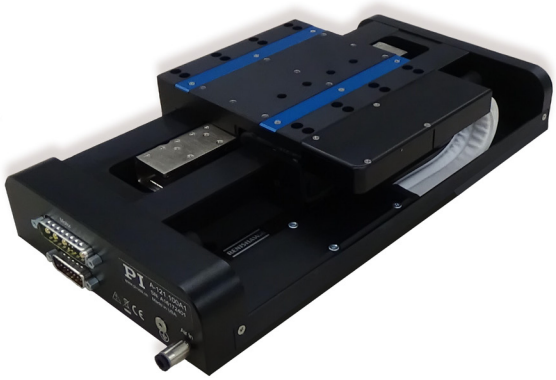
PIglide AT1 Linear Stage with Air Bearings

High Performance Small Footprint Nanopositioning Stage



A-121

- Ideal for scanning applications or high-precision positioning
- Cleanroom compatible
- Size of the motion platform 115 mm × 115 mm
- Travel ranges to 350 mm
- Low profile from 60 mm
- Resolution to 1 nm

Product Overview

The stages in the PIglide are equipped with a servo drive linear motor with preloaded air bearings and integrated linear encoder. The combination of these noncontact components results in a frictionless motion platform that offers the highest performance, quality, and lifetime.
A high-force linear motor can drive the stage to top speed within a few milliseconds. The preloaded air bearing construction supports mounting in any orientation.

Accessories and options

- Encoder
- PIglide filter and air preparation kits
- Multi-axis motion controller and direct drives
- XY setups and individual configurations
- Cable track variations
- Counterbalance options for vertical assembly
- Base plates made of granite and systems for reducing vibration

Application fields

PIglide positioning systems are ideally suited for many high-precision applications such as metrology, photonics, and precision scanning in semiconductor or flat panel display manufacturing.
Thanks to the friction-free motion, no particles are formed, which makes PIglide stages ideal for cleanroom applications.

Specifications

Motion	A-121.050	A-121.100	A-121.150	A-121.200	A-121.250	A-121.350	Unit	Tolerance
Active axes	X	X	X	X	X	X		
Travel range	50	100	150	200	250	350	mm	
Pitch / yaw (1)	12	12	15	20	25	35	µrad	max.
Straightness / flatness (1)	±0.5	±0.5	±0.5	±0.75	±0.75	±1.25	µm	max.
Straightness / flatness per 25 mm travel range (1)	0.1	0.1	0.1	0.1	0.1	0.1	µm	max.
Velocity, unloaded (2)	1	1	1	1	1	1	m/s	max.
Acceleration, unloaded (2)	20	20	20	20	20	20	m/s²	max.

Mechanical properties	A-121.050	A-121.100	A-121.150	A-121.200	A-121.250	A-121.350	Unit	Tolerance
Load capacity in z (3)	100	100	100	100	100	100	N	max.
Load capacity in y (3)	40	40	40	40	40	40	N	max.
Moved mass	1.2	1.2	1.2	1.2	1.2	1.2	kg	
Overall mass	3.5	4.2	4.5	5.2	5.7	6.8	kg	
Guide type	Air bearing	Air bearing	Air bearing	Air bearing	Air bearing	Air bearing		

Drive properties	A-121	Unit	Tolerance
Drive type	Linear motor, ironless, 3-phase		
Intermediate circuit voltage, effective	48, nominal 80, max.	V DC	
Peak force	33.2	N	typ.
Nominal force	11.1	N	typ.
Force constant, effective	6.67	N/A	typ.
Resistance phase-phase	6.3	Ω	typ.
Inductivity phase-phase	1.0	mH	typ.
Back EMF phase-phase	7.7	V·s/m	max.
Cabling	External, moving cable		

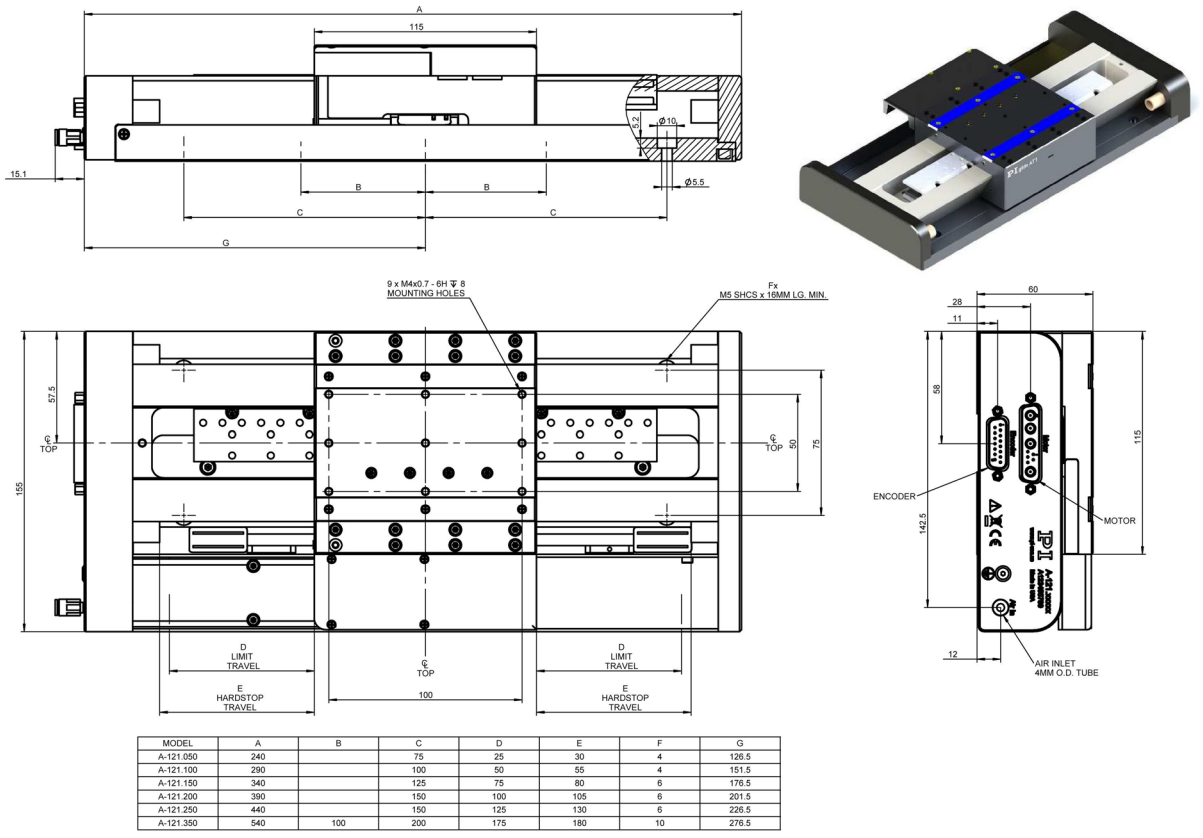
Positioning	A-121.xxxA	A-121.xxxB	A-121.xxxC
Integrated Sensor	Incremental linear encoder	Absolute encoder	Incremental linear encoder
Sensor signal	Sin/cos, 1 V peak-peak, 20 µm signal period	BiSS-C	A/B quadrature, TTL
Sensor resolution	1.2 nm (4)	1 nm	50 nm
Bidirectional repeatability	A-121.050: ± 0.25 µm (4) A-121.100: ± 0.25 µm (4) A-121.150: ± 0.25 µm (4) A-121.200: ± 0.25 µm (4) A-121.250: ± 0.25 µm (4) A-121.350: ± 0.50 µm (4)	A-121.050: ± 0.25 µm A-121.100: ± 0.25 µm A-121.150: ± 0.25 µm A-121.200: ± 0.25 µm A-121.250: ± 0.25 µm A-121.350: ± 0.50 µm	A-121.050: ± 0.25 µm A-121.100: ± 0.25 µm A-121.150: ± 0.25 µm A-121.200: ± 0.25 µm A-121.250: ± 0.25 µm A-121.350: ± 0.50 µm
Accuracy,	A-121.050: ± 1.0 µm A-121.100: ± 1.0 µm	A-121.050: ± 1.5 µm A-121.100: ± 1.5 µm	A-121.050: ± 1.0 µm A-121.100: ± 1.0 µm

uncompensated [5]	A-121.150: ± 1.5 µm A-121.200: ± 2.0 µm A-121.250: ± 2.0 µm A-121.350: ± 3.0 µm	A-121.150: ± 1.5 µm A-121.200: ± 1.5 µm A-121.250: ± 1.5 µm A-121.350: ± 1.5 µm	A-121.150: ± 1.5 µm A-121.200: ± 2.0 µm A-121.250: ± 2.0 µm A-121.350: ± 3.0 µm
Accuracy, with error compensation [5]	A-121.050: ± 0.50 µm A-121.100: ± 0.50 µm A-121.150: ± 0.50 µm A-121.200: ± 0.50 µm A-121.250: ± 0.50 µm A-121.350: ± 1.0 µm	A-121.050: ± 0.5 µm A-121.100: ± 0.5 µm A-121.150: ± 0.5 µm A-121.200: ± 0.5 µm A-121.250: ± 0.5 µm A-121.350: ± 0.5 µm	A-121.050: ± 0.50 µm A-121.100: ± 0.50 µm A-121.150: ± 0.50 µm A-121.200: ± 0.50 µm A-121.250: ± 0.50 µm A-121.350: ± 1.0 µm

Miscellaneous	A-121
Operating pressure [6]	65 to 75 psi (450 to 520 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
Materials	Hardcoat aluminum, stainless steel fasteners

[1] Dependent on the flatness of the surface, on which the stage is mounted.
[2] Can be limited by the payload, controller or drive.
[3] Assumes payload CG is centered no more than 50 mm above the motion platform.
[4] Assumes 16384x interpolation. Contact PI for the use of other factors.
[5] Improved accuracy can be obtained with controller-based error compensation. The stage must be ordered with a controller from PI to reach these values. Accuracy values assume short-term duration and do not consider the long-term effects of thermal drift on the stage.
[6] To protect the stage against damage, it is recommended to connect an air pressure sensor to the Motion-Stop input of the controller.

Drawings and Images



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	176.5
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

A-121. dimensions in mm

Ordering Information

Travel range 50 mm

A-121.050A1
PIglide AT1 Linear Stage, Air Bearing, 50 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.050B1
PIglide AT1 Linear Stage, Air Bearing, 50 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.050C1
PIglide AT1 Linear Stage, Air Bearing, 50 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Travel range 100 mm

A-121.100A1
PIglide AT1 Linear Stage, Air Bearing, 100 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.100B1
PIglide AT1 Linear Stage, Air Bearing, 100 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.100C1
PIglide AT1 Linear Stage, Air Bearing, 100 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Travel range 150 mm

A-121.150A1
PIglide AT1 Linear Stage, Air Bearing, 150 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.150B1
PIglide AT1 Linear Stage, Air Bearing, 150 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.150C1
PIglide AT1 Linear Stage, Air Bearing, 150 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Travel range 200 mm

A-121.200A1
PIglide AT1 Linear Stage, Air Bearing, 200 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.200B1
PIglide AT1 Linear Stage, Air Bearing, 200 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.200C1
PIglide AT1 Linear Stage, Air Bearing, 200 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Travel range 250 mm

A-121.250A1
PIglide AT1 Linear Stage, Air Bearing, 250 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.250B1
PIglide AT1 Linear Stage, Air Bearing, 250 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.250C1
PIglide AT1 Linear Stage, Air Bearing, 250 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Travel range 350 mm

A-121.350A1
PIglide AT1 Linear Stage, Air Bearing, 350 mm Travel Range, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Signal Period, 3-Phase Linear Motor, 48 V

A-121.350B1
PIglide AT1 Linear Stage, Air Bearing, 350 mm Travel Range, Absolute Encoder, 1 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

A-121.250C1
PIglide AT1 Linear Stage, Air Bearing, 250 mm Travel Range, Linear Encoder with A/B Quadrature Signal Transmission, 50 nm Sensor Resolution, 3-Phase Linear Motor, 48 V

Alternate TTL encoder resolutions are available on request.