

## Scalable Precision & Dynamics

# AGV 2D Laser Scan Heads



### Scale Your Process With Precision

Designed to meet a range of performance needs, Aerotech's 2-axis laser scan heads share CORE performance features—and control hardware. Choose the model that delivers micrometer-scale accuracy at speeds your process requires, and scale without sacrificing precision or incurring additional control hardware costs. CORE performance features include dual-digital encoders for ultimate process stability in scan field resolutions ranging from 22 to 32 bits of effective scan-field resolution; ultra-low thermal drift performance enabled by direct-water cooling; and electronics located outside of the scan head. All models use ultra-low inertia motors and mirrors, while different materials, encoder technology and motor construction allow for their defining performance capabilities.

### Key Applications

The AGV laser scan heads are ideal for a range of high-precision laser applications, including:

- Micromachining
- Drilling
- Process research & development
- Cutting
- Surface texturing & marking

### CORE Performance:

- ◆ **100 kHz trajectory planning & 200 kHz servo rates** ensure zero tracking error
- ◆ **POSITION SYNCHRONIZED OUTPUT (PSO)** enables accurate laser triggering regardless of process speed or acceleration
- ◆ **Dual digital encoder feedback** eliminates velocity error & enables **SINGLE-DIGIT MICROMETER-LEVEL ACCURACY** throughout the scanner's Field of View(FOV)
- ◆ **INFINITE FIELD OF VIEW (IFOV)** enables seamless synchronization with linear & rotary servo motion to extend the scanner's FOV to large processing areas
- ◆ **DIRECT MOTOR STATOR WATER COOLING & GAS MIRROR COOLING** minimizes process stabilization time & thermal drift
- ◆ Available in **10 mm, 14 mm, & 20 mm** input apertures with standard wavelength support from **343 nm to 10.6μm**

## Contouring

3 mm radius corner at  
constant velocity  
Max allowable tracking  
error: 3  $\mu\text{m}$

Max Speed		
CPO	1.9 m/s	
HPO	3.8 m/s	100% speed improvement
XPO-E1	4.3 m/s	126% speed improvement

*\*Data shown for 20mm aperture with ESC enabled*



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All Aerotech AGV 2-axis laser scan heads are controlled by the Automation1 PC-based controller and Automation1 GL4 laser scan head drive. What sets each scan head apart from the others? The models deliver different precision and dynamics, making them suitable for different applications. This means you can perform research and develop your process with the AGV-CPO, then scale to the AGV-XPO without needing any additional control hardware from Aerotech—and without any downtime.

### AEROTECH AGV 2-AXIS SCANNER SPECIFICATIONS

Specifications	CPO	HPO	XPO
Beam Aperture	10, 14, & 20 mm	10, 14, 20 & 30 mm	10, 14, & 20 mm
Feedback Resolution	0.15 $\mu\text{rad}$ (22-Bit)	0.012 $\mu\text{rad}$ (25-Bit)	0.012 $\mu\text{rad}$ (-E1) (25-Bit) 0.0016 $\mu\text{rad}$ (-E2) (32-Bit)
Dither (RMS)	0.6 $\mu\text{rad}$	0.4 $\mu\text{rad}$	0.4 $\mu\text{rad}$ (-E1) 0.02 $\mu\text{rad}$ (-E2)
Accuracy (Pk:Pk)	100 $\mu\text{rad}$	50 $\mu\text{rad}$	50 $\mu\text{rad}$
Repeatability (RMS)	0.6 $\mu\text{rad}$	0.4 $\mu\text{rad}$	0.4 $\mu\text{rad}$
Peak Acceleration <sup>(1)(2)</sup>	224,000 $\text{m/s}^2$	288,000 $\text{m/s}^2$	355,000 $\text{m/s}^2$
Continuous Acceleration <sup>(1)(3)</sup>	52,000 $\text{m/s}^2$	75,200 $\text{m/s}^2$	95,000 $\text{m/s}^2$
Move & Settle <sup>(1)(4)</sup>	450 $\mu\text{s}$	270 $\mu\text{s}$	210 $\mu\text{s}$
24-hrs Long-Term Drift Gain   Offset <sup>(5)</sup>	15 $\mu\text{rad}$   10 ppm		
Thermal Drift per 1°C Gain   Offset <sup>(5)</sup>	10 $\mu\text{rad}$   1 ppm		
MTBF	20,000 hours		

#### Notes

- Specifications shown for 10mm aperture only with Enhanced Scanner Control (ESC) enabled, unless otherwise noted. Larger apertures will have lower performance due to mirror inertia.
- Based on the maximum rated current of the motor, 20A.
- Based on rated RMS current of 4A, with -WC water cooling option, maximum continuous.
- Typical performance with  $f = 160\text{mm}$  F-Theta objective. Settled to within 1% of move distance.
- After an initial 3-hour warm-up, ambient temperature variation  $<0.5^\circ\text{C}$ .
- All angles are optical unless otherwise specified.
- All specifications are per axis unless otherwise noted.



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scan heads or visit us at:

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