

PIglide AT3 Linear Stage with Air Bearings

High Performance Nanopositioning Stage



A-123

- Ideal for scanning applications or high-precision positioning
- Cleanroom compatible
- Size of the motion platform 210 mm × 210 mm
- Travel ranges 50 mm to 750 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, and the high-capacity bearings can support payloads up to 60 kg. The laterally opposed, actively preloaded air bearing design in this model allows mounting in any orientation.

Accessories and options

- Encoder
- PIglide Filter and Air Preparation Kits
- Single and multi-axis motion controller
- Pneumatic lock/unlock option
- XY setups and individual configurations
- Cable track variations
- Options with counterweight for vertical (Z) orientation
- Customizations available
- 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.

Motion	Unit	Tolerance	A-123.050A1	A-123.050B1	A-123.100A1	A-123.100B1	A-123.200A1	A-123.200B1	A-123.350A1	A-123.350B1
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		50	50	100	100	200	200	350	350
Acceleration in X, unloaded	m/s ²	Max.	30	30	30	30	30	30	30	30
Maximum velocity in X, unloaded	mm/s		1000	1000	1000	1000	1000	1000	1000	1000
Straightness error in Y (straightness)	μm	Max.	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.5	±0.5
Straightness error in Z (flatness)	μm	Max.	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.5	±0.5
Angular error around Y (pitch)	μrad	Max.	±5	±5	±5	±5	±7.5	±7.5	±7.5	±7.5
Angular error around Z (yaw)	μrad	Max.	±5	±5	±5	±5	±7.5	±7.5	±7.5	±7.5

Positioning	Unit	Tolerance	A-123.050A1	A-123.050B1	A-123.100A1	A-123.100B1	A-123.200A1	A-123.200B1	A-123.350A1	A-123.350B1
Positioning accuracy in X, calibrated	µm	Typ.	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3
Positioning accuracy in X, uncalibrated	µm	Typ.	±1.5	±1.5	±1.5	±1.5	±2	±1.5	±3	±1.5
Bidirectional repeatability in X	µm	Typ.	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Reference switch			Encoder index	—	Encoder index	—	Encoder index	—	Encoder index	—
Limit switches			Hall effect	—	Hall effect	—	Hall effect	—	Hall effect	—
Integrated sensor			Incremental linear encoder	Absolute linear encoder	Incremental linear encoder	Absolute linear encoder	Incremental linear encoder	Absolute linear encoder	Incremental linear encoder	Absolute linear encoder
Sensor signal			Sin/cos, 1 V peak-peak	BiSS-C	Sin/cos, 1 V peak-peak	BiSS-C	Sin/cos, 1 V peak-peak	BiSS-C	Sin/cos, 1 V peak-peak	BiSS-C
Sensor signal period	µm		20	—	20	—	20	—	20	—
Sensor resolution	nm		4.88	1	4.88	1	4.88	1	4.88	1

Drive Properties	Unit	Tolerance	A-123.050A1	A-123.050B1	A-123.100A1	A-123.100B1	A-123.200A1	A-123.200B1	A-123.350A1	A-123.350B1
Drive type			Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor
Nominal voltage	V		48	48	48	48	48	48	48	48
Peak voltage	V		80	80	80	80	80	80	80	80
Nominal current, RMS	A	Typ.	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Peak current, RMS	A	Typ.	15	15	15	15	15	15	15	15
Drive force in positive direction of motion in X	N	Typ.	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
Drive force in negative direction of motion in X	N	Typ.	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
Peak force in positive direction of motion in X	N		298	298	298	298	298	298	298	298
Peak force in negative direction of motion in X	N		298	298	298	298	298	298	298	298
Force constant	N/A		19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Resistance phase-phase	Ω	Typ.	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Inductance phase-phase	mH		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Back EMF phase-phase	V·s/m	Max.	16	16	16	16	16	16	16	16
Pole pitch N-N	mm		30	30	30	30	30	30	30	30

Mechanical Properties	Unit	Tolerance	A-123.050A1	A-123.050B1	A-123.100A1	A-123.100B1	A-123.200A1	A-123.200B1	A-123.350A1	A-123.350B1
Permissible push force in Y	N	Max.	205	205	205	205	205	205	205	205
Permissible push force in Z	N	Max.	410	410	410	410	410	410	410	410
Permissible torque in θX	N·m	Max.	25	25	25	25	25	25	25	25
Permissible torque in θY	N·m	Max.	10	10	10	10	10	10	10	10
Moved mass in X, unloaded	g		5000	5000	5000	5000	5000	5000	5000	5000
Guide			Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load	Air bearing with air pre-load
Overall mass	g		14000	14000	15500	15500	18000	18000	21500	21500
Material			Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel

Miscellaneous	Unit	Tolerance	A-123.050A1	A-123.050B1	A-123.100A1	A-123.100B1	A-123.200A1	A-123.200B1	A-123.350A1	A-123.350B1
Operating temperature range	°C		15 to 25	15 to 25	15 to 25	15 to 25	15 to 25	15 to 25	15 to 25	15 to 25
Connector			D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)
Sensor connector			D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)
Operating pressure	kPa		515 to 585	515 to 585	515 to 585	515 to 585	515 to 585	515 to 585	515 to 585	515 to 585
Air consumption	L/min	Max.	28	28	28	28	28	28	28	28
Air quality			Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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
Recommended controllers / drivers			A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x

Motion	Unit	Tolerance	A-123.500A1	A-123.500B1	A-123.750A1	A-123.750B1
Active axes			X	X	X	X
Travel range in X	mm		500	500	750	750
Acceleration in X, unloaded	m/s ²	Max.	30	30	30	30
Maximum velocity in X, unloaded	mm/s		1000	1000	1000	1000
Straightness error in Y (straightness)	µm	Max.	±0.75	±0.75	±1.5	±1.5
Straightness error in Z (flatness)	µm	Max.	±0.75	±0.75	±1.5	±1.5
Angular error around Y (pitch)	µrad	Max.	±10	±10	±12.5	±12.5
Angular error around Z (yaw)	µrad	Max.	±10	±10	±12.5	±12.5

Positioning	Unit	Tolerance	A-123.500A1	A-123.500B1	A-123.750A1	A-123.750B1
Positioning accuracy in X, calibrated	µm	Typ.	±0.5	±0.5	±0.5	±0.5
Positioning accuracy in X, uncalibrated	µm	Typ.	±3.5	±1.5	±5	±1.5
Bidirectional repeatability in X	µm	Typ.	0.2	0.2	0.2	0.2
Reference switch			Encoder index	—	Encoder index	—
Limit switches			Hall effect	—	Hall effect	—
Integrated sensor			Incremental linear encoder	Absolute linear encoder	Incremental linear encoder	Absolute linear encoder
Sensor signal			Sin/cos, 1 V peak-peak	BiSS-C	Sin/cos, 1 V peak-peak	BiSS-C
Sensor signal period	µm		20	—	20	—
Sensor resolution	nm		4.88	1	4.88	1

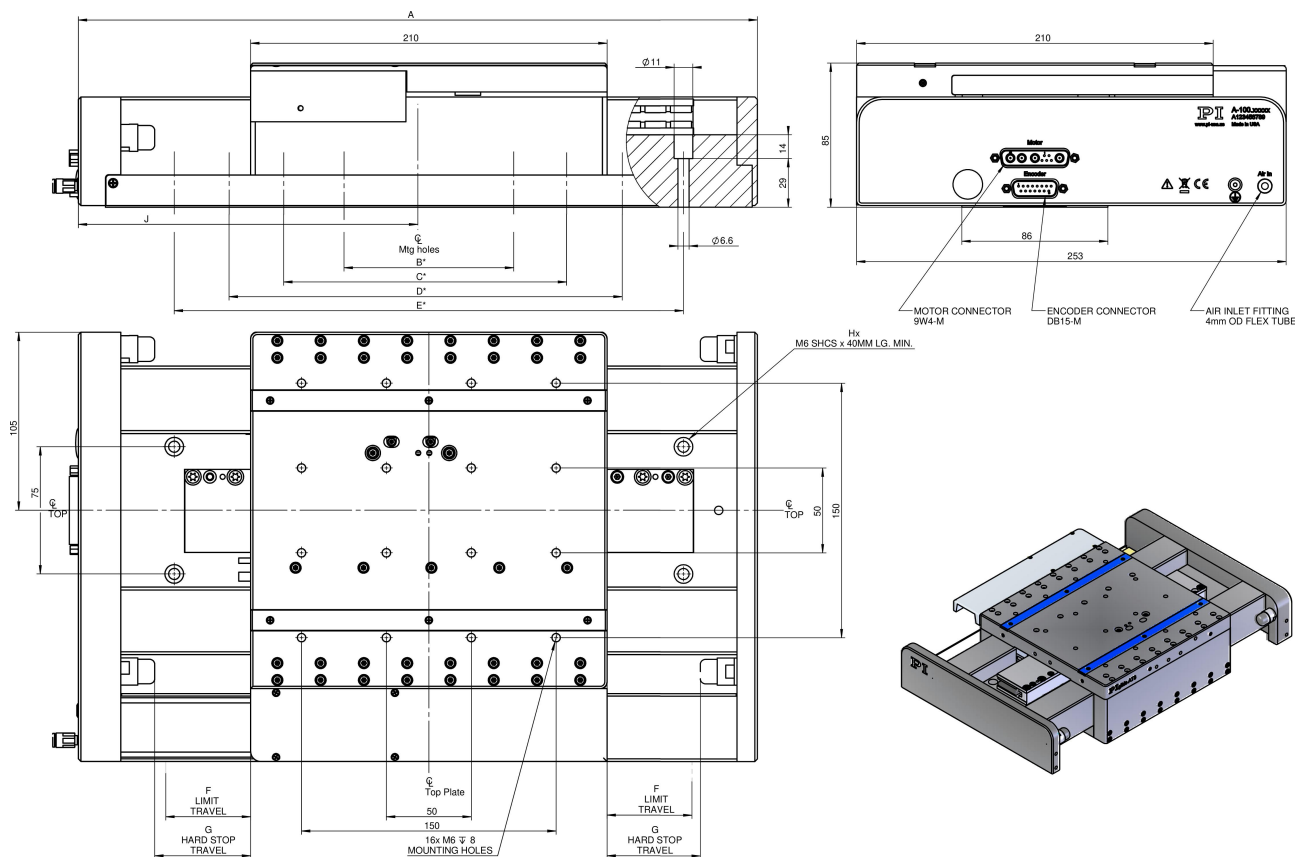
Drive Properties	Unit	Tolerance	A-123.500A1	A-123.500B1	A-123.750A1	A-123.750B1
Drive type			Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor	Ironless 3-phase linear motor
Nominal voltage	V		48	48	48	48
Peak voltage	V		80	80	80	80
Nominal current, RMS	A	Typ.	4.4	4.4	4.4	4.4
Peak current, RMS	A	Typ.	15	15	15	15
Drive force in positive direction of motion in X	N	Typ.	87.5	87.5	87.5	87.5
Drive force in negative direction of motion in X	N	Typ.	87.5	87.5	87.5	87.5
Peak force in positive direction of motion in X	N		298	298	298	298
Peak force in negative direction of motion in X	N		298	298	298	298
Force constant	N/A		19.9	19.9	19.9	19.9
Resistance phase-phase	Ω	Typ.	3.6	3.6	3.6	3.6
Inductance phase-phase	mH		1.2	1.2	1.2	1.2
Back EMF phase-phase	V·s/m	Max.	16	16	16	16
Pole pitch N-N	mm		30	30	30	30

Mechanical Properties	Unit	Tolerance	A-123.500A1	A-123.500B1	A-123.750A1	A-123.750B1
Permissible push force in Y	N	Max.	205	205	205	205
Permissible push force in Z	N	Max.	410	410	410	410
Permissible torque in Θ_X	N·m	Max.	25	25	25	25
Permissible torque in Θ_Y	N·m	Max.	10	10	10	10
Moved mass in X, unloaded	g		5000	5000	5000	5000
Guide			Air bearing with air preload	Air bearing with air preload	Air bearing with air preload	Air bearing with air preload
Overall mass	g		25000	25000	32000	32000
Material			Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel

Miscellaneous	Unit	Tolerance	A-123.500A1	A-123.500B1	A-123.750A1	A-123.750B1
Operating temperature range	°C		15 to 25	15 to 25	15 to 25	15 to 25
Connector			D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)	D-sub 9W4 (m)
Sensor connector			D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)
Operating pressure	kPa		515 to 585	515 to 585	515 to 585	515 to 585
Air consumption	L/min	Max.	28	28	28	28
Air quality			Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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	Clean (filtered up 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
Recommended controllers / drivers			A-81x, A-82x	A-81x, A-82x	A-81x, A-82x	A-81x, A-82x

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

Drawings / Images



MODEL	A	B*	C*	D*	E*	F	G	Hx	J	Moving Mass	Total Mass
A-123.050	350				250	25	31.5	4	181.5	5kg	14kg
A-123.100	400	100			300	50	56.5	8	206.5	5kg	15.5kg
A-123.200	500	100			400	100	106.5	8	256.5	5kg	18kg
A-123.350	650	100	325		550	175	181.5	12	331.5	5kg	21.5kg
A-123.500	800	100	300	500	700	250	256.5	16	406.5	5kg	25kg
A-123.750	1050	100	400	700	1000	375	381.5	16	531.5	5kg	32kg

* Mounting holes symmetric about Φ located at "J"

A-123, dimensions in mm

Order Information

A-123.050A1

Pliglide AT3 linear stage; air bearings; 50 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 μ m sensor signal period; ironless 3-phase linear motor, 48 V

A-123.050B1

Pliglide AT3 linear stage; air bearings; 50 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V

Order Information

A-123.100A1

Pliglide AT3 linear stage; air bearings; 100 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 µm sensor signal period; ironless 3-phase linear motor, 48 V

A-123.100B1

Pliglide AT3 linear stage; air bearings; 100 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V

A-123.200A1

Pliglide AT3 linear stage; air bearings; 200 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 µm sensor signal period; ironless 3-phase linear motor, 48 V

A-123.200B1

Pliglide AT3 linear stage; air bearings; 200 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V

A-123.350A1

Pliglide AT3 linear stage; air bearings; 350 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 µm sensor signal period; ironless 3-phase linear motor, 48 V

A-123.350B1

Pliglide AT3 linear stage; air bearings; 350 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V

A-123.500A1

Pliglide AT3 linear stage; air bearings; 500 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 µm sensor signal period; ironless 3-phase linear motor, 48 V

A-123.500B1

Pliglide AT3 linear stage; air bearings; 500 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V

A-123.750A1

Pliglide AT3 linear stage; air bearings; 750 mm travel range; incremental linear encoder with sin/cos signal transmission, 20 µm sensor signal period; ironless 3-phase linear motor, 48 V

A-123.750B1

Pliglide AT3 linear stage; air bearings; 750 mm travel range; absolute linear encoder with BiSS-C signal transmission, 1 nm sensor resolution; ironless 3-phase linear motor, 48 V