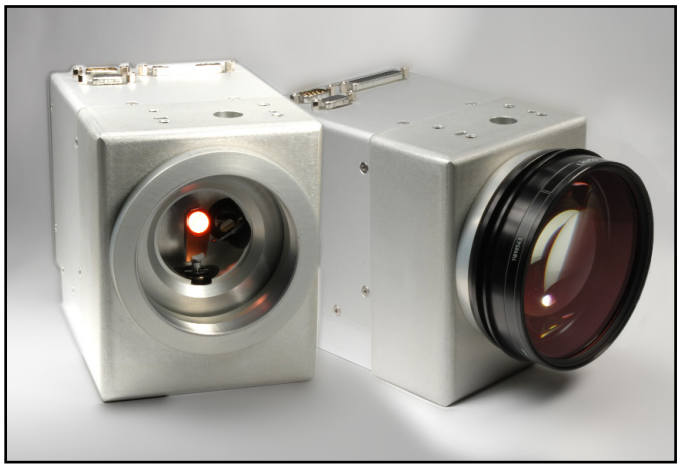
General Scanning SOLUTIONS
a cambridge technology business

Lightning XP™ Digital Scan Heads

For 7, 10 & 14mm Clear Apertures

Highest Speed for the Most Demanding Applications,
with State Space Self Tuning Servo Design.



Enclosed Head Configuration (Shown with and without Lens)

Key Specifications

- **Lightning XP Digital Technology**
  - Cambridge Technology Galvo Motors
  - DC2000 State Space Digital Servo Driver
  - Self Tuning Servo
  - No Tracking Error
- **Family of Sizes**
  - Clear Aperture Sizes of 7mm,10mm,14mm
  - Broad Range of Supported Lenses
- **Plug & Play**
  - Digital XY2-100 Communication Protocol
  - Standard Power and Communication Pinouts
  - Standard Mechanical Interface
  - Standard and Custom Lens Grid Correction Files

General Scanning Solutions brings you the latest technology in high performance scan heads available. The **Lightning XP Digital Scan Heads** offer the latest state space digital servo technology matched with high performance galvanometers in a compact rugged scan head design. State space servo technology (SSST) has user feed forward commands with trajectory planning using a real time simulator. SSST delivers higher speeds and greater accuracy than traditional PID servo designs. Also, Lightning XP is self-tuning which means your system is always running with the highest performance and with the greatest efficiency. These core components are offered with industry standard mechanical bolt patterns, industry standard power and communication pinouts as well as a range of popular apertures, mirror coatings and lenses making them ideal for easy OEM design integration. These scan heads are suited for the highest performance applications such as high speed marking, data matrix marking, coding, texturing and more. **Lightning XP Digital Scan Heads** give improved beam steering with the superior material processing speed of state space digital servo technology with the greatest efficiency, superior performance and increased throughput for your system.

Lightning™
Digital Scan Heads

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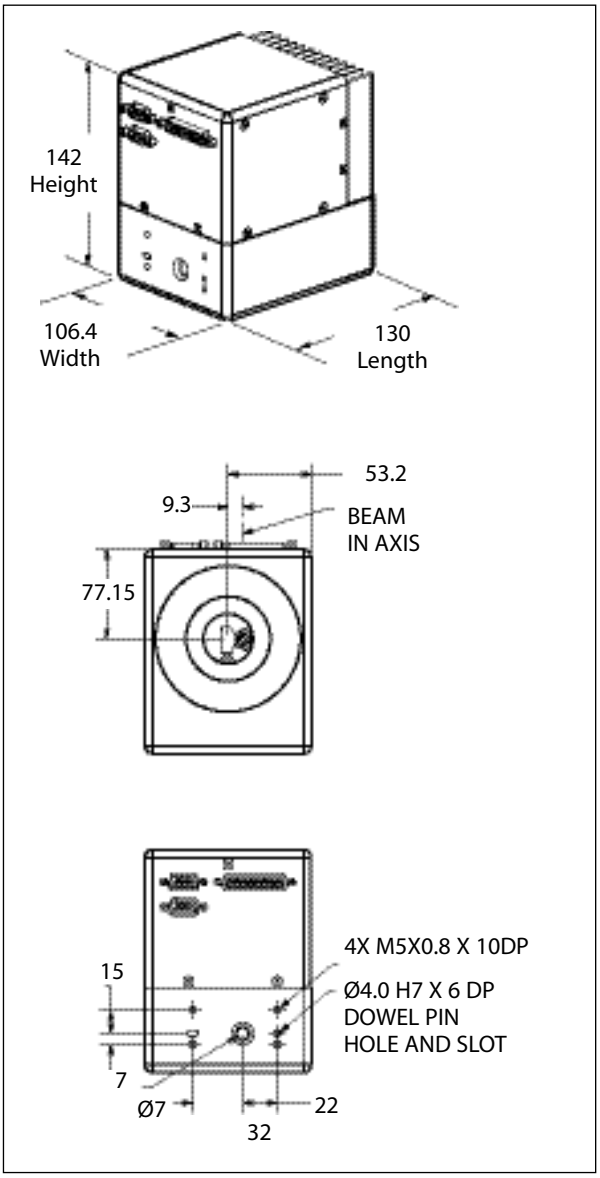
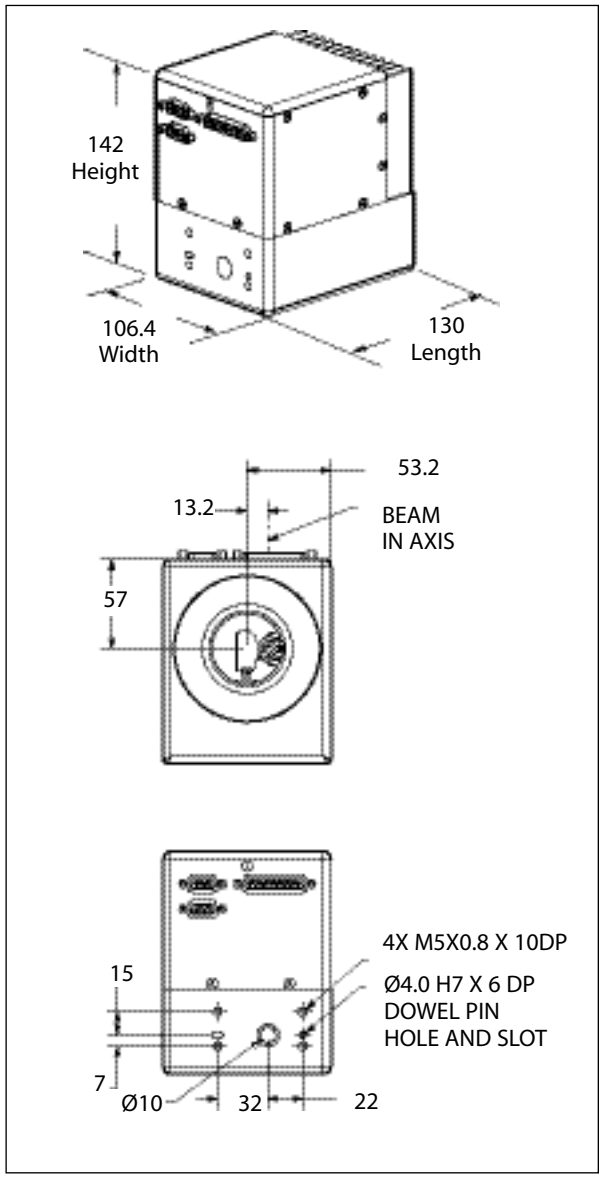
Dimensions and Technical Specifications: Lightning XP Digital Scan Head - 7 mm



Product Specific Specifications	
Aperture Size	7 mm
Beam Displacement	9.3 mm
Step Response (1% Full Scale)[1]	200 µs
Typical Mark Speed[2]	6.5 m/s
Typical Jump Speed[2]	16 m/s
Typical Writing Speed[2]	1400 cps
Tracking Error[3]	0 µs
Long Term Drift (8 hours)	0.3 mrad
Nonlinearity (Max. % over ± 20° optical)	0.1
Shared Specifications	
Repeatability[4]	30 µrad
Typical Scan Angle[5]	± 20°
Gain Error	< 5 mrad
Zero Offset	< 5 mrad
Skew	< 1.5 mrad
Power Requirements	±15 - 24 V DC max. 3A each
Digital Communication	XY2-100
Digital Service Port	9-pin (female)
Weight	2.7kg
Operating Temp	25° ± 10° C
Mirror Coatings	YAG, CO2, Silver
F-theta Lenses	YAG - 100, 160, 170, 255, 347, 420 CO2 - 100, 200, 300

[1] Step Response settling to within XXX% of position
[2] Single stroke 1 mm characters with f-160 lens with +/-24V power supplies
[3] Tracking Error is defined as the delay between a command and the system responding to the command. Typically, the tracking error of a system is used to set Laser ON and Laser OFF delays to compensate for this lag between command and response. Lightning XP Digital Scan Heads have the DC2000 State Space Servo which has a fixed pre-filter command delay of 380µs which allows for truly synchronous laser scanner control with 0 (or near 0) tracking error. The 380us laser delay lines are accessible through 9-pin service port or by using EC1000 controller. See User Manual for more information.
[4] Root mean square

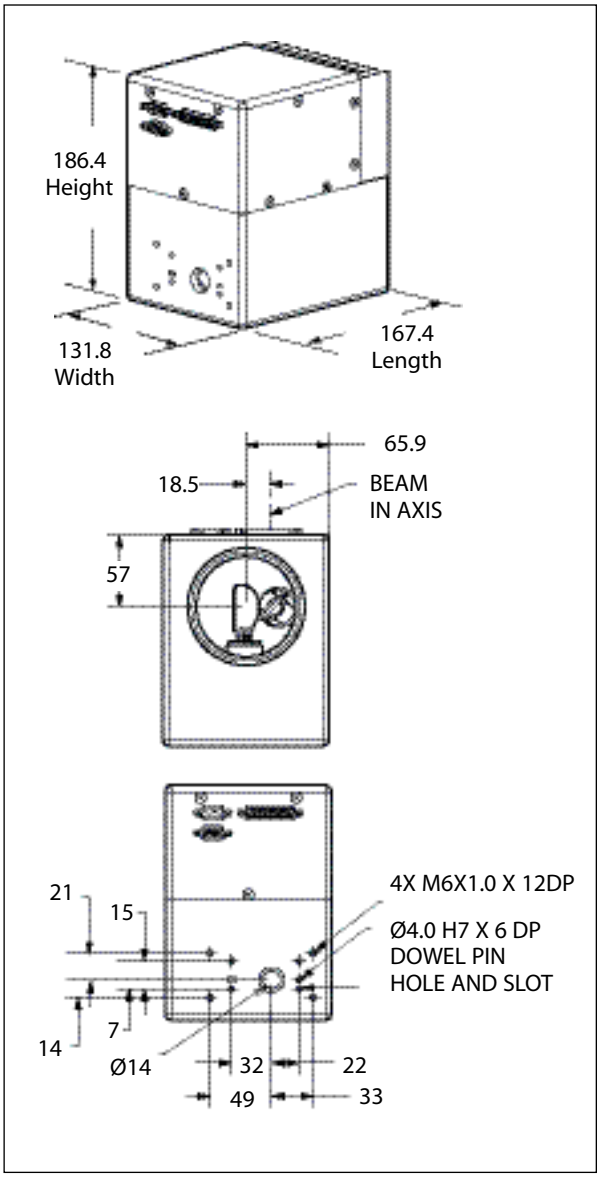
Dimensions and Technical Specifications: Lightning XP Digital Scan Head - 10 mm



Product Specific Specifications	
Aperture Size	10 mm
Beam Displacement	13.2 mm
Step Response (1% Full Scale)[1]	220 µs
Typical Mark Speed[2]	5.5 m/s
Typical Jump Speed[2]	11 m/s
Typical Writing Speed[2]	1000 cps
Tracking Error[3]	0 µs
Long Term Drift (8 hours)	0.3 mrad
Nonlinearity (Max. % over ± 20° optical)	0.1
Shared Specifications	
Repeatability[4]	30 µrad
Typical Scan Angle[5]	± 22°
Gain Error	< 5 mrad
Zero Offset	< 5 mrad
Skew	< 1.5 mrad
Power Requirements	±15 - 24 V DC max. 3A each
Digital Communication	XY2-100
Digital Service Port	9-pin (female)
Weight	~2.7kg
Operating Temp	25° ± 10° C
Mirror Coatings	YAG, CO2, Silver
F-theta Lenses	YAG - 100, 160, 170, 255, 347, 420 CO2 - 100, 200, 300

[1] Step Response settling to within XXX% of position
[2] Single stroke 1 mm characters with f-160 lens with +/-24V power supplies
[3] Tracking Error is defined as the delay between a command and the system responding to the command. Typically, the tracking error of a system is used to set Laser ON and Laser OFF delays to compensate for this lag between command and response. Lightning XP Digital Scan Heads have the DC2000 State Space Servo which has a fixed pre-filter command delay of 380µs which allows for truly synchronous laser scanner control with 0 (or near 0) tracking error. The 380us laser delay lines are accessible through 9-pin service port or by using EC1000 controller. See User Manual for more information.
[4] Root mean square

Dimensions and Technical Specifications: Lightning XP Digital Scan Head - 14 mm



Product Specific Specifications	
Aperture Size	14 mm
Beam Displacement	18.5 mm
Step Response (1% Full Scale)[1]	340 µs
Typical Mark Speed[2]	4.5 m/s
Typical Jump Speed[2]	8.5 m/s
Typical Writing Speed[2]	600 cps
Tracking Error[3]	0 µs
Long Term Drift (8 hours)	0.3 mrad
Nonlinearity (Max. % over ± 20º optical)	0.1
Shared Specifications	
Repeatability[4]	30 µrad
Typical Scan Angle	± 22º
Gain Error	< 5 mrad
Zero Offset	< 5 mrad
Skew	< 1.5 mrad
Power Requirements	±15 - 24 V DC max. 3A each
Digital Communication	XY2-100
Digital Service Port	9-pin (female)
Weight	~4.4kg
Operating Temp	25º ± 10º C
Mirror Coatings	YAG, CO2, Silver
F-theta Lenses	YAG - 100, 160, 170, 255, 347, 420 CO2 - 100, 200, 300

[1] Step Response settling to within XXX% of position
[2] Single stroke 1 mm characters with f-160 lens with +/-24V power supplies
[3] Tracking Error is defined as the delay between a command and the system responding to the command. Typically, the tracking error of a system is used to set Laser ON and Laser OFF delays to compensate for this lag between command and response. Lightning XP Digital Scan Heads have the DC2000 State Space Servo which has a fixed pre-filter command delay of 380µs which allows for truly synchronous laser scanner control with 0 (or near 0) tracking error. The 380us laser delay lines are accessible through 9-pin service port or by using EC1000 controller. See User Manual for more information.
[4] Root mean square

Contact Information

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