Nmark GCL

High-Performance Galvo Control

- Closed-loop, two-axis servo drive for Aerotech's AGV series scanners
- Infinite Field of View (IFOV) seamlessly combines AGV and servo motion to expand the scanner work area
- Full servo state control with "zero-tracking error" eliminates speed-related part distortion such as necking on circles and rounding of corners
- Position-based laser firing (PSO) with windowing maintains consistent spot spacing over a wide range of operating speeds
- External clock input for synchronization with mode-locked lasers
- Part-Speed Position Synchronized Output (PSO) included

Nmark GCL is optimized to drive AGV and AGV-HP series galvo scanners.

New Design Available!

We recommend the GL4 for all new applications.

The Nmark® GCL provides an optimized platform for controlling Aerotech's family of AGV scanners. Industry leading settling times, long-term thermal stability, and micron-level tracking accuracy are possible due to advanced features such as full state feed-forward, 192 kHz servo rates, and look-ahead-based velocity control.

High-Resolution Feedback

The AGV-HP has thermally stable feedback transducers with virtually no gain or offset drift. The Nmark GCL uses advanced interpolation electronics to provide up to 26-bits of effective resolution. Onboard real-time 2D calibration ensures accurate beam placement over the entire field of view.

Position Synchronized Output

The ability to accurately place a laser spot as a function of X/Y axis position is a key feature of Aerotech's linear position tables for laser processing applications (Figures 1 and 2). With the release of the Nmark GCL, this functionality is now available for scanner applications. The ability to accurately trigger the laser as a function of position removes the need to program mark, jump, and polygon delays, resulting in reduced programming complexity. By using the Position Synchronized Output functionality, scanner-based processes can now be programmed in the same fashion as traditional X/Y stage-based applications.

Remote Power Devices

Most competitive scanners have the power devices integrated directly into the head, along with the galvos and feedback devices. These power devices can inject considerable thermal energy into the scanner head causing drift in the feedback positions and changing offsets between the mirrors, all of which detract from marking accuracy. Some systems use PWM power stages to minimize heat input. However, this approach results in reduced tracking accuracy due to nonlinear effects that are present when the galvo motors and control currents reverse polarity. By moving the power stage out of the head, it is possible to use higher performing transistors to drive the galvos and the heat source is effectively removed from the scanner resulting in improved system accuracy (Figures 3 and 4).

Nmark GCL SPECIFICATIONS

Specifications	
Motor Supply	±40 VDC max
Control Supply	85-240 VAC; 50-60 Hz
Digital Inputs	Four Optically Isolated
Digital Outputs	Four Optically Isolated
Analog Inputs	One 16-Bit Differential; ±10 V
Analog Outputs	Two 16-Bit Single-Ended; ±10 V
Laser Outputs	Three Optically Isolated; 3 TTL
Emergency Stop Sense Input (ESTOP)	Standard; 24 V Opto-Isolated
Position Synchronized Output (PSO)	Standard: Two-axis PSO Three-axis Part-Speed PSO
Interpolated Feedback Output	Yes
FireWire®	Yes
Operating Temperature	0-50°C
Storage Temperature	-30-85°C
Weight	2.9 kg
Standards	CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

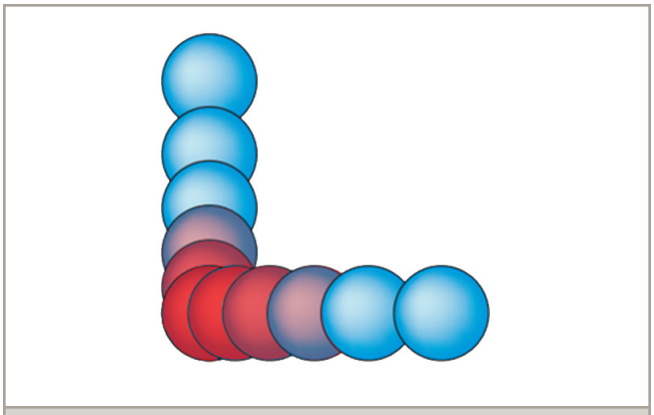


Figure 1. Laser spot placement without PSO. Notice the uneven overlap evident when changing direction which causes inconsistent energy delivery to the workpiece resulting in poor part quality.

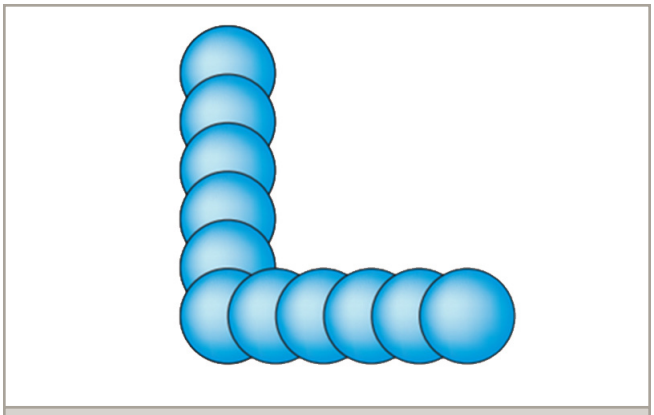


Figure 2. Laser spot placement with PSO. Notice the even overlap, even when changing direction, when Aerotech's PSO is applied. This results in consistent energy delivery and better part quality.

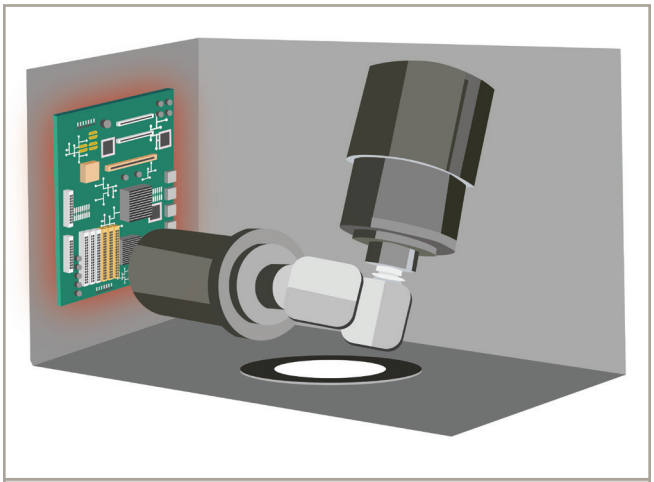


Figure 3. Competitive Galvo Scanner where the heat-dissipating electronics are placed in close proximity to the scanner mechanics. This packaging design creates thermal stability problems due to the power dissipated by the control electronics.

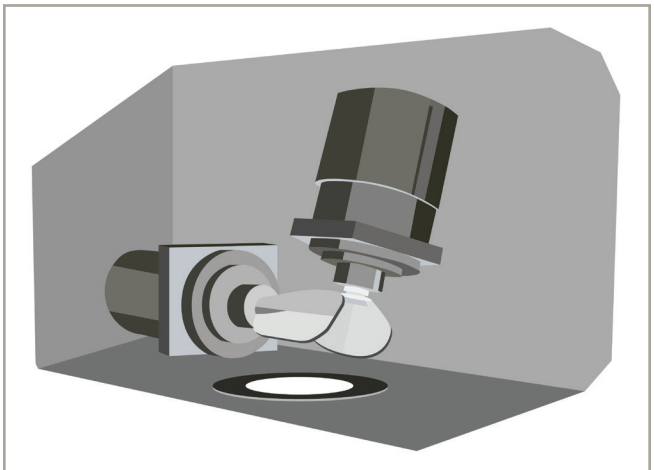
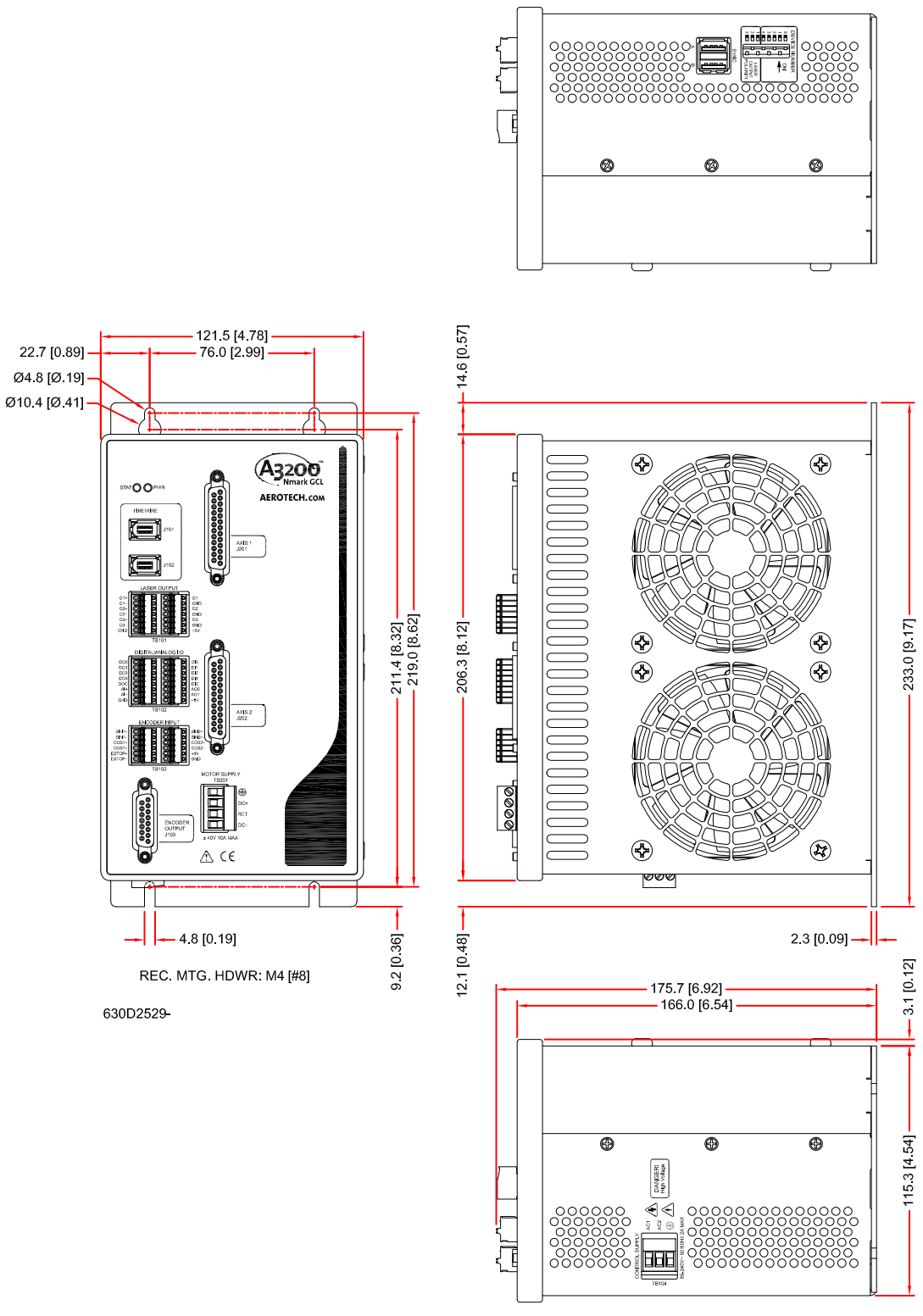


Figure 4. Aerotech's AGV Galvo Scanner where heat-dissipating electronics are removed from the scanner allowing for better thermal stability and higher-precision motion.

Nmark GCL DIMENSIONS



Nmark GCL ORDERING INFORMATION

Nmark GCL Series (Required)

NMARK-GCL	Dual linear stage amplifier designed to operate Aerotech's AGV family of scanners