Engineered Systems Capabilities

Precision components, stable control and a great deal of experience in engineering are essential for high-precision complex motion and positioning solutions. PI is a supplier of technologically sophisticated drive components and high-precision positioners and also offers all levels of integration up to the turnkey solution.

Engineering services have been a part of PI's core business for many years. Complete solutions, fitting seamlessly into existing processes, advance automation in major research installations as well as manufacturing and inspection processes for chip production or photonics packaging.

Complex multi-axis designs and fully integrated systems are available, like this assembly system for photonics packaging

Core Competences

- Application support and consulting for motion and positioning applications
- Reliable and prompt series production even for large quantities
- Economic design
- Commissioning of turnkey solutions
- Complex multi-axis designs and parallel kinematic robotics
- Broad spectrum of technologies: Drive, guide, and sensor technologies
- In-house motion control electronics and software platform
- Customized software integration such as Epics, LabVIEW, Tango, ...

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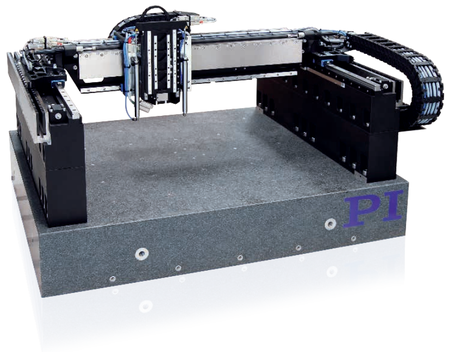
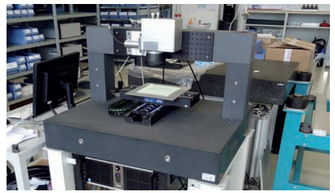


Gantry Systems

LASER MATERIAL PROCESSING, WAFER INSPECTION AND ELECTRONICS ASSEMBLY

Throughput, Precision and Reliability

Solutions for Motion-Centric Industrial Automation



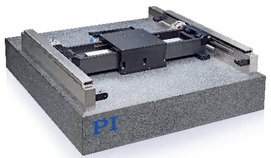
XY and Portal Systems from PI

Positioning and motion tasks in industrial automation such as those in assembly, semiconductor manufacturing, mechanical engineering, laser material processing, inspection systems or in additive manufacturing demand solutions that need to be robust and reliable.

PI offers a broad range of in-house drive and motion control technologies such as EtherCAT-based industrial controllers by ACS, where PI holds the major shares, or air bearing technology for optimized guiding accuracy. System engineering for customization and a global service and training network are added-value offers. PI is therefore the ideal partner for motion-centric industrial solutions.

Smarter Motion & Positioning

ACS is a worldwide leading developer and manufacturer of modular motion controllers for multi-axis drive systems. The partnership with ACS has put PI into a position to supply customized complete systems for industrial applications with the highest demands on precision and dynamics and also to add its extensive experience in high-end projects for industrial applications intended to combine precision, productivity, and reliability all over the world.



A-322 Piglide XY stage with ironless linear motors and air bearing technology

Air bearing technology provides

- Frictionless high-precision positioning
- Excellent velocity stability
- Excellent guiding accuracy up to 5 µrad/100 mm
- Optional active yaw control for gantries
- Direct drive linear & torque motors for smooth, high speed scanning

Experience with matters for OEMs. 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.

Simultaneous 2D Processing

High Accuracy and Ultimate Throughput

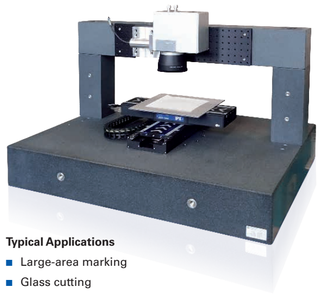
Together with SCANLAB and ACS, PI offers a motion control solution for laser material processing, which combines the laser beam scanner and sample scanner, provides the ability to mark and process large pieces with very high precision and an ultimate throughput.

Key Advantages

- Large field of view, wide range of XY stages
- Significantly increased throughput (up to 41% compared with conventional systems)
- No stitching errors
- Higher precision
- Smooth processing with high dynamics and no stage vibrations high speed scanning

Stiching motion

Simultaneous movement



Typical Applications

- Large-area marking
- Glass cutting
- Drilling of large-area PCBs

No Stitching Errors

Piecewise processing (stitching) of large workpieces is prone to marking displacement near the edges of adjacent fields. By combining the motion of the scan head with the motion of the XY stage, stitching errors are eliminated and in addition the process time is shortened significantly (image by SCANLAB).

Powered by ACS and SCANLAB

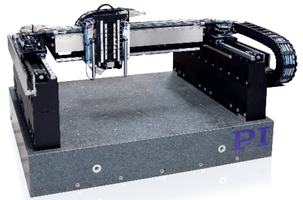
The jointly developed syncAXIS control software enables simultaneous control of a 2D scan head and a 2D scanning stage equipped with high-dynamic magnetic linear drives. The combined system substantially increases the image field size for wide-area marking, and in addition provides superior capabilities for cutting of glass, drilling of large PCBs and laser micro-machining. Unlike tiled processing, this innovative laser processing system with an extended image field can significantly slash process times, thereby delivering enhanced productivity and cost reduction in manufacturing.

ACS MOTION CONTROL

SCANLAB innovators for industry

PIMag® Gantry System

High-Dynamic Precision Positioning in 3 Axes



- Vertical axis with pneumatic counter weight
- 508 mm x 508 mm x155 mm travel range
- Ironless linearmotors
- Direct measuring incremental linear encoders
- Controlled by ACS Motion Control

Preliminary Specifications				Unit	Tolerance
Active axes	X	Y	Z		
Motion and positioning					
Travel range	508	508	155	mm	
Integrated sensor	Optical linear encoder, incremental	Optical linear encoder, incremental	Optical linear encoder, incremental		
Sensor resolution	0.002	0.002	0.002	µm	
Unidirectional repeatability	0.5	0.5	0.5	µm	typ.
Max. velocity*)	3000	3000	2000	mm/s	typ.
Max. acceleration**)	30	30	20	m/s²	typ.
Mechanical properties					
Bearings	Ball bearing	Ball bearing	Cross roller bearings		
Load capacity	5			kg	max.
Motor type	Ironless linear motor	Ironless linear motor	Ironless linear motor with pneumatic counterbalance		
Miscellaneous					
Feedback	20 µm sin/cos	20 µm sin/cos	20 µm sin/cos		
Material of base	Granite				

* Maximum speed based on stage capability. Maximum application velocity may be limited by system data rate and system resolution. Maximum speed of the z-axis is specified without pneumatic counterbalance.
** No load. Maximum acceleration of the z-axis is specified without pneumatic counterbalance.