIR BEARINGS



A-60X.MTT Series

- Table diameters from 75 mm to 300 mm
- Manual operation
- 4 axes of motion (X, Y, Tip, Tilt)
- Clear aperture
- Directly mounts to A-60X and A-62X rotary air bearing products

Overview

The Pliglide MTT series of manual alignment tabletops can manually adjust a payload mounted to a rotary air bearing in four degrees of freedom, allowing alignment of the payload to the bearing's axis of rotation. Adjustments can be made in two linear orthogonal directions (X and Y) and in two angular directions (tip and tilt).

The tabletop surface is made from durable, wear-resistant stainless-steel. This accessory is ideal for metrology, roundness measurement, and part gauging applications.

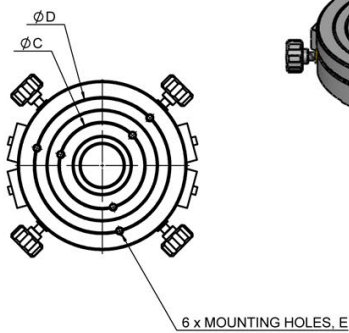
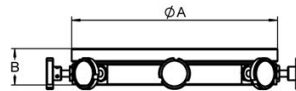
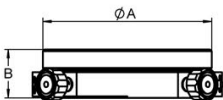
Specifications

Model	Table Diameter (mm)	Travel Range		Mass (kg)	Moment of Inertia (kg-mm ²)
		X, Y (mm)	Tip-Tilt (°)		
A-602.MTT	75	+/- 3mm	+/- 1.25°	0.8	620
A-603.MTT	100			1.5	2,090
A-604.MTT	150			4	12,900
A-605.MTT	200			8.6	52,100
A-607.MTT	300			25	319,000

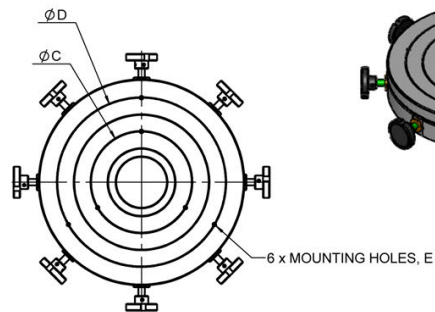
Ordering Information

Manual X-Y-Tip-Tilt Tabletop Accessory Kit			
Part #	Table Diameter	Compatible with Pliglide models:	
A-602.MTT	75mm	A-602.xxx RT Series	
A-603.MTT	100mm	A-603.xxx RT Series	A-623.xxx RM Series
A-604.MTT	150mm	A-604.xxx RT Series	A-624.xxx RM Series
A-605.MTT	200mm	A-605.xxx RT Series	
A-607.MTT	300mm	A-607.xxx RT Series	A-624.xxx RM Series

Dimensions (in mm)



A-602 / A-603



A-604 through A-607



Model	A	B	C	D	E
A-602.MTT	75	25	30	50	M3x0.5, 6 DEEP
A-603.MTT	100	30	50	75	M4x0.7, 8 DEEP
A-604.MTT	150	35	75	125	M5x0.8, 10 DEEP
A-605.MTT	200	45	100	150	M6x1.0, 12 DEEP
A-607.MTT	300	55	150	250	M6x1.0, 12 DEEP

Plglide RT Rotary Air Bearing

FRICTIONLESS, NON-MOTORIZED



A-60X Series

- Table diameters from 50mm to 300mm
- 425kg max payload
- Radial/Axial error motion < 200nm
- Can be mounted vertically or horizontally
- Ideal for positioning, scanning, metrology, inspection, alignment, calibration, and cleanroom applications

Overview

The Plglide RT series of non-motorized passive rotary air bearings are designed for accuracy, precision, high stiffness, and ease of use. They can be used in any orientation and are easy to integrate with motors and encoders for complete positioning solutions. Applications include optical alignment, metrology, inspection, calibration, and scanning. The RT series bearings offer superior runout, flatness, and wobble performance. Since they are completely frictionless, they exhibit no breakaway “stiction” or drag friction during operation. They are ideal for use in cleanrooms, require no maintenance or lubrication, and have unlimited life.

An optional high resolution optical encoder can be added to allow precision table angle recording during manual operation. Applications include parts inspection, optical alignment and drag torque measurement.

Options, Accessories, and Customizations

- Optional Mounting Base
- Optional Position Encoder
- Air Preparation Kits
- Custom Mounting Flanges and Square Housings

Sizes and Capacities

Model	Table Diameter (mm)	Journal Length (mm)	Load Capacity (N [lbf])		Tilt Load Capacity (N-m [lbf-in])	Stiffness (N/μm [lbf/μin])	
			Axial	Radial		Axial	Radial
A-601.025	50	25	134 [30]	57 [13]	0.57 [5]	26 [0.15]	8 [0.05]
A-602.038	75	38	299 [67]	132 [30]	1.13 [10]	57 [0.33]	22 [0.13]
A-603.025	100	25	536 [121]	115 [26]	1.70 [15]	96 [0.55]	18 [0.10]
A-603.050	100	50	536 [121]	229 [51]	4.52 [40]	96 [0.55]	35 [0.20]
A-604.050	150	50	1206 [271]	344 [77]	22.6 [200]	210 [1.2]	64 [0.37]
A-604.090	150	90	1206 [271]	605 [135]	36.7 [325]	210 [1.2]	113 [0.65]
A-605.065	200	65	2144 [482]	577 [129]	39.6 [350]	385 [2.2]	110 [0.63]
A-605.100	200	100	2144 [482]	917 [205]	67.8 [600]	385 [2.2]	175 [1.0]
A-607.075	300	75	4244 [954]	1203 [269]	141.3 [1250]	788 [4.5]	204 [1.17]
A-607.175	300	175	4244 [954]	2789 [627]	282.5 [2500]	788 [4.5]	475 [2.71]

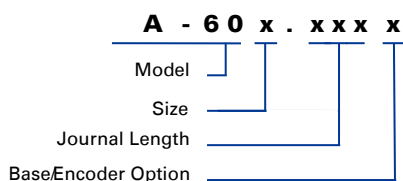
Note: Capacities listed assume supply pressure of 80 psi. Please contact PI if alternate pressures are required.

Performance Specifications

Model	Units	A-601	A-602	A-603		A-604		A-605		A-607	
		x.025	x.038	x.025	x.050	x.050	x.090	x.065	x.100	x.075	x.175
Radial Error Motion (1)	nm	< +/- 200		< +/- 100		< +/- 50					
Axial Error Motion (1)	nm	< +/- 200		< +/- 100		< +/- 50					
Tilt Error Motion (1)	μrad	< 9		< 4		< 2				< 1.5	
Max Velocity(2)	RPM	3,000					2,000		1,000		
Moment of Inertia	kg-mm ²	35	231	705	750	4,715	5,050	17,900	18,800	181,900	206,700
Rotating Mass	kg	0.15	0.4	0.7	0.8	2.1	2.6	4.6	5.3	19.4	26
Total Weight	kg	0.4	1.2	1.5	2.5	5.4	8.2	11.6	16.3	38.1	59
Operating Pressure	550 +/-35 kPa (80 +/-5 psi)										
Air Consumption	< 57 liters/minute (2.0 SCFM)										
Air Quality	Clean (filtered to 1.0 μm or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3										
Construction (3)	Hardcoat Aluminum with SS Fasteners										

1. Precision specifications are dependent on quality of mounting surfaces, payload weight, payload imbalance, mounting orientation, and external forces on the bearing. Please consult PI for application-specific parameters. Values shown are static (zero rotational velocity during measurement).
2. Velocity may be limited by encoder options or payload imbalance. See below or please contact PI for details.
3. Alternate tabletop materials, such as stainless steel, are available. Please contact PI for a quote.

Ordering Information

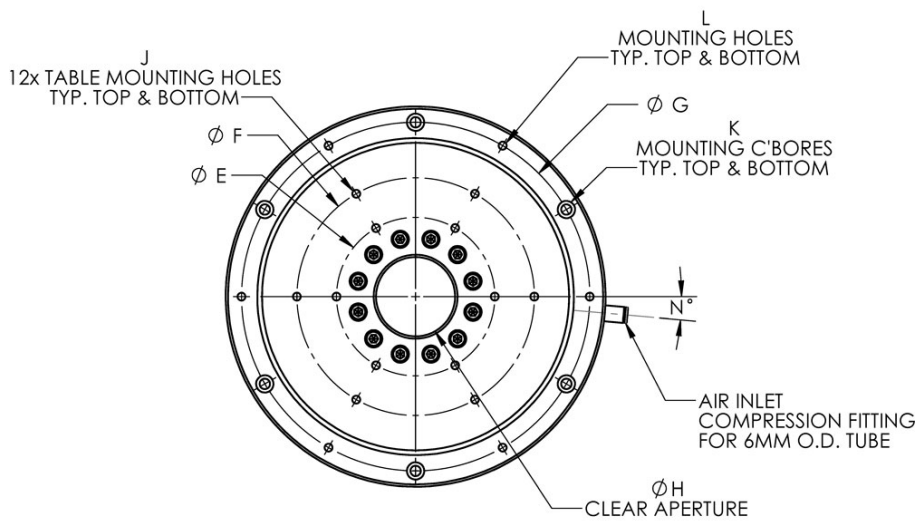
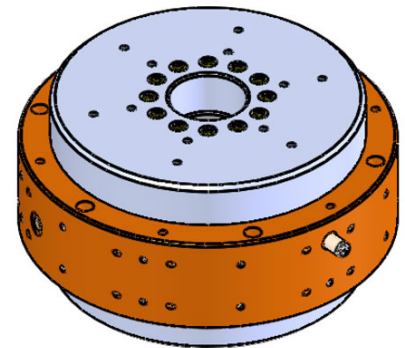
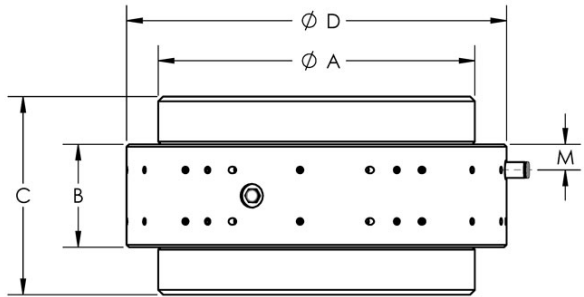


Ordering Example

Part# **A-602.038M** is a
Model: A-60 (PIglide RT rotary air bearing)
Size: 2 (75 mm diameter table)
Journal Length: 38 mm
Encoder: M (Supplied with mounting base)

Model	Table Diameter	Journal Length	Mounting Base / Encoder Option
A-60	1 = 50mm	025 = 25mm	(Blank) = No encoder or base
	2 = 75mm	038 = 38mm	
	3 = 100mm	025 = 25mm	M = Mounting Base (no Encoder)
		050 = 50mm	
	4 = 150mm	050 = 50mm	H = Digital incremental, RS-422 Output 4x Interpolation, 4 MHz Clock Includes Mounting Base
		090 = 90mm	
	5 = 200mm	065 = 65mm	
100 = 100mm			
7 = 300mm	075 = 75mm		
	175 = 175mm		

Dimensions (mm)

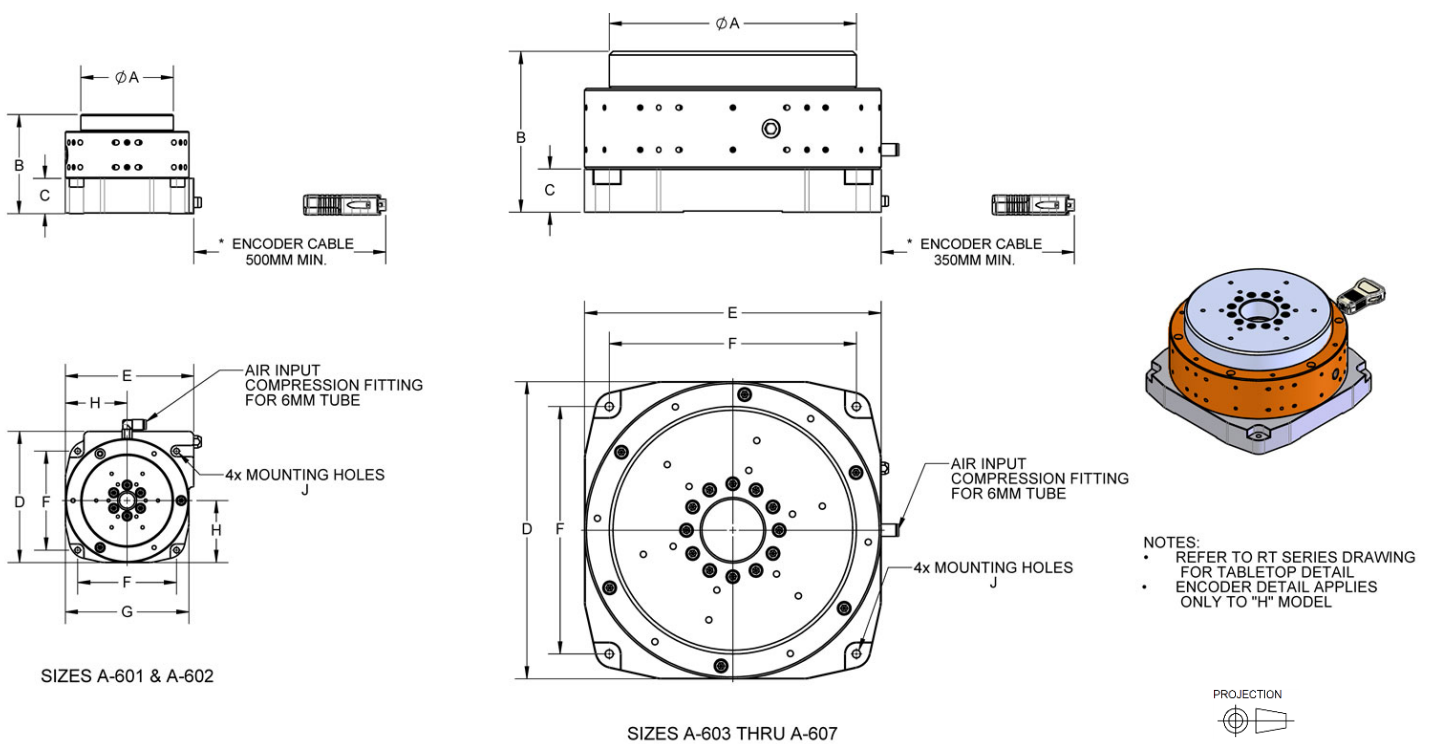


Model	A	B	C	D	E	F	G	H	J	K	L	M	N
A-601.025	50	25	50	70	25	40	60	8	M3x0.5, 6 DEEP	3x M3 SHCS, 30 LG. MIN	3x M3x0.5, 6 DEEP	6	30
A-602.038	75	38	65	100	30	50	87.5	12.5	M3x0.5, 6 DEEP	3x M4 SHCS, 40 LG. MIN	3x M4x0.7, 8 DEEP	9.5	30
A-603.025	100	25	55	125	50	75	112.5	25	M4x0.7, 8 DEEP	3x M5 SHCS, 30 LG. MIN	3x M5x0.8, 10 DEEP	6	30
A-603.050	100	50	80	125	50	75	112.5	25	M4x0.7, 8 DEEP	3x M5 SHCS, 50 LG. MIN	3x M5x0.8, 10 DEEP	12.5	30
A-604.050	150	50	95	185	75	125	170	40	M5x0.8, 10 DEEP	4x M6 SHCS, 50 LG. MIN	4x M6x1.0, 12 DEEP	12.5	68
A-604.090	150	90	135	185	75	125	170	40	M5x0.8, 10 DEEP	4x M6 SHCS, 90 LG. MIN	4x M6x1.0, 12 DEEP	22.5	68
A-605.065	200	65	125	240	100	150	220	60	M6x1.0, 12 DEEP	6x M6 SHCS, 70 LG. MIN	6x M6x1.0, 12 DEEP	16	5
A-605.100	200	100	160	240	100	150	220	60	M6x1.0, 12 DEEP	6x M6 SHCS, 100 LG. MIN	6x M6x1.0, 12 DEEP	23.5	5
A-607.075	300	75	150	355	150	250	330	75	M6x1.0, 12 DEEP	6x M8 SHCS, 80 LG. MIN	6x M8x1.25, 16 DEEP	17.3	5
A-607.175	300	175	250	355	150	250	330	75	M6x1.0, 12 DEEP	6x M8 SHCS, 150 LG. MIN	6x M8x1.25, 16 DEEP	58.5	5

Specifications - Optional Optical Encoder

Model	Code	Units	A-601.xxx	A-602.xxx	A-603.xxx	A-604xxx	A-605.xxx	A-607.xxx
Resolution	H	arc-sec	39.6	27.4	20.6	13.7	10.3	6.9
Max Velocity		RPM	3000	2500	1900	1200	900	600
Output Signal		-	Incremental Digital RS-422 A-quadr-B, Differential, 4 MHz Clock					
Index Mark		-	1 / rev, 1 count wide, Synchronized to Output Signal					

Dimensions (mm), Models with "M" or "H" Base/Encoder Option



Model	A	B	C	D	E	F	G	H	J
A-601.025 M or H	50	65	26.5	82	74	55	70	35	M3 SHCS, 25 LG. MIN
A-602.038 M or H	75	80	28.5	106	104	80	100	50	M4 SHCS, 30 LG. MIN
A-603.025 M or H	100	65	25	135	125	100	-	-	M5 SHCS, 25 LG. MIN
A-603.050 M or H	100	90	25	135	125	100	-	-	M5 SHCS, 25 LG. MIN
A-604.050 M or H	150	100	27.5	185	185	150	-	-	M5 SHCS, 30 LG. MIN
A-604.090 M or H	150	140	27.5	185	185	150	-	-	M5 SHCS, 30 LG. MIN
A-605.065 M or H	200	130	35	240	240	200	-	-	M6 SHCS, 35 LG. MIN
A-605.100 M or H	200	165	35	240	240	200	-	-	M6 SHCS, 35 LG. MIN
A-607.075 M or H	300	155	42.5	355	355	300	-	-	M8 SHCS, 40 LG. MIN
A-607.175 M or H	300	255	42.5	355	355	300	-	-	M8 SHCS, 40 LG. MIN

PIglide FPC: Flat Pad Circular Air Bearings

FRICTIONLESS MODULAR AIR BEARINGS



A-41X Series

- Diameters from 25 mm to 300 mm
- Payload to 1590 kg (3500 lbs)
- Stiffness to 860 kN/mm
- Mounting hardware, customizations, and accessories available
- For construction of positioning, scanning, metrology, inspection & calibration systems

Overview

PI's line of flat pad circular air bearings is designed for use in any application where frictionless, accurate linear or planar motion is required. The modular nature of these bearings allows the user to build their own motion system. Multiple bearings can be combined to increase load capacity or to create multi-axis motion platforms. Air bearings are wear-free and ideal for clean environments. Air bearings do not exhibit any breakaway or running friction, regardless of payload.

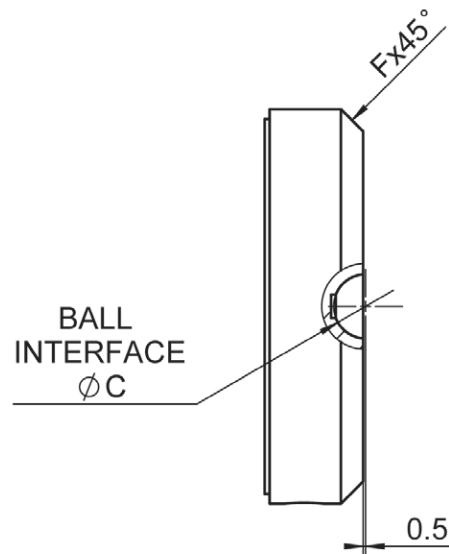
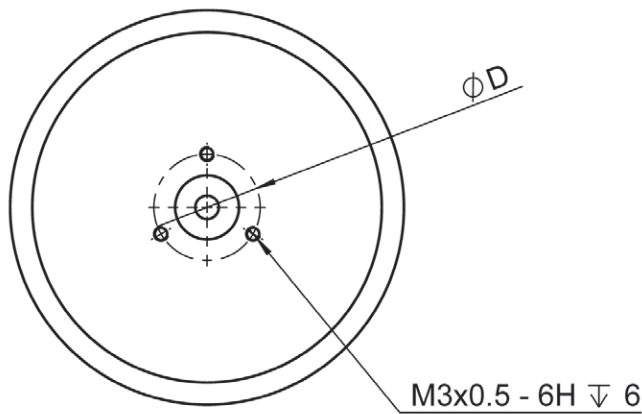
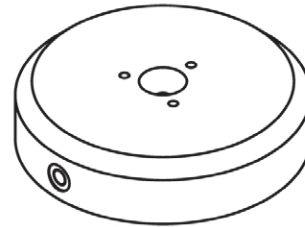
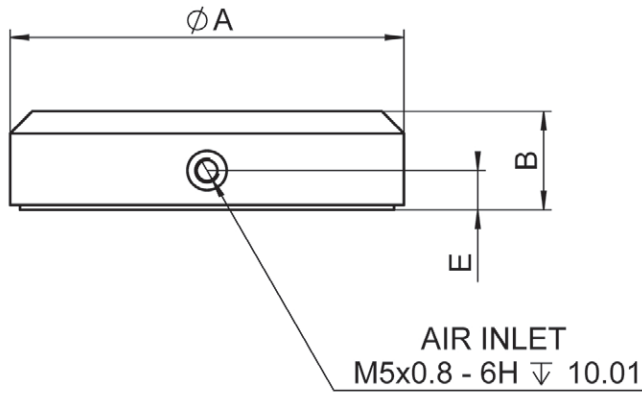
Part#	Diameter (mm)	Ball Interface Diameter (mm)	Load Capacity (N [lbf])	Stiffness (N/ μ m [lbf/ μ in])	Air Flow (L/hr [SCFH])	Mass (g [oz])
A-411.025	25	13	88 [20]	17.5 [0.10]	60 [2]	16 [0.6]
A-411.040	40	13	220 [50]	28.0 [0.16]	60 [2]	42 [1.5]
A-411.050	50	13	330 [75]	52.5 [0.30]	85 [3]	66 [2.3]
A-411.065	65	13	660 [150]	78.8 [0.45]	115 [4]	171 [6.0]
A-411.080	80	13	1010 [230]	111 [0.64]	170 [6]	259 [9.1]
A-411.100	100	20	1710 [390]	175 [1.00]	170 [6]	505 [18]
A-411.125	125	20	2780 [625]	254 [1.45]	230 [8]	1105 [39]
A-411.150	150	20	4000 [900]	350 [2.00]	285 [10]	1590 [56]
A-411.200	200	20	7700 [1750]	520 [2.97]	570 [20]	4040 [143]
A-411.300	300	20	15500 [3500]	860 [4.90]	850 [30]	12000 [423]

Note: Values assume supply pressure of 550 kPa (80 psi). Contact PI for specifications if alternate supply pressures are needed.

Guideway Surface Flatness	< 1 μ m / 300mm (0.00005" / 12")
Guideway Material	Guideways are customer-supplied. Granite, hardcoat aluminum, stainless steel, ceramics, nickel-plated steel, or nickel-plated cast iron are recommended guideway materials.
Nominal Fly-Height	10 - 15 μ m (0.0004" - 0.0006")
Operating Pressure	80 psi (550 kPa) nominal
Air Quality	Clean (filtered to 1.0 μ m or better) - ISO 8573-1 Class 1 Oil-free -ISO 8573-1 Class 1 Dry (-15 °C dew point) - ISO 8573-1 Class 3
Construction	Hardcoat Aluminum / SS Fasteners
Bearing Type	Discrete Orifice

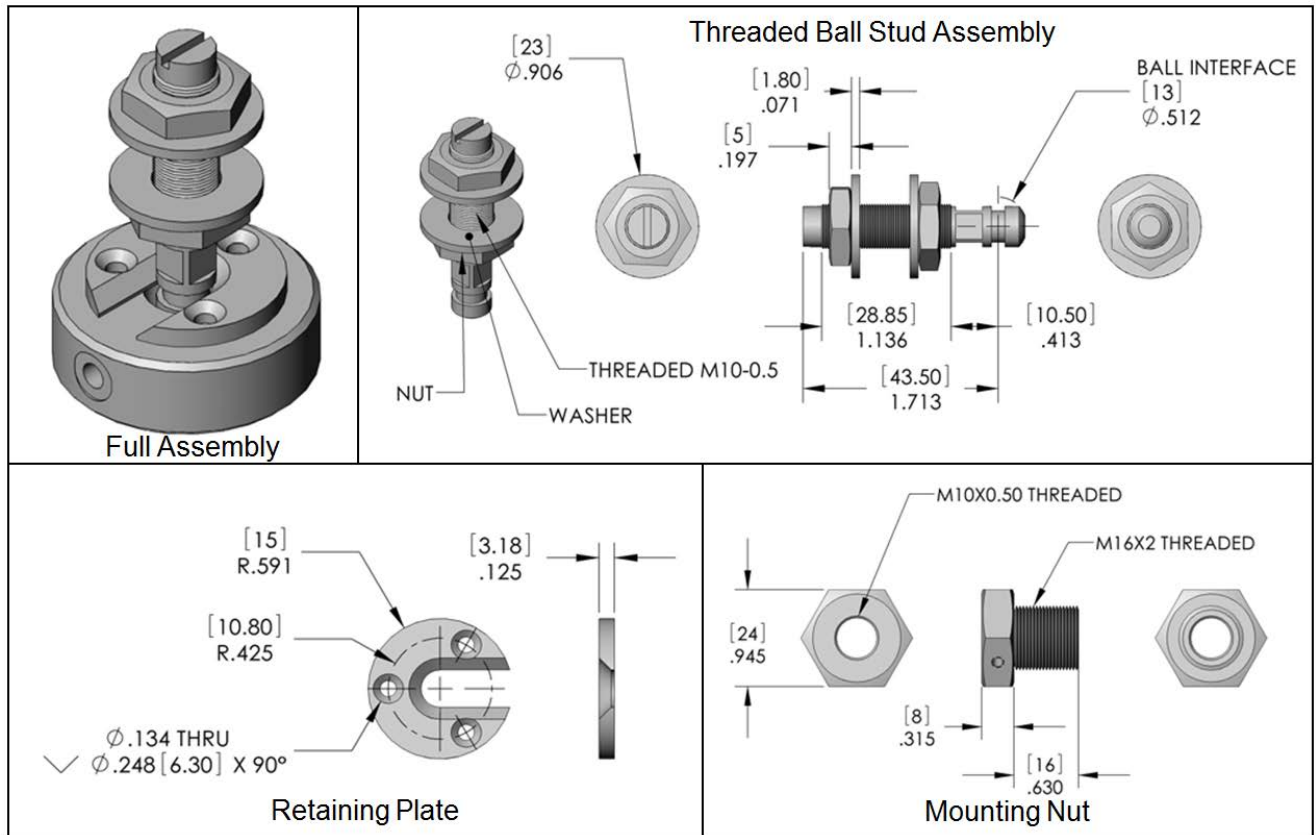
Mounting Hardware (sold separately)

Part #	Description	Ball Interface Diameter (mm)
A-412.013S	Threaded Ball Stud Assembly	13
A-412.013N	Mounting Nut	13
A-412.013P	Retaining Plate	13
A-412.020S	Threaded Ball Stud Assembly	20
A-412.020N	Mounting Nut	20
A-412.020P	Retaining Plate	20

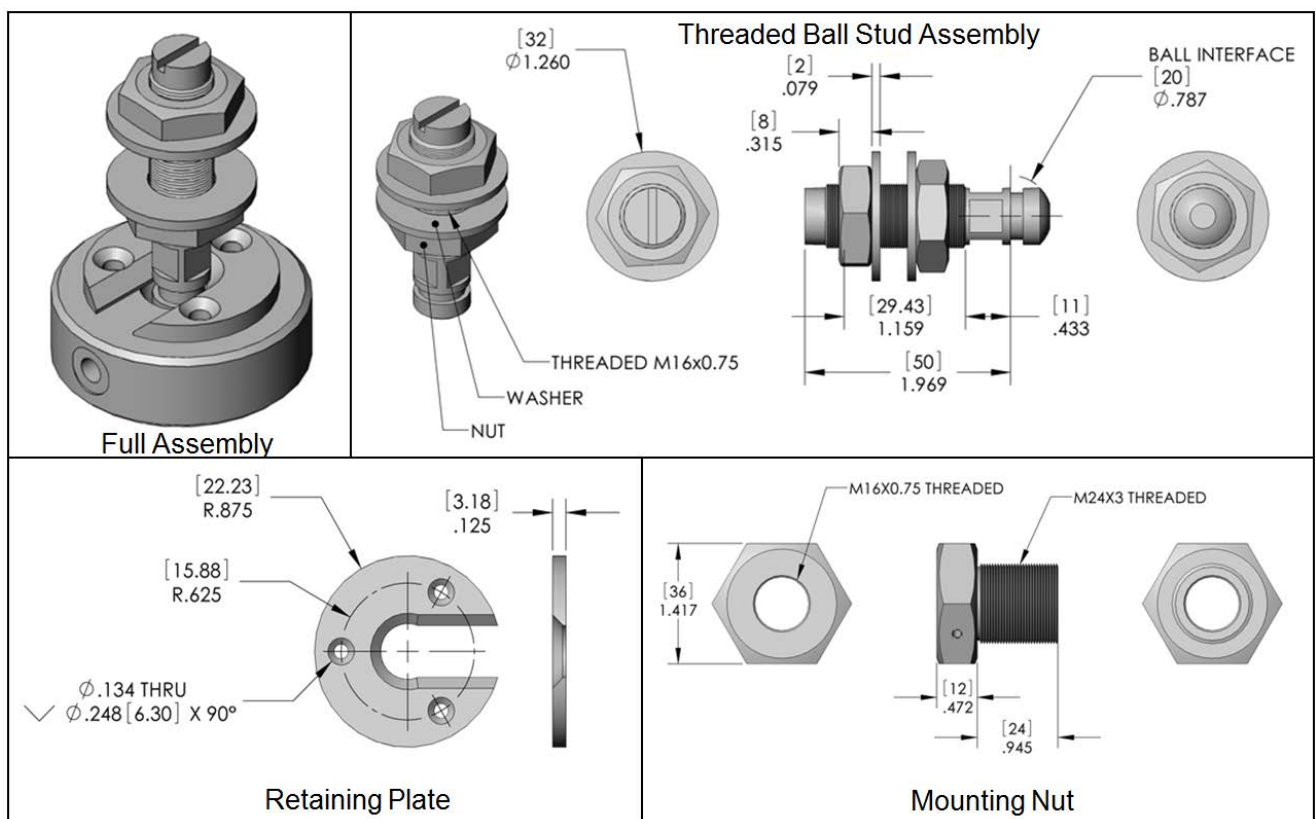


Model	A	B	C	D	E	F
A-411.025	25	13	13	N/A	6.4	1.5
A-411.040	40	13	13	21.6	7	1
A-411.050	50	13	13	21.6	7	1
A-411.065	65	20	13	21.6	8	1
A-411.080	80	20	13	21.6	8	4.5
A-411.100	100	25	20	31.6	9	6.4
A-411.125	125	35	20	31.6	9	6.4
A-411.150	150	35	20	31.6	9	6.4
A-411.200	200	66	20	31.6	9	25
A-411.300	300	66	20	31.6	9	25

Mounting Hardware Dimensions: 13mm diameter ball interface



Mounting Hardware Dimensions: 20mm diameter ball interface



PIglide RB: Linear Air Bearing

FRICTIONLESS, IDEAL FOR POSITIONING, SCANNING, METROLOGY



A-10X Series

- # Ideal for scanning or high-resolution positioning
- Clean room compatible
- Table sizes up to 300mm x 300mm
- Travel lengths up to 1m
- Load to 775kg
- #S Straightness/Flatness to 0.5 μ m / 25mm
- #P Pitch/Roll/Yaw to 0.25 arc-sec / 25mm

Overview

For applications that require smooth, precise, linear motion, the PIglide RB series linear air bearings are right for you. These bearings can easily replace ball bearing and crossed roller bearing slides, and are simple to integrate and use.

They offer better straightness, angular deviation, and repeatability than ball bearing slides, especially for travel lengths over 4". In addition, because air bearings are inherently frictionless, they do not exhibit breakaway or running friction, even under their maximum loading. The totally noncontact, clean nature of air bearings means that they are virtually maintenance free and their accuracy won't degrade over time due to wear.

Accessories and Options

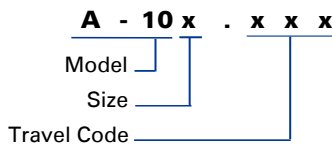
- Air preparation kit
- Mounting feet
- Custom configurations available upon request

Model	Table Size Length x Width (mm x mm)	Travels Available (mm)	Load Capacity (N)	
			Normal	Lateral
A-101	50 x 50	50 - 200	130	75
A-102	50 x 100	50 - 300	260	260
A-103	75 x 75	50 - 300	350	195
A-104	75 x 115	50 - 300	540	540
A-105	100 x 100	50 - 300	630	370
A-106	100 x 150	50 - 600	950	950
A-107	150 x 150	50 - 750	1580	790
A-108	200 x 200	50 - 1000	2950	1475
A-109	300 x 300	50 - 1000	7600	2210

Note: Load capacities listed assume supply pressure of 80 psi.

		Travels to 300 mm	Travels to 600 mm	Travels to 1000 mm
Straightness & Flatness (TIR)	Short-term	0.5µm / 25mm		
	Overall	2.5 µm	5.0 µm	10.0 µm
Stability	+/- 0.05 µm			
Pitch & Yaw (TIR)	Short-term	0.25 arc-sec / 25 mm		
	Overall	2.0 arc-sec	4.0 arc-sec	6.0 arc-sec
Operating Pressure	80 psi (550 kPa) nominal			
Air Consumption	< 1.0 SCFM (28 SLPM)			
Air Quality	Clean (filtered to 1.0 µm or better) Oil-free Dry (-15 °C dew point)			
Construction	Hardcoat Aluminum SS Fasteners			

Note: Precision specifications are dependent on load, orientation, and external forces on the bearing. Please consult PI for application-specific parameters.



Ordering Example

Part# A-102.450 is a

Model: A-10 (PIglide RB linear air bearing)

Size: 2 (50x100mm table)

Travel: 450mm

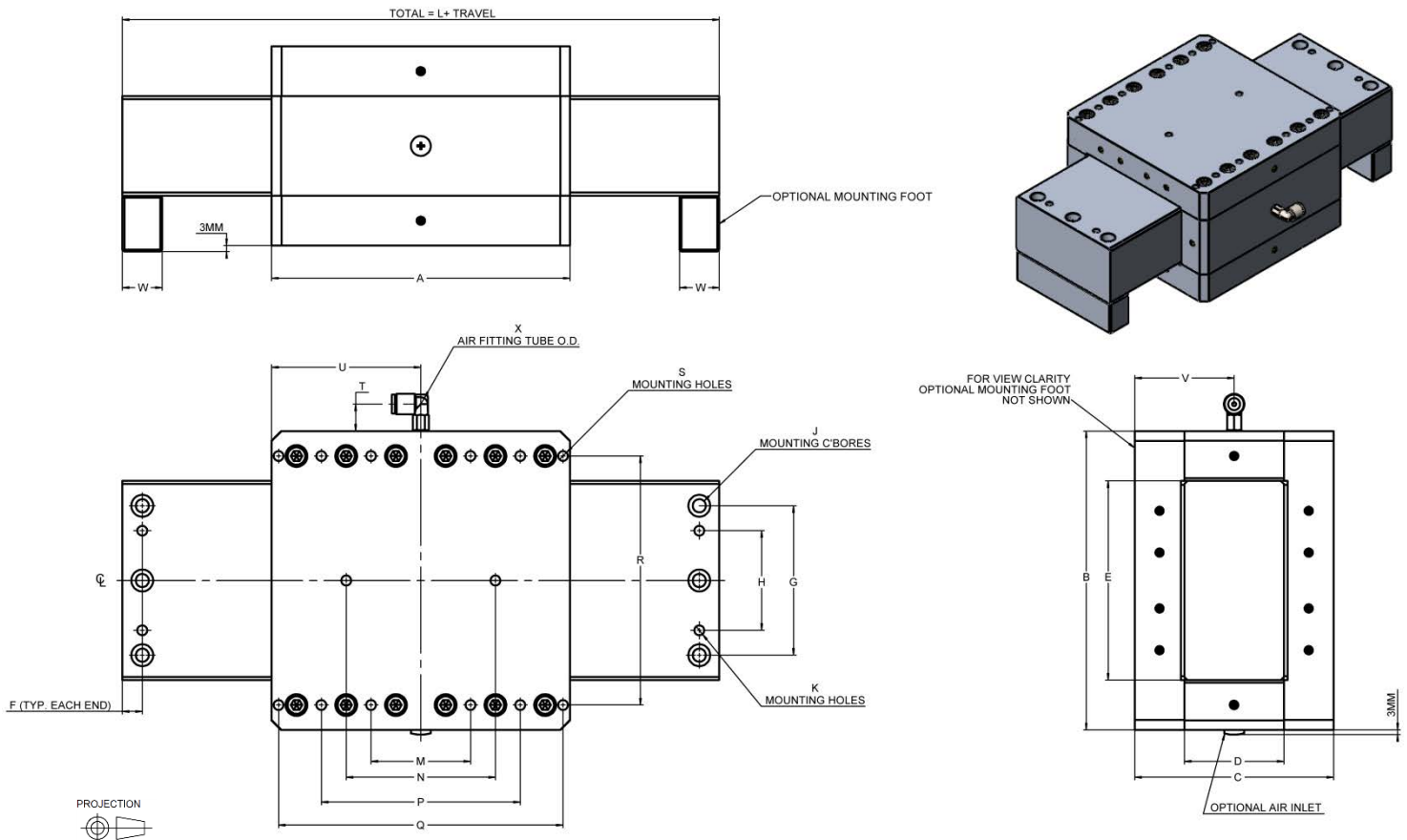
Code	Travel (mm)
50	50
100	100
150	150
200	200
300	300
450	450
600	600
750	750
A00	1000

Accessories

Order the A10x-MNT mounting feet kit separately.

Check the drawing and table on following page for dimensions.

x = size (1...9)



Model A-10x.xxx, in mm

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
A-101	50	50	35	15	25	5	15	CL	4x M3 C'BORE	2x M3	80	15	40	N/A	N/A	40	6x M3	12	21	30	10	4 (5/32")
A-102	100	50	45	25	25	5	15	CL	4x M3 C'BORE	2x M3	130	15	40	60	N/A	40	10x M3	12	46	40	10	6 (1/4")
A-103	75	75	55	25	45	7.5	30	12.5	4x M5 C'BORE	2x M5	115	35	N/A	N/A	N/A	60	4x M5	14	37.5	47.5	15	6 (1/4")
A-104	115	75	75	45	45	7.5	30	12.5	4x M5 C'BORE	2x M5	155	50	N/A	N/A	N/A	60	4x M5	14	57.5	67.5	15	6 (1/4")
A-105	100	100	75	35	60	10	40	20	4x M6 C'BORE	2x M6	150	50	N/A	N/A	N/A	80	4x M6	14	50	37.5	20	6 (1/4")
A-106	150	100	100	60	60	10	40	20	4x M6 C'BORE	2x M6	200	50	N/A	110	N/A	80	8x M6	14	75	50	20	6 (1/4")
A-107	150	150	100	50	100	10	75	50	6x M6 C'BORE	4x M6	200	50	N/A	110	N/A	125	8x M6	14	75	50	20	6 (1/4")
A-108	200	200	130	70	140	10	100	50	6x M6 C'BORE	4x M6	250	50	N/A	150	N/A	170	8x M6	14	100	65	20	6 (1/4")
A-109	300	300	140	70	240	10	200	100	6x M6 C'BORE	4x M6	350	50	N/A	150	250	270	12x M6	14	150	65	20	6 (1/4")

PIglide HB: Hemispherical Air Bearing

FRICTIONLESS, IDEAL FOR ROTATIONAL MOTION IN THREE AXES



A-65X Series

- Clean room compatible
- Low inertia
- Diameters up to 300mm
- Freedom of rotation in three directions
- Load to 635kg
- Range of tip/tilt motion up to +/- 45 degrees
- Operating pressures from 30 to 90 psi
- Ideal for satellite attitude control testing and zero-g simulation

Overview

The PIglide HB series spherical air bearing enables unique positioning and simulation applications in both research and industrial fields. These bearings provide excellent load capacity and stiffness while allowing three axes of inherently frictionless rotational motion. Commonly used for zero-g satellite research, spherical bearings are also used in systems for precision chip bonding and optical alignment. Extremely rigid spindles can be made using a spherical bearing at each end of the spindle shaft. This arrangement also allows precision alignment of the spindle shaft on the fly by moving one spherical bearing relative to the other.

Accessories and Options

- Air preparation kit
- Mounting pedestals
- Custom configurations available upon request

Model	Sphere Dia. (mm)	Travel(2) (+/- °)	Load Capacity(1) (kg)	Mass (kg)			Moment of Inertia(3) (g*m2)
				Base	Sphere	Pedestal	
A-651	50	45	15	0.115	0.070	3.1	0.02
A-652	75	45	35	0.235	0.215	4.0	0.14
A-653	100	45	65	0.550	0.475	16	0.58
A-654	150	45	160	1.350	1.475	16	4.21
A-655	200	45	265	2.500	3.350	17	17.2
A-656	250	45	405	4.000	5.525	43	46.3
A-657	300	45	635	6.500	8.100	44	103

1. Load capacities listed assume supply pressure of 80 psi. Contact PI to determine load capacity if alternate supply pressures are required.
2. Other travels available upon request.
3. About the sphere center.

Operating Pressure: 80 psi (550 kPa) nominal, 90 psi maximum

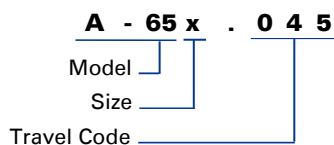
Air Consumption: < 1.0 SCFM (28 SLPM)

Air Quality: Clean (filtered to 1.0 µm or better) - ISO 8573-1 Class 1

Oil-free -ISO 8573-1 Class 1

Dry (-15 °C dew point) - ISO 8573-1 Class 3

Materials: Hardcoat aluminum, stainless steel fasteners
Alternate materials available upon request



Ordering Example

Part# A-652.045 is a

Model: A-65 (PIglide HB hemispherical air bearing)

Size: 2 (75mm diameter hemisphere)

Travel: 045 (+/-45 degrees)

Travel Codes

Code	Travel
045	+/-45°

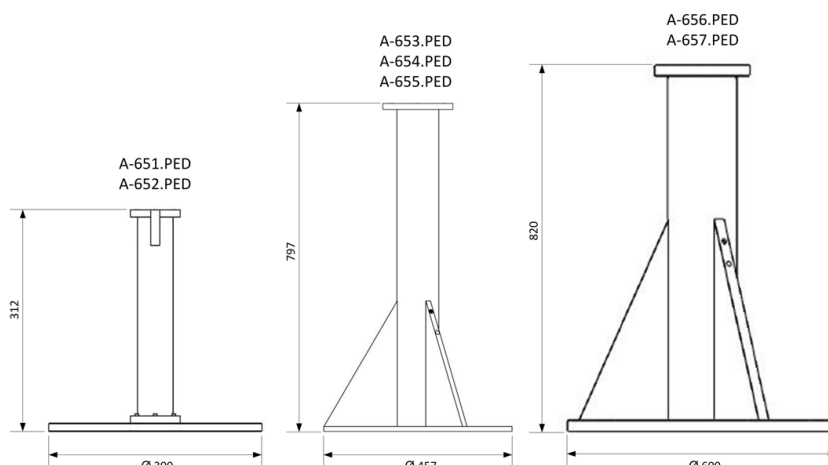
Accessories

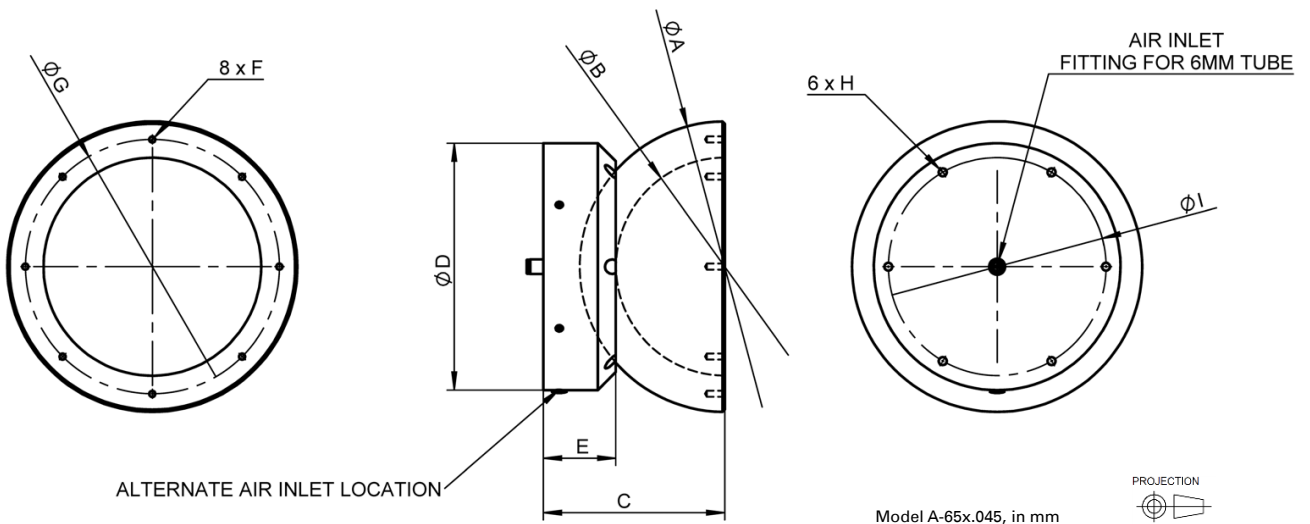
Mounting Pedestal. Used to mount the bearing above the support surface. Sold separately.

Part #	Compatible with model:
A-651.PED	A-651.xxx
A-652.PED	A-652.xxx
A-653.PED	A-653.xxx
A-654.PED	A-654.xxx
A-655.PED	A-655.xxx
A-656.PED	A-656.xxx
A-657.PED	A-657.xxx



PIglide HB Hemispherical Air Bearing, shown on optional pedestal mount; sold separately.





Model A-65x.045, in mm

Model	A	B	C	D	E	F	G	H	I
A-651	50	30	42	55	23	M3	38	M3	45
A-652	75	50	55	70	27	M3	60	M3	60
A-653	100	70	70	100	30	M4	85	M4	85
A-654	150	110	95	140	40	M5	125	M5	125
A-655	200	150	125	170	50	M5	175	M5	150
A-656	250	200	150	210	55	M6	225	M6	190
A-657	300	250	175	250	65	M6	275	M6	230

PIglide Motion Controllers



A-81x Series

- 1, 2, & 4 Axes of Motion
- Fully Integrated Closed Loop Servo Control, Drives, and Power Supplies
- For Voice Coils, DC Motors, and 3-phase Brushless Motors
- Quiet PWM Drives
- Encoder inputs support Sine and BiSS-C
- 19-inch Rack Mount Design
- 5A Continuous/10A Peak Output Current Per Axis

Overview

The A-81x series of motion controllers from PI offers a completely integrated electronics solution, with controller, drives, and power supplies packaged together in a compact 19-inch rack-mount enclosure. These controllers are designed and optimized to work with the PIglide line of air bearing stages which feature direct drive linear and rotary servo motors and high resolution encoders. Standard options include inputs for incremental sine, as well as absolute encoders using the BiSS-C serial data protocol. Sine encoder support includes integrated encoder multiplication up to 8192x. All controllers feature on-board flash memory for stored motion programs and parameters. The A-81x controllers can run in standalone mode running stored programs, or controlled via an external PC. A PC is required for programming and setup. All software is included with the controller.

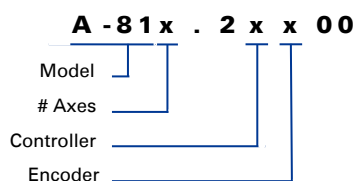
When purchased along with a PIglide air bearing stage or motion system, PI will perform all servo tuning, controller set-up, and error calibrations and deliver a complete motion system that is ready-to-use.

Typical Customizations

- Alternate packaging for OEM designs
- I/O configurations
- Position event triggers
- Emulated encoder outputs
- Advanced control algorithms
- Dual-feedback control loops
- Additional axes
- Higher power output
- Linear servo drives and power supplies

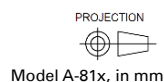
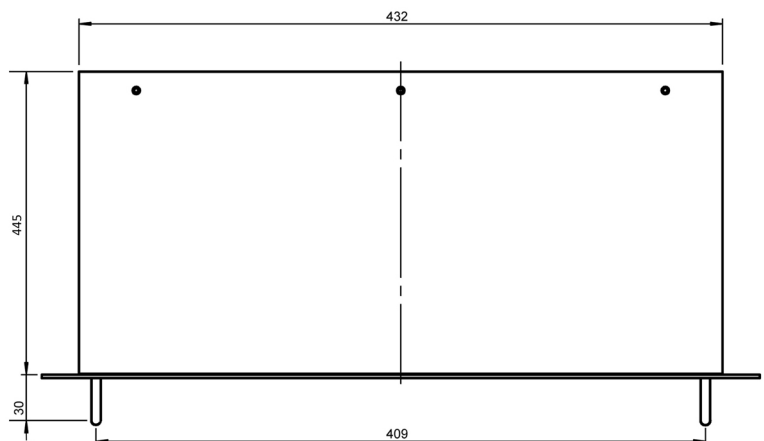
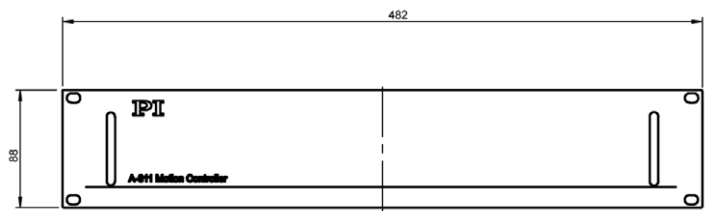
Model	A-811.23x00	A-812.21x00	A-814.21x00
# Axes	1	2	4
Controller Type	Closed loop servo (PID) with on-the fly parameter change capability		
Position Loop Update Rate	10 kHz		
Current Loop Update Rate	20 kHz		
Trajectory Profiles	Point-to-point, jog	Point-to-point, jog, S-curve, Interpolated coordinated multi-axis	
Drive Type	Digital PWM		
Feedback Options (Factory Configured)	Incremental Sine Encoder (1 Vp-p) Absolute BiSS-C		
Encoder Multiplication (Sine Encoder Option)	Up to 8192x	Up to 4096x	
Motor Output Voltage	60 VDC		
Motor Types	Voice-coil DC Brush 3-phase Brushless Servo with Encoder-based Sine Commutation		
Output Current (per Axis)	5A continuous, 10A peak		
Input Power	120 - 240 VAC, 1-phase, 50-60 Hz (Factory Configured)		
User I/O (Does not include limits)	4x DIN 24VDC Sink 4x DOOUT 24VDC Sink 1x AIN Differential +/-10VDC, 12-bit	3x DIN 24VDC Sink 2x DOUT 24VDC Source 2x AIN Differential +/-10VDC, 12-bit 1x AOUT Differential +/-10VDC, 10-bit	
Communications	USB 2.0	Ethernet TCP/IP	
Interlock / E-stop	2x 24VDC	1x 24VDC	
Connector Interface	Rear panel connectors D-sub for motor and signal connections IEC 60320 Type C14 for power input		
Weight (approximate)	6 kg	8 kg	9 kg

Model	# Axes	Controller Type ⁽¹⁾	Encoder Input Type
A-81	1	3 = Point-to-point	A = Incremental Sine (1 Vp-p)
	2	1 = Coordinated	B = Absolute BiSS-C serial
	4		



Ordering Example

Part# **A-814.21A00** is a
Model: A-81 (Pliglide Motion Controller
 19" Rack Mount Enclosure)
Axes: 4
Controller Type: 1 (Coordinated)
Encoder: A (Incremental Sine 1 Vp-p Input)



PIglide Air Preparation Kits

ACCESSORIES FOR PIGLIDE AIR BEARING STAGES



A-80x Series

- Cleans and filters compressed air supply
- Regulates supply pressure
- Optional pressure switch
- Recommended for use with all PIglide air bearing products
- Customization available

Overview

In order to guarantee long-term reliability and proper operation of air bearings, their air supply must be clean, dry, and oil-free. Contamination in the air can cause a reduction in stiffness and load capacity as well as increase in friction. Eventually, the bearing will be damaged and fail due to contamination. To prevent such contamination, PI offers efficient and cost effective air preparation assemblies which give users a simple way to clean any air supply. These kits will filter particulates and remove oil down to ISO 8573-1 Class 1.

Sizing & Selection

PI recommends the A-801 model for installations where the air supply quality is not clean to ISO 8573-1 Class 3 or for installations supporting more than four axes of air bearing motion.

If the air supply is clean and oil-free to ISO 8573-1 Class 3 and the installation requires less than 10 SCFM (300 SLPM) of air flow, customers may select the smaller A-802 model. Customers unsure of their air supply quality should use the A-801 model.

If the compressed air supply contains moisture (ISO 8573-1 Class 4 or higher, dew point higher than 0°C), PI recommends adding a dryer (desiccant or refrigeration type) to the air supply upstream of the air preparation kit.

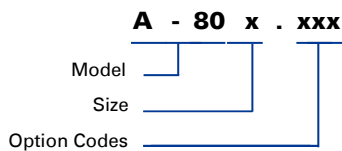
Features

- Multi-stage filtration - multiple filter elements enable the air preparation assembly to remove the most common air contaminants.
- Pressure regulation - the assembly includes a pressure regulator with integrated pressure gage. Adjustments to the bearing supply pressure are easily made.
- Shut-off Valve - a manual shut-off valve is standard with the air preparation kit.
- Tubing and fittings - PI offers a variety of air fittings for the input and the output connections to the air preparation kit. If you do not see the fitting you require, please contact us for customizations. 2 meters of tubing to connect the air preparation kit to the air bearing are included with each kit.
- Semi-automatic drains - allow easy removal of captured materials.
- Optional Pressure switch - when used to supply a motorized air bearing stage, the air preparation kit should be purchased with the optional air pressure switch. This switch can be wired into the E-stop/STO input of the motion controller to help prevent damage to the air bearing in the event of supply pressure failure. The set-point of the switch is adjustable.

Model	Description	Max Flow	Supply Air Quality (ISO 8573-1)(1)	Max Input Pressure	Primary Construction	Weight
A-801	Large 4-stage air prep kit	60 SCFM (1680 SLPM)	Any	150 psi (1035 kPa)	Aluminum	4.2 kg
A-802	Small 2-stage air prep kit	10 SCFM (300 SLPM)	Class 3 or better	150 psi (1035 kPa)	Polycarbonate	0.7 kg

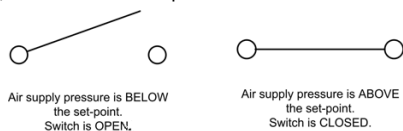
1. All kits require supply air humidity levels of Class 3 or better (dew point no greater than 0°C).

Ordering Information



Models	Option 1 Pressure Switch	Option 2 (1) Input Air Fitting	Option 3 (1) Output Air Fitting
A-801 = Large 4-stage kit, 60 SCFM	1 = None	0 = 6 & 8 mm OD tube (metric), One touch fitting	0 = 6 & 8 mm OD tube (metric), One touch fitting
A-802 = Small 2-stage kit, 10 SCFM	2 = Normally Open, Adjustable set point	3 = 1/4" & 3/8" OD tube (English), One-touch fitting	3 = 1/4" & 3/8" OD tube (English), One-touch fitting

(a) Pressure Switch Operation. Contact PI for detailed electrical specifications and wiring instructions.

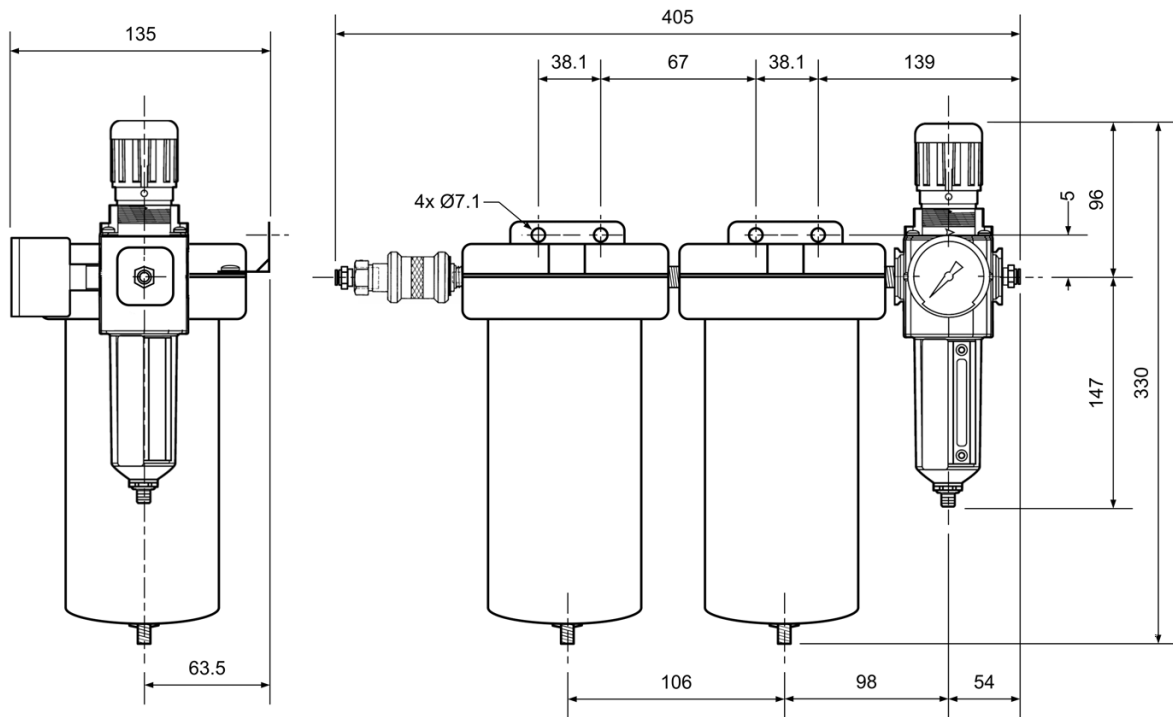


(b) Other fitting types and sizes available upon request, contact PI for a quote.

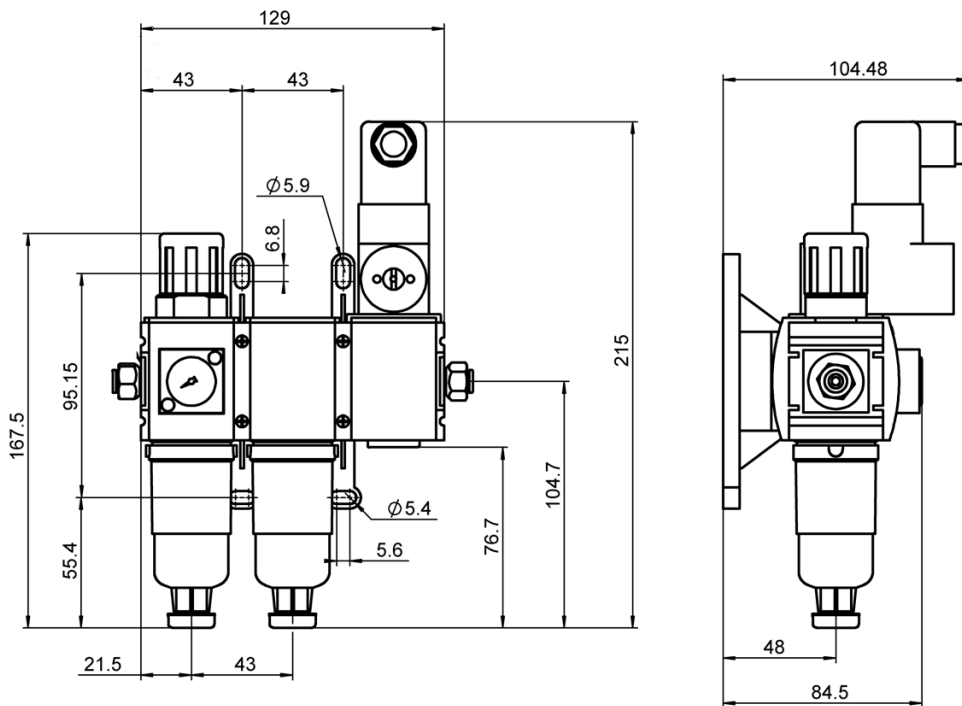
Ordering Example

Part# **A-801.200** is a

- Model:** A-80 (PIglide Air Preparation Kit)
- Size:** 1 (Large 4 Stage)
- Option 1:** 2 (Includes normally open adjustable pressure switch)
- Option 2:** 0 (Input air fitting is a one-touch style for 6mm OD flexible tube)
- Option 3:** 0 (Output air fitting is a one-touch style for 6mm OD flexible tube)



Model A-801.1xx, in mm



Model A-802.2xx, in mm



Magnetic Direct Drive Technology

Drive technology and control know-how as well as an expertise in bearings and encoders allow for a broad range of motors for system integration. Proprietary developments also include high-resolution force sensors for manufacturing and test equipment.

Ironless Linear Motors

- High acceleration and velocity
- Linear stages, planar scanners, PIMag[®] 6D positioning system
- Torque motors for rotation stages

Voice Coil Drives

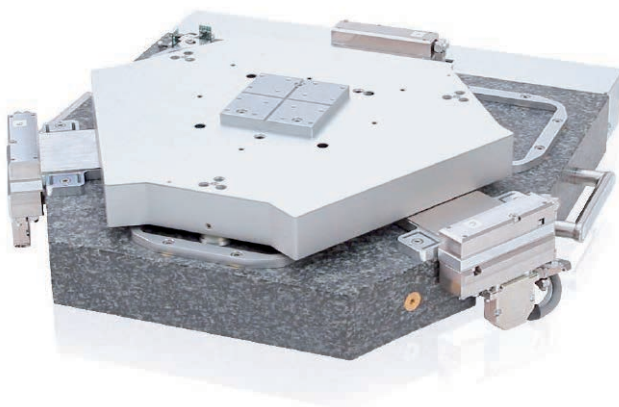
- High dynamics for fast scanning and positioning
- OEM actuators, linear scanners, Hexapods
- Optional force sensors

Drive Technology Beyond Standard

- Highest accelerations up to 60g with resonance motor
- Highest force density for single phase linear motors with reluctance motor and cylindrical Halbach arrays
- High force density and low weight with linear Halbach arrays

Guiding Systems

- PIGlide air bearings for frictionless motion and optimum straightness and flatness
- Active magnetic guidings align flatness during motion
- Flexure guidings provide frictionless motion over short strokes
- Ball and roller bearings from the leading suppliers



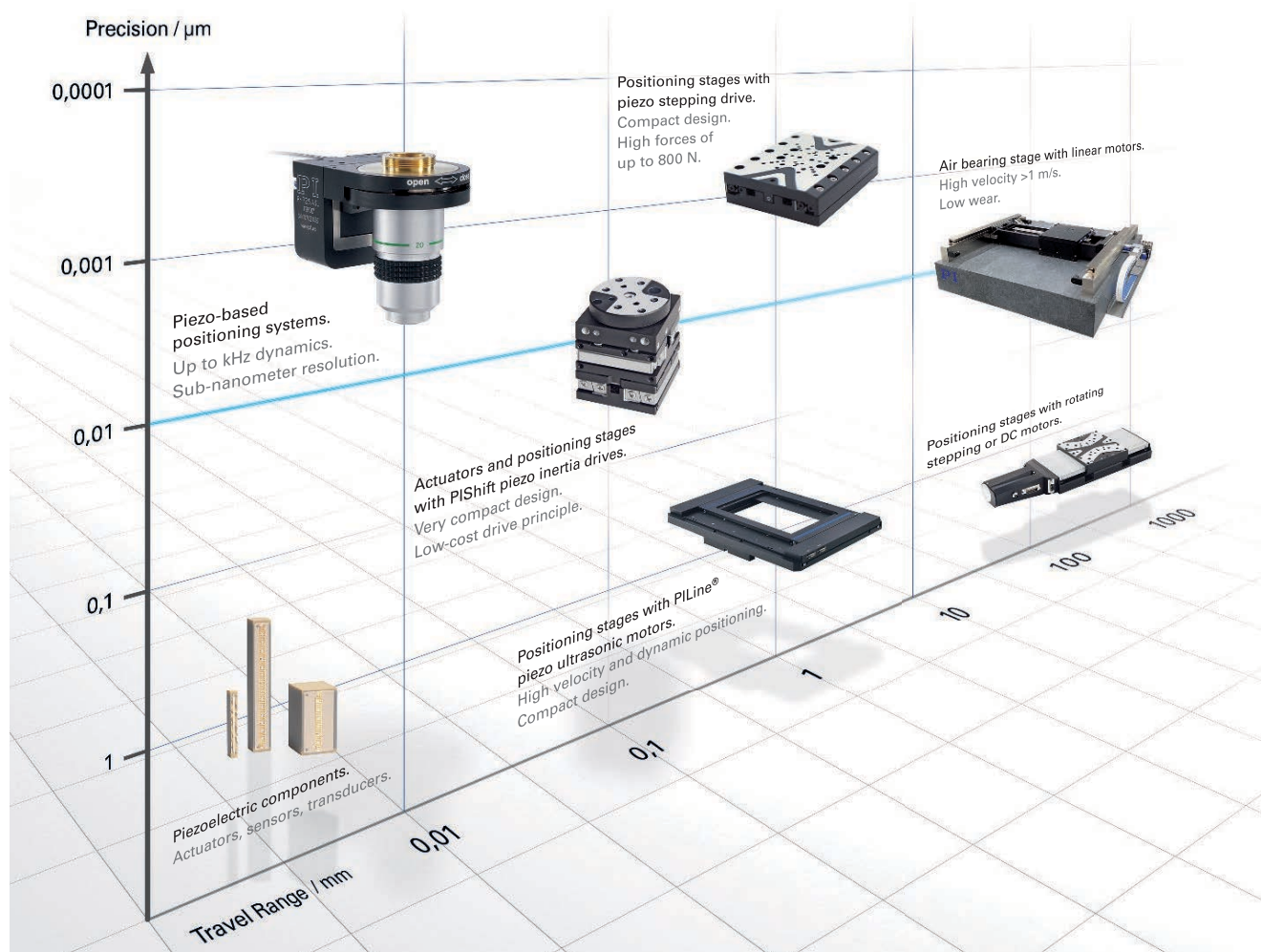
Technology

The Broadest and Deepest Portfolio

The technological scope of the PI Group is unique worldwide. PI develops, manufactures and qualifies all its core technologies itself. Thus PI is independent of components available on the market and offers individual solutions that go beyond the state of the art. Through its high measure of flexibility, PI plays a pioneering role in precision positioning and enables PI customers to benefit from distinct competitive advantages.

Core Technologies

- Piezo components, actuators and motors
- Magnetic drives
- Air bearing technology
- Guiding systems
- Nanometrology sensors
- Electronic amplifiers
- Digital controllers
- Software



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- R&D departments, which are able to react promptly to the demands of the local markets and ensure a direct dialog with the customers
- Sample and prototype construction – in close contact with development departments and customers
- Sales and application engineers – experts for the entire product portfolio of the PI Group and your contact for customized developments – from the initial consultation to the delivery
- Market and business development experts who listen to what customers in specific market segments want and enable the PI Group to develop products that fulfill these requirements

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