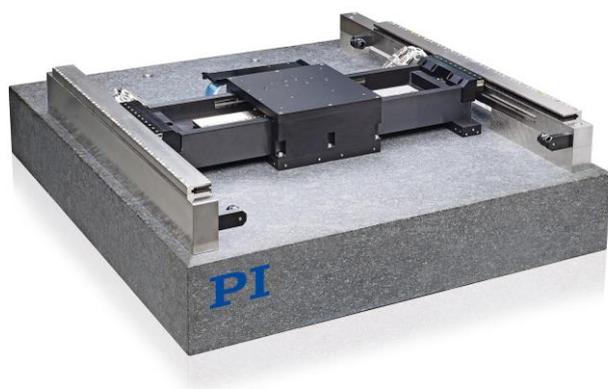


PIglide HS Gantry-Type Planar XY Stage with Air Bearing

Planar XY Scanner with 1 nm Resolution



A-322 XY Linear Stage with Air Bearings, Base Model Shown

A-322

- Three performance classes: Base, Plus, and Ultra
- Ideal for scanning applications or high-precision positioning
- Cleanroom compatible
- Travel ranges to 500 mm × 1000 mm
- Load capacity to 245 N

Resolution to 1 nm, Velocity to 2 m/s

Gantry-Type Planar XY Positioning System with 3 / 4 Linear Motors

The PIglide HS A-322 is a granite-based planar XY scanner with absolute encoders, air bearings and 3-phase linear motors. The air bearings are vacuum preloaded (internally generated or external option) and guarantee contact- and friction-free motion with the highest accuracy and reliability.

The positioning system was designed to both maximize the throughput and ensure the highest precision. The flexible coupling of the bridge axis to the gantry axis allows lateral decoupling without sacrificing the stiffness of the system. The A-322 is coupled with industry-leading controllers and drive modules from ACS that offer superior servo performance, advanced control algorithms to improve dynamic performance and error compensation, and a wide suite of software development tools.

The A-322 series is a starting point for further adaptations. Critical core components such as linear motors, measuring systems, and air bearing assemblies have already been developed, tested, and have proven their capabilities. Depending on the application and requirements of the customer a variant of the A-322 series forms the ideal starting point for a tailor-made, ultraprecise solution.

3 performance / price classes are offered

- Base: XY gantry design with 3 standard linear motors.
- Plus: XY gantry design with 3 liquid-cooled, high-performance linear motors. For applications with a high duty cycle and high accelerations.
- Ultra: XY gantry design with 4 liquid-cooled, high-performance linear motors. Both the X and the Y axis have 2 linear motors and 2 linear encoders each. This design improves the positioning accuracy, repeatability, and error compensation, in particular for loads with large dimensions.

Absolute encoder – no referencing

Absolute encoders supply explicit position information that enables immediate determination of the position. This means that referencing is not required during power-up, which increases efficiency and safety during operation.

PIMag® 3-phase linear motor magnetic direct drive

3-phase magnetic direct drives do not use mechanical components in the drivetrain, they transmit the drive force to the motion platform directly and without friction. The drives reach high velocities and accelerations. Ironless motors are particularly suitable for positioning tasks with the highest demands on precision because there is no undesirable interaction with the permanent magnets. This allows smooth running even at the lowest velocities and at the same time, there is no vibration at high velocities. Nonlinearity in control behavior is avoided and any position can be controlled easily. The drive force can be set freely.

Accessories and options

- PIGlide Filter and Air Preparation Kits
- Additional axes
- Machine bases
- Base plates made of granite and systems for reducing vibration
- Suitable retainer for additional positioners such as tip/tilt platforms or 6-axis positioners with piezo drives.

Long lifetime, cleanroom suitable drag chains

The A-322 has high-quality, long-lasting ribbon cables and pneumatic hoses. Extensive research and development has resulted in an optimized cable management system that enables millions of maintenance-free cycles. Teflon coating ensures low particle formation.

Application fields

PIGlide positioning systems are ideally suited for many high-precision applications, such as metrology, photonics, and precision scanning as well as 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.

Ordering Information

A-322 Base

PIGlide HS – Gantry-type planar XY stage / scanner, air bearing guides, 3 x 3-phase linear motors, 3 absolute linear encoders, travel range to 500 mm x 500 mm (please specify in the request)

A-322 Plus

PIGlide HS –Gantry-type planar XY stage / scanner, air bearing guides, 3 x 3-phase, high-performance liquid cooled linear motors, 3 absolute linear encoders, travel range to 500 mm x 1000 mm (please specify in the request)

A-322 Ultra

PIGlide HS –Gantry-type planar XY stage / scanner, air bearing guides, 4 x 3-phase, high-performance liquid cooled linear motors, 4 absolute linear encoders, travel range to 500 mm x 750 mm (please specify in the request)

Specifications: A-322 Gantry-Type Planar XY Air Bearing Stage Family

XY Gantry System Model		A-322 Base	A-322 Plus	A-322 Ultra
Precision / dynamics level		Standard/Standard	Standard/High	High/High
Motion	Unit			
Travel ranges: Bridge Axis (BA) Gantry Axis (GA), any combination	mm	350, 500 (BA) 350, 500 (GA)	350, 500 (BA) 350, 500, 750 (GA)	350, 500 (BA) 350, 500, 750, 1000 (GA)
Size of the motion platform	mm	250 × 268	250 × 268	250 × 318
Guide		Air bearing, vacuum preload	Air bearing, vacuum preload	Air bearing, vacuum preload
Number of 3 phase ironless motors		1× Bridge 2× Gantry Axis	1× Bridge 2× Gantry Axis	2× Bridge 2× Gantry Axis
Number of linear encoders		1× Bridge 2× Gantry Axis	1× Bridge 2× Gantry Axis	2× Bridge 2× Gantry Axis
Encoder resolution	nm	1	1	1
Encoder type		Absolute, BiSS-C, Steel Scale	Absolute, BiSS-C, Steel Scale	Absolute, BiSS-C, Steel Scale
Load capacity ⁽¹⁾	kg	15	20	30
Bidirectional repeatability ⁽²⁾	µm	±0.1	±0.1	±0.05
Positioning accuracy, calibrated ⁽²⁾	µm	±0.35	±0.35	±0.2
Straightness ⁽²⁾	µm	1	1	0.5
Flatness	µm	2	2	2
Pitch	µrad	10	10	10
Yaw ⁽²⁾	µrad	2	2	2
XY orthogonality	µrad	5	5	2
Max. velocity, unloaded ⁽³⁾	m/s	0.5	1	1
Max. acceleration, unloaded ⁽³⁾	m/s ²	10	20	20/15 (Bridge/Gantry Axis)
Position stability	nm	±30	±30	±30
Moved mass: Bridge Axis; Gantry Axis (for 350/500mm bridge)	kg	14; 40/44	14; 53/56	14; 70/75
Motor Specifications	Unit			
Nominal voltage: Bridge/Gantry Axis	V DC	70/70	70/70	70/70
Peak voltage: BA/GA	V DC	300/300	300/300	300/300
Nominal force: BA/GA	N	87/87	140/140	87/140
Peak force: BA/GA	N	300/300	480/480	300/480
Force constant, RMS: BA/GA	N/A	19.9/19.9	27.5/27.5	19.9/27.5
Nominal current, RMS: BA/GA	A	4.4/4.4	5.1/5.1	4.4/5.1
Peak current, RMS: BA/GA	A	15/15	17.5/17.5	15/17.5
Back EMF phase-phase: BA/GA	V·s/m	16/16	22.5/22.5	16/22.5
Resistance phase-phase: BA/GA	Ω	3.6/3.6	2.6/2.6	3.6/2.6
Inductance phase-phase: BA/GA	mH	1.2/1.2	2.0/2.0	1.2/2.0
Cooling System		-	Water, 20°C, 2 to 3 l/min	Water, 20°C, 2 to 3 l/min

⁽¹⁾ @550 kPa air bearing operating pressure. Payload center of gravity must be within 50 mm of surface of motion platform.

⁽²⁾ Requires controller-based error compensation. Stage must be ordered with a PI / ACS controller. Values assume short time duration and do not consider long-term effects of thermal drift on the stage.

⁽³⁾ Depends on the motor selected, controller performance, duty cycle, load, and other application-specific parameters. Acceleration, duty cycle, and motion profile should be agreed with a PI application engineer.

⁽⁴⁾ Overall weight depends on the customer-specific granite base.

Example of values for a travel range of 500 mm × 500 mm. Contact PI for the exact specifications with other travel ranges.

Miscellaneous	A-322 (all models)
Operating pressure	550 ±35 kPa (80 ±5 psi)
Air consumption	56 l/min (2 SCFM) / 112 l/min (4 SCFM)- with external / internal vacuum supply
Vacuum	74.66 kPa (560 mmHg), 14 l/min (0.5 SCFM)
Air quality	Clean (filtered to <=1.0 µm) - ISO 8573-1 Class 1; Oil free - ISO 8573-1 Class 1; Dry (-15 °C dew point) - ISO 8573-1 Class 3
Materials	Granite base; Hard coat aluminum; Nickel-plated steel side rails; Mounting hardware made of stainless steel