A-361 PIglide Air Bearing XY-Theta Stage

High Performance, Cleanroom Compatible, Low Profile

- X&Y Travel range 5 mm
- Theta (Θz) Travel ±1°
- Load capacity to 3 kg
- Ø200mm Table
- Frictionless
- 40mm overall height
- Integral Vacuum Chuck
- Lock-down Capable

Product Overview

The PIglide A-361.AA100 is a direct-drive air-bearing-guided X-Y-Theta stage. The upper motion platform moves in the X, Y, and Theta-Z directions as a single solid body (i.e. parallel kinematics). This stage offers ultra-precision in low profile format. The combination of the non-contact components results in a frictionless motion platform that offers the highest performance, quality, and lifetime. The stage features lock-down capability for the best-possible in-position stability.
When the A-361 is mounted on an A-523, ZTT stage, this results in allow profile 6DOF system.

Accessories and options

- Air Filter kits
- Multi-axis motion controllers
- Integral vacuum chuck

Application fields

The stage is ideally suited for many high precision applications such as wafer inspection, photonics alignment, optics positioning, flat panel inspection, direct-write lithography, and µLED fabrication. The noncontact design is ideal for cleanroom applications.

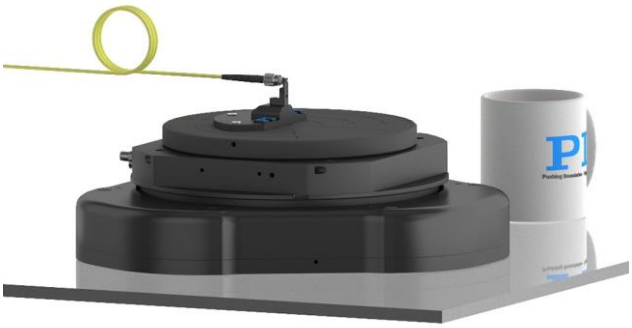

Fig 1. 6-Axis combination of the A-361 and A-523 Z-tip/tilt stage set up for photonics alignment. Mug for size comparison

Ordering Information

A-361.AA100

PIglide XY-Theta air bearing stage, 200 mm motion platform diameter, 5 mm X&Y travel, 2° Theta Travel, Incremental SIN/COS Encoders, Voice-Coil (1-phase) Direct Drive

Specifications

Motion and Positioning	A-361.AA100	Unit	Tolerance
Active axes	X, Y, Theta (Θz)		
Travel range in X & Y [1]	±2.5	mm	Max.
Travel range in Theta (Θz) [1]	±1	°	Max.
X&Y Pitch	25	µrad	Max.
X&Y Yaw	2	µrad	Max.
X&Y Accuracy, calibrated [2]	±0.2	µm	Max.
X&Y Bi-directional Repeatability	±0.1	µm	Max.
X&Y Minimum incremental motion[3]	< 30	nm	typ.
Θz Accuracy, calibrated [2]	±5	µrad	Max.
Θz Bi-directional repeatability	±2	µrad	Max.
Θz Minimum incremental motion[3]	< 0.5	µrad	Typ.

Mechanical properties	A-361.AA100	Unit	Tolerance
Load capacity in Z [4]	30	N	max.
Overall mass	3.4	kg	typ.
Moved Mass	1.4	kg	typ.
Guide type	Air bearing, with lock-down capability		

Drive properties (per motor)	A-361.AA100	Unit	Tolerance
Drive type	Linear motor, brushless, 1-phase (voice-coil)		
Number of motors	X Axis: 1 Y Axis: 2		
Intermediate circuit voltage, effective	24, nominal 48, max.	V DC	
Peak current	1.2	A	Max
Nominal current	0.4	A	Max
Peak force	19.2	N	Max
Nominal force	6.4	N	Max
Force constant	16	N/A	typ.
Resistance phase-phase	26	Ω	typ.
Inductivity phase-phase	8.5	mH	typ.
Back EMF phase-phase	16	V·s/m	typ.

Feedback	A-361.AA100
Integrated sensor	Incremental, Optical. 3x encoders, specs below per encoder
Sensor signal	Analog 1 Vp-p SIN/COS, Differential
Sensor resolution	80µm signal period, 20nm with 4096x Interpolation
Reference/Index Mark	

Miscellaneous	A-361.AA100
Operating pressure [5]	70±5 psi (482±35 kPa)
Air consumption	<1.0 SCFM (28 SLPM)
Air quality	Clean (unfiltered 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
Cabling interface	HD 44-pin male connector
Air Inlet	4mm OD one-touch air fitting
Vacuum Inlet (for integral chuck)	6mm OD one-touch air fitting

[1] The travel ranges of the individual coordinates (X, Y, θz) are interdependent. The data for each axis in this table shows its maximum travel range, where all other axes are held stationary and are located at their reference position.

[2] Calibrated accuracy can only 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.

[3] Minimum incremental performance is directly related to system stability (jitter) performance. This performance is dependent on the servo drive used. Performance may be improved by using ServoBoost+ on an ACS SPiiPlus controller.

[4] Assumes an air bearing operating pressure of 70 psi (480 kPa). The stage is designed for horizontal operation only.

[5] To protect the stage against damage, it is recommended to connect an air pressure sensor to the E-Stop input of the controller.

Drawings and Images