Precision Motion Systems for Flat Panel Display Processing
High Precision Motion Systems for Flat Panel Display Processing

Anorad precision positioning systems help FPD process tool manufacturers achieve superior results

Special considerations for FPD process equipment builders
- Various system configurations for Gen 3 through Gen 7 substrate sizes
- Systems available with over 2 meters of X and Y travel
- Class 10 cleanroom and vacuum compatible positioning platforms
- Production ready systems optimized for integration into FPD process tools
- Korean manufacturing facility to serve Asia-Pacific customers

High precision linear motor based motion control
- Micron-level accuracy and sub-micron repeatability over full travel lengths
- Nanometer-level feedback for repeatable results and tight process control
- A variety of linear bearing technologies for optimal system performance

Integration of value-added subsystems to facilitate FPD processing
- Sophisticated pre-engineered multi-axis servo control packages
- Custom engineering capabilities including machine bases, frames, enclosures as well as vacuum chucks, vibration isolation and mini-environments
- Graphical user interface (GUI) hardware and software from Rockwell Automation using industry standard SECS II, OPC and other communication interfaces
- Safety solution hardware and electronics integrated with the motion control system

Anorad Builds Cleanroom and Vacuum Compatible Systems

Ultra Precision Gantry

VersaView™ Touch Screen Flat Panel Monitors

Anorad Builds Cleanroom and Vacuum Compatible Systems

Multi-function Mobile Devices
Anorad motion platforms offer the precision motion control that enables many critical FPD processes

Automated Optical Inspection Applications
- Thin Film Transistor (TFT) overlay metrology
- RGB color filter thickness testing
- ITO, SiO, photoresist and critical dimension (CD) inspection

Precise motion control for inkjet printing applications
- Electroluminescent (EL) devices
- Drop on demand (DoD) applications
- Active Matrix Organic Light Emitting Diodes (AMOLEDs)
- Polymer Light Emitting Diodes (P-LEDs)

Additional FPD Precision Motion Applications
- Precision spacer ball placement
- Bonding FPD leads to the driver electronics board
- Material handling of displays throughout the production process
Gen 3 Moving Panel XY Platform

**FP1020 Features**
- Coplanar XY stage for superior accuracy
- 80 kg capacity
- Class 10 cleanroom approved
- Sub-micron repeatability
- 4 nm resolution available
- Hybrid bearing technology

Anorad’s Gen 3 and Gen 4 flat panel (FP) systems use a hybrid of bearing technologies
- Ultra-smooth zero-friction air bearings on the upper scanning axis for outstanding repeatability, resolution and velocity control
- Precision ground recirculating linear bearings on the lower stepping axis for high rigidity, load capacity and reduced cost

Gen 4 Moving Panel XY Platform

**FP1300 Features**
- Over 1 m X and Y travel
- 100 kg capacity
- Integral vibration isolation
- Sub-micron repeatability
- Velocity variation < 0.01%
- 500 mm/s velocity
- 10 m/s² acceleration
- Hybrid bearing technology

Gen 5 Stationary Panel XYZ Gantry

**Ultra Precision Gantry Features**
- Air bearing linear guides on X, Y and Z axes
- ±3.0 µm accuracy over 1.8 m of travel
- 50 nm mechanical resolution
- 200 nm position stability
- +/-1 arc-sec orthogonality
- Dual Y-axis motors & encoders for dynamic yaw control
- Class 10 cleanroom compatible
Vacuum Compatible E-beam XY Stage

**E-beam System Features**
- Low-outgassing materials for vacuum operation to $10^{-7}$ Torr
- Scalable for future substrate sizes
- Extremely low stray magnetic field design
- Stiff open frame stage ideal for inspection of transparent media

Large Travel Split-Axis Air Bearing Systems

**Split-Axis XY Features**
- Unique Gen 6 and Gen 7 machine designs simplify shipping and installation issues
- Independent X and Y axes for moving substrate applications (shown with Z-axes)
- Powerful dual motor Y-axis maximizes system throughput
- Class 10 cleanroom compatible
- Sub-micron repeatability
- 4 nm resolution available
Anorad Engineering Capabilities

Anorad is the foremost provider of flat panel display precision motion control solutions

Delivering outstanding value for FPD process equipment
- Industry-leading expertise in the design and manufacture of high precision, high-speed FPD positioning systems
- Solutions available for 6th and 7th generation substrates
- Advanced design knowledge of multi-axis positioning systems for cleanroom and vacuum compatible environments
- Integration of motion systems for non-contact automated optical inspection (AOI) applications

Sophisticated analytical engineering capabilities
- Finite element analysis (FEA) of mechanical systems
- Magnetic field analysis to minimize process interaction
- Motion profile optimization to maximize throughput
- Extensive testing services to verify system performance
- Global technical support maximizes equipment uptime

Custom Engineering Services
- 30 years of related experience serving semiconductor and electronics assembly OEMs
- Integration with the diverse line of Rockwell Automation industrial control and automation products
  - ViewAnyWare™ GUI hardware and software
  - Safety control solutions: light curtains, safety relays, interlocks and safety networks
- Korean manufacturing facilities
Anorad – Positioned to Deliver

The pioneer, Anorad has a technological heritage of definitive leadership in precision motion control. Ours is a proud history of firsts. We created the first commercial brushless linear servo motor, produced the original non-contact positioning system, and built the first sub-micron positioning systems on a production scale. With robust product lines and quick turn custom capabilities, we remain the world’s recognized leader in precision motion control – solving complex and critical problems, every day, for customers around the world.

Anorad is the precision motion control division of Rockwell Automation, the world’s largest company dedicated to automation. At Rockwell Automation, we deliver Complete Automation™ solutions through well known brands that customers have relied upon for years. No one offers more direct experience in engineering, operations, manufacturing, and support of the latest motion and automation solutions.

OEMs Prefer Anorad’s Insourcing™ Capabilities

The trust you put into your supply chain partners is critical to your success. That is why Anorad treats your outsourcing needs with a unique perspective. We prefer to call our infrastructure support Insourcing. Our competencies enhance your level of success, mainly because we truly become an extension of your organization. We help reduce your time to market because our whole organization is focused and dedicated to precision motion, a core element of your machine. We allow you to focus on the machine and process while our proven technologies reduce your exposure and risk.

By Insourcing Anorad’s capabilities you get more than just technology and expertise. We understand your special needs for risk management, logistics, confidentiality and allegiance during all business cycles.

So, don’t just outsource... Insource with Anorad and truly extend the value and capabilities of your organization.

The World Leader in Precision Motion Control

- 30 years of innovation
- Leading edge technology
- An OEM focused partner
- Standard and custom solutions
- Global support and manufacturing
- ISO certified World-class quality
Microglide™ Air Bearing Positioning Systems – Sub-micron positioning solutions for ultra-high precision applications.

High Performance Gantry – For pick and place, dispensing, optical inspection and automated assembly applications.

Vacuum Compatible Systems – Precision stages designed, assembled, and packaged for vacuum operation.

High Precision Positioning Stages – Single and multi-axis positioning stages for precision motion control systems.

Linear Servo Motors – The industry’s widest selection of brushless linear motors from the company that invented them.

Servo Controls – A comprehensive line of feature rich, DSP based servo controls and amplifiers for OEM applications.

Engineered-to-Order Systems – Specifically developed to meet your unique and exacting requirements.

Anocast Polymer Composite Bases – Vibration damping structures for precision motion platforms.

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