Galvo Laser Scan Head
Linear Drive

Automation1 GL4

High-Performance Laser Scanning Solution with Advanced Features

The Automation1 GL4 is a high-performance, closed loop 2-axis linear servo drive for controlling our AGV laser scan heads. With an effective scanning resolution of greater than 24-bit and advanced features like Infinite Field of View (IFOV), Position Synchronized Output (PSO) and Enhanced Scanner Control (ESC), the GL4 stands out as a superior scan head drive solution for your most demanding high-precision applications.

Automation1

The GL4 is a part of the user-friendly Automation1 motion control platform, which includes the following:

- **Development Software**
- **Controls**
- **Motor Drives**
- **Fiber-Optic HyperWire® Communication Bus**

KEY FEATURES:

- **200 KHZ FULL SERVO RATE** control eliminates speed-related part distortion such as necking on circles & rounding of corners
- Dual linear amplifier design drives a single 2-axis laser scan head like the AGV-HPO, enabling **>24 BIT EFFECTIVE RESOLUTION** & **SUB-MICRON IN-POSITION STABILITY**
- On-board **REAL-TIME 2D CALIBRATION** for planar distortion & power correction
- Optional **ENHANCED SCANNER CONTROL (ESC)** enables real time trajectory optimization for the most demanding trajectories
- **INFINITE FIELD OF VIEW (IFOV)** combines standard linear & rotary motion to produce scanner trajectories with single-digit micron accuracy over most work area sizes
- PSO allows for commanded **LASER PULSES AT UP TO 12.5 MHZ** & latencies as low as 80 nanoseconds, enabling real spatial domain pulse control

AUTOMATION1 GL4 GENERAL SPECIFICATIONS

FEATURE	DESCRIPTION
Motor Style	±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)[1]	Standard: Three-axis PSO, Three-axis Part-Speed PSO
Enhanced Scanner Control (ESC)[2]	Optional: ESC-specific drive hardware & firmware configuration enables ESC feature.
Interpolated Feedback Output	Yes
Communication Bus	HyperWire® fiber-optic interface
Operating Temperature	0 to 50°C
Storage Temperature	-30 to 85°C
Weight	2.9 kg
Servo Loop Rate	200 kHz
Compliance	CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

Note:

1. Three-axis PSO is only available with Automation1 V2.4.0 and later. For V2.3.2 and older, including all A3200 controllers, Two-axis PSO is standard.
2. Enhanced Scanner Control (ESC) is an optional feature that is only available with Automation1 V2.7.0 and later. It is not compatible with A3200 controllers.

AUTOMATION1 GL4 ORDERING OPTIONS

GL4 Series (Required)

GL4	Single-phase linear amplifier

Current (Required)

-20	20 A peak; 5 A continuous

Optional Drive Enhancements

-ESC0	without Enhanced Scanner Control
-ESC1	with Enhanced Scanner Control (for use with the AGVHPO)
-ESC2	with Enhanced Scanner Control (for use with the AGVXPO)

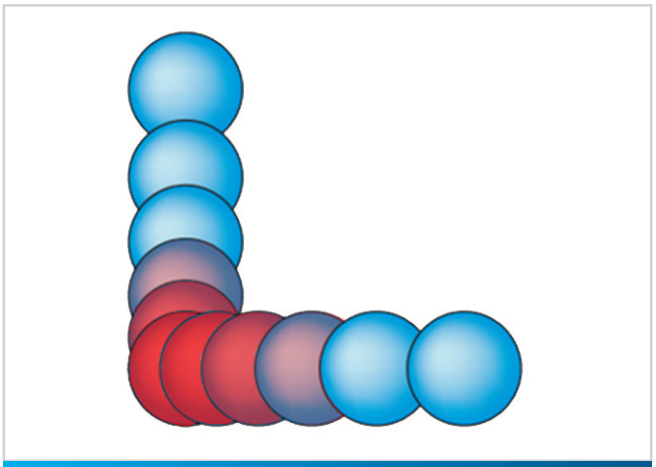


Figure 1. Laser spot placement without PSO. Notice the uneven overlap evident when changing direction. This causes inconsistent energy delivery to the workpiece, resulting in poor part quality.

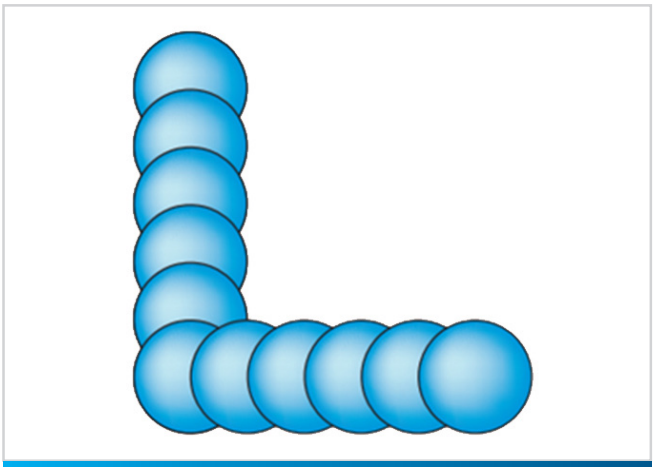


Figure 2. Laser spot placement with PSO. Notice the even overlap, even when changing direction, when Aerotech's PSO is applied. This results in consistent energy delivery and better part quality.

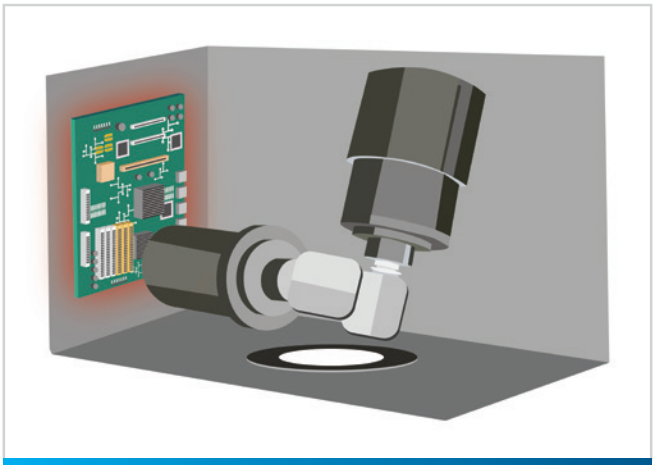


Figure 3. Competitive galvo scanners place the heat-dissipating electronics in close proximity to the scanner mechanics. This design creates thermal stability problems due to the power dissipated by the control electronics.

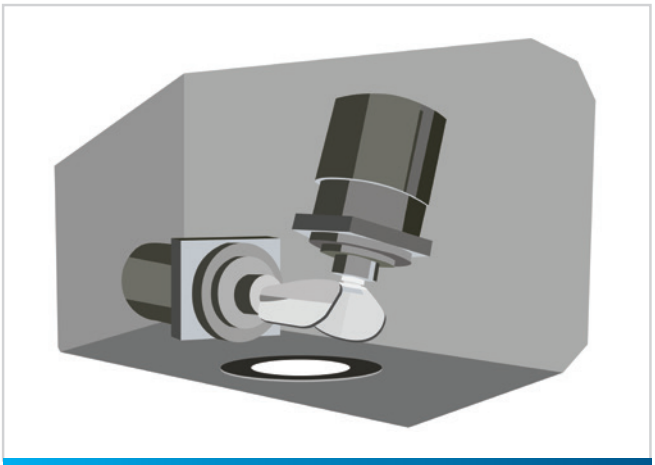
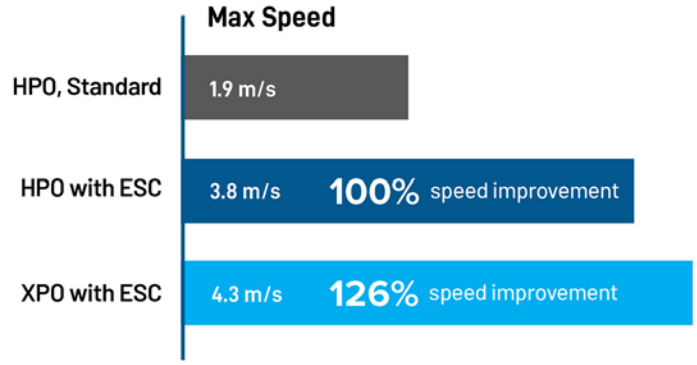


Figure 4. Aerotech's AGV galvo scanner removes heat-dissipating electronics from the scanner for better thermal stability and higher-precision motion.

Contouring

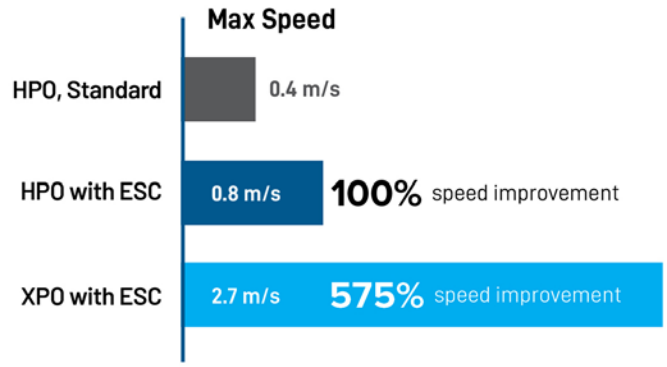
3 mm radius corner at constant velocity
Max allowable tracking error: 3 µm



Apply higher accelerations and velocity up to GL4 bus voltage limit to settle faster, minimizing or eliminating jump delays for step and settle motion. Most impactful for laser drilling applications.

Contouring

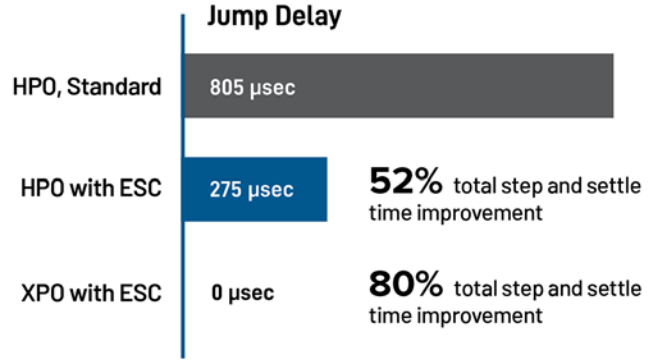
0.3 mm diameter circle
Max allowable tracking error: 3 µm



Perform high-frequency circular contour motion while still minimizing tracking error. Most impactful for ring welding and cutting applications.

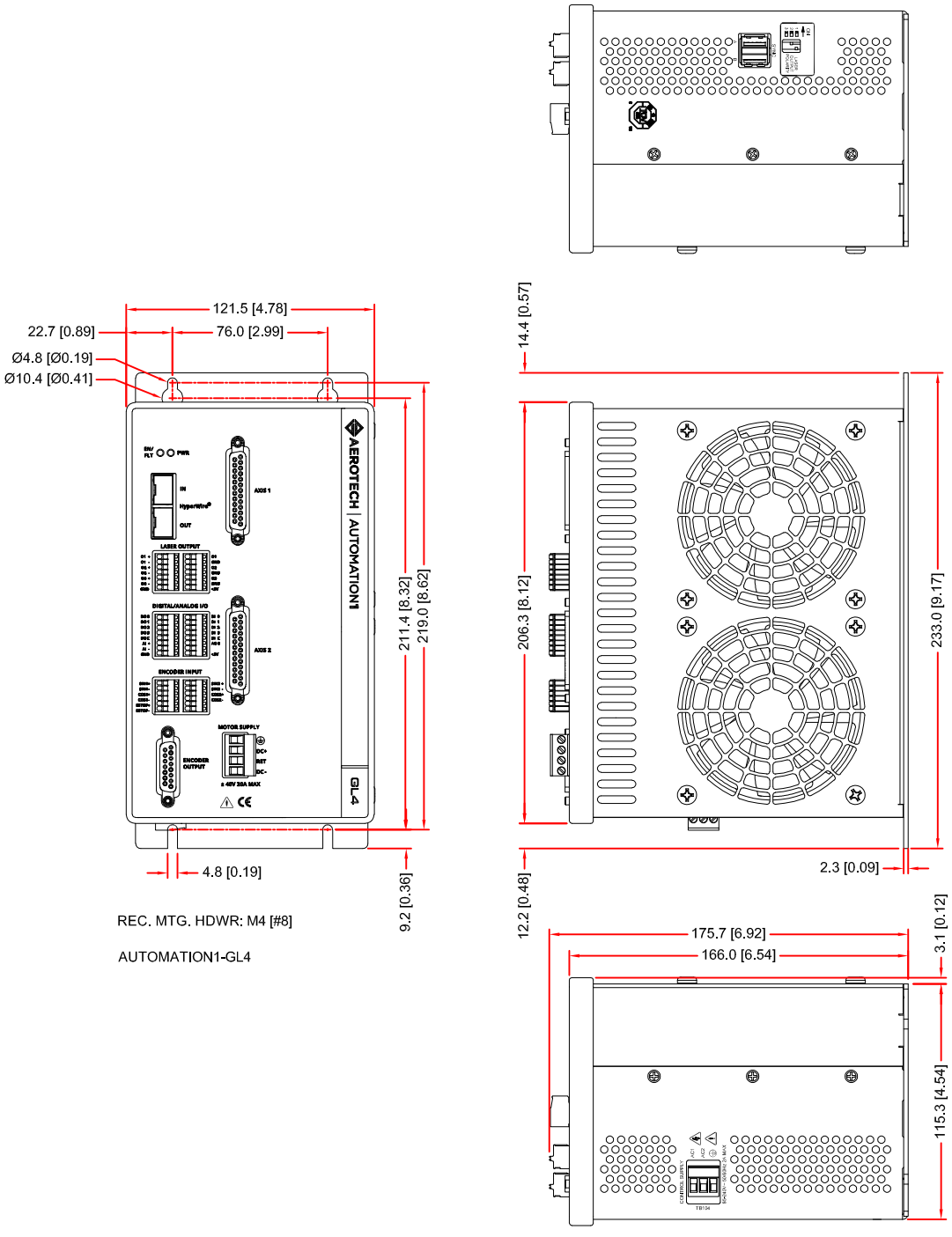
Step and Settle

0.3 mm step size
Move time: 250 µsec
Settle window: 3 µm



Increase vector contouring speed without sacrificing tracking performance. Most impactful for laser cutting and micromachining applications.

AUTOMATION1 GL4 DIMENSIONS



REC. MTG. HDWR: M4 [#8]

AUTOMATION1-GL4