

PROVIDER OF PROFESSIONAL GALVO SCANNER, CONTROLLER, OPTICS, ENCODER SOLUTIONS

提供专业的振镜 / 控制卡 / 光学 / 编码器解决方案



ScannerOptics
思特光学

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COMPANY PROFILE

公司简介



深圳市思特光学科技股份有限公司，是一家集技术研发、生产和销售为一体的高科技企业，致力于为全球客户提供专业的振镜、控制卡、光学、编码器解决方案。

Scanner Optics Co.,Ltd. is a high-tech enterprise integrating technology research and development, production and sales. It is committed to providing professional Galvo Scanner, Controller, Optics, Encoder Solutions for global customers.

中国深圳 SHENZHEN CHINA

总部及研发中心
Headquarters and R&D Center

6

国内销售和服务点 Domestic sales and service outlets

深圳 SHENZHEN
苏州 SUZHOU
武汉 WUHAN
济南 JINAN
重庆 CHONGQING
宁德 NINGDE

6

海外销售渠道 Overseas sales channels

美国 U.S.A
德国 GERMANY
意大利 ITALY
日本 JAPAN
韩国 SOUTH KOREA
中国香港 HONGKONG



思特光学拥有专业的光学、机械、电子、软件、工艺测试研发团队，拥有百余项实用新型专利、发明专利和软件著作权。除了研发标准扫描振镜和打标控制卡，还为客户提供定制化的振镜扫描解决方案。现产品有光电系列振镜电机、光栅系列振镜电机、空心杯电机、音圈电机、光电系列扫描振镜方头、光栅系列扫描振镜方头、雷霆高功率振镜焊接系统、3D加工系统、转镜面扫描系统、四轴联动激光加工系统、五轴微加工系统、光学相干断层扫描模块和医疗点阵系统等。

思特光学校振镜方头和振镜系统解决方案已成功应用于3C电子行业、精密加工行业、PCB加工行业、锂电和汽车焊接行业、光伏新能源行业、显视面板行业、激光演示行业、3D打印行业、食品包装行业、烟草行业以及医疗行业等领域。

Scanner Optics has a strong R&D team of optics, mechanical, electronics, software and process testing, and has obtained hundreds of utility model patents, invention patents and software copyrights. In addition to developing standard galvo scanning system and marking controllers, we also provide customers with customized galvo scanning system solutions. Our products include ultra-galvo scanners, extra-galvo scanners, BLDC motor, voice coil motors, ultra-galvo scan heads, extra-galvo scan heads, Thunder High Power Welding System, 3D processing system, polygon scanning system, four-axis synchronizing motion system, five-axis laser micromachining system, optical coherence tomography scan module and medical fractional laser system, etc.

Our scan heads and galvo scanning system solutions have been successfully applied in 3C industry, precision processing industry, PCB processing industry, lithium battery and automobile welding industry, photovoltaic industry, display panel industry, laser demonstration industry, LAM industry, food packaging industry, tobacco industry, medical industry, etc.

GALVO MOTOR

振镜电机

电机结构

STRUCTURE

单轴振镜电机包含高精度传感器和基于移动磁铁技术的电机部分。电机转子经过优化设计,有极佳的动态属性和响应特性,此外,电机具有高刚性和低摩擦的特点。另外通过电磁学和动力学仿真,针对每个电机都匹配了一定惯量的镜片。

Single-axis galvo consists of a high-precision sensor and motor based on moving magnet technology. The rotor of the galvo has been optimized to have excellent dynamic response performance. In addition, the galvo has the characteristics of high rigidity and low friction. In addition, through electromagnetism and dynamics simulation, each galvo has been matched with a mirror of a certain inertia.

光电振镜

ULTRAGALVO

使用光电传感器作为位置反馈的振镜电机,具有较高的重复精度和线性度,性价比极高。

Using photoelectric sensor as position feedback system, our galvo has high repeatability, linearity and high cost performance.

光栅振镜

EXTRAGALVO

使用光栅编码器作为位置反馈的振镜电机,对比光电振镜电机,具有更高的位置解析度、更好的重复精度和更低的漂移,即使在环境温度变化的条件下,也能保持优越的重复精度。

Compared with Ultragalvo, our Extragalvo using grating encoder as position feedback system has higher position resolution, better repeatability and lower drift, and can maintain superior repeatability even under the condition of changing ambient temperature.

传感器参数对比

SENSOR PARAMETER COMPARISON

	STGalvo	UltraGalvo	ExtraGalvo
最大偏转角度 ^① Max. Scanning Angle (°)	±20	±12.5	±12.5
非线性度 Nonlinearity (%)	<0.4	<0.4	<0.1
重复精度 Repeatability (μrad)	<2	<2	<1
零位漂移 Offset Drift (μrad/K)	<15	<10	<15
增益漂移 Gain Drift (ppm/K)	<40	<25	<8
位置解析度 Position Resolution	18 Bit ^②	18 Bit ^②	23 Bit ^②
共模输出信号 Output signal, Common mode	130uA with AGC current of 40mA	Typical 170uA with AGC current of 30-40mA	/
差模输出信号 Output signal, Differential mode	11.5uA/° with AGC current of 40mA	9-10uA/° with AGC current of 30-40mA	/

① 以上角度均为机械角度 All angles above are mechanical angles

② 18bit@25°对应为1.7urad, 23bit@360°对应为0.75urad 18 bit @25°corresponds to 1.7 urad, and 23bit @corresponds to 0.75urad

STGALVO MOTOR

ST振镜电机

技术参数

TECHNICAL PARAMETERS

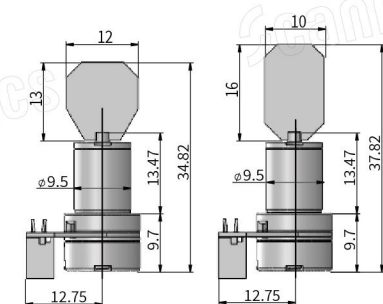


STGalvo	201	200	210	215	218	220	231	230	240	250	260
入口光斑 Input Beam Aperture (mm)	≤7	≤7	≤7	≤7	≤7	7-10	10-14	14	20-30	50-80	50-120
转动惯量 Moment of Inertia (g·cm ²)	0.01	0.013	0.018	0.028	0.024	0.126	0.67	0.78	2.073	14.3	40.47
转矩常数 Torque Constant (N·mm/A)	0.9	1.2	2.7	3.6	3.0	6.0	11.1	13.1	20	70.8	86
线圈电阻 Coil Resistance (Ω)	2.0	2.1	3.6	2.1	2.7	2.8	1.27	1.12	1.1	1.3	1.2
线圈电感 Coil Inductance (μH)	25	35	70	70	120	180	171	150	240	600	580
最大连续电流 Max. Continuous Current (A)	1.2	1.2	1.5	3.5	2.5	3.5	3.5	3.5	4	7	10
峰值电流 Peak Current (A)	6	6	8	15	10	15	10	10	12	15	18
1%小角度响应时间 1% Angle Response Time (ms)	0.2	0.1	0.13	0.13	0.15	0.15	0.25	0.25	0.35	0.8	1.0
质量 Weight (g)	12	13	18	25	50	50	200	230	320	420	1040

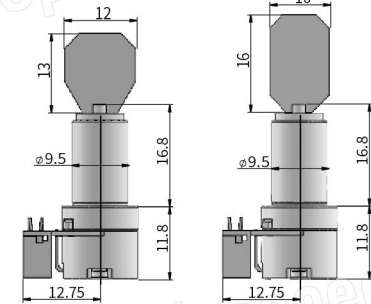
外形尺寸图

TECHNICAL DRAWING

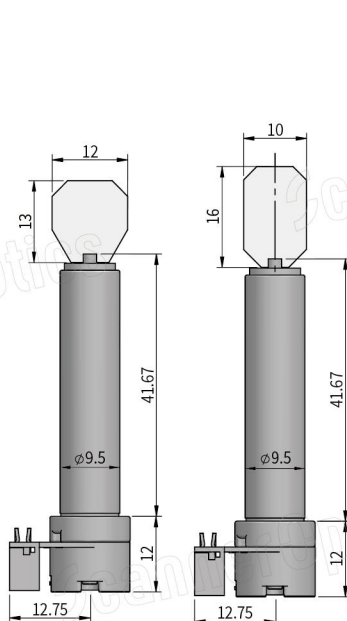
ST201 (7mm)



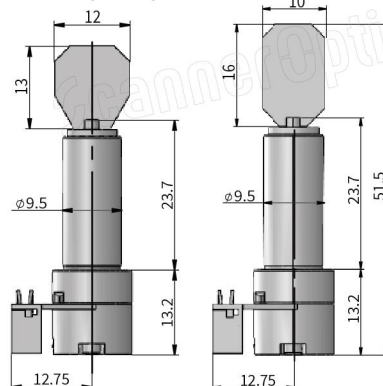
ST200 (7mm)



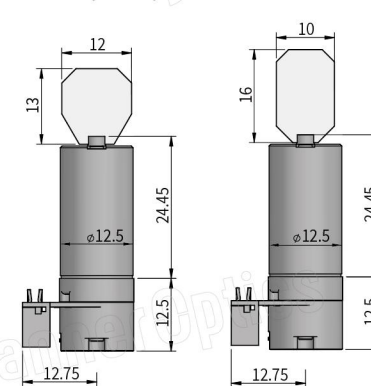
ST215 (7mm)



ST210 (7mm)



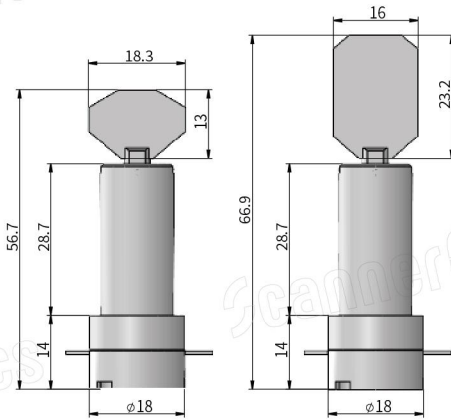
ST218 (7mm)



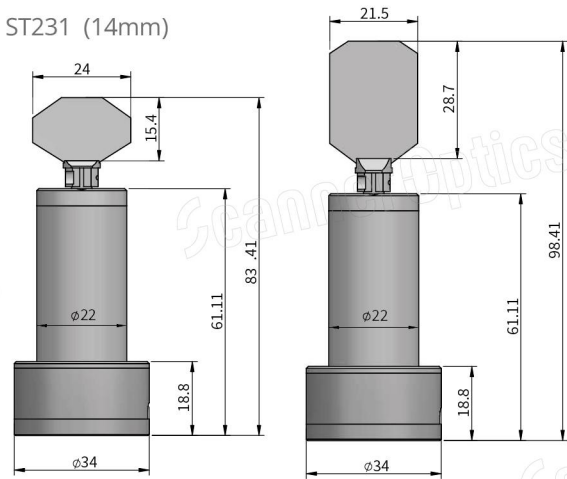
外形尺寸图

TECHNICAL DRAWING

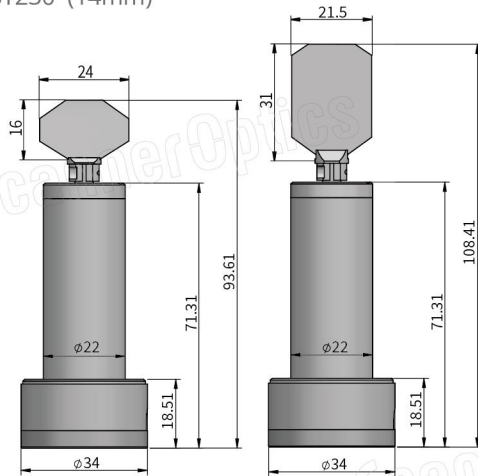
ST220 (10mm)



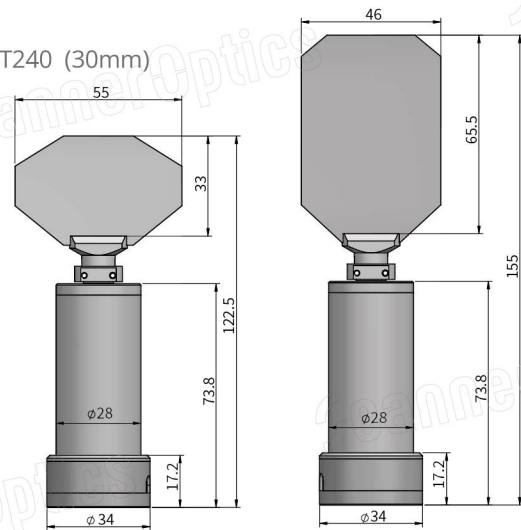
ST231 (14mm)



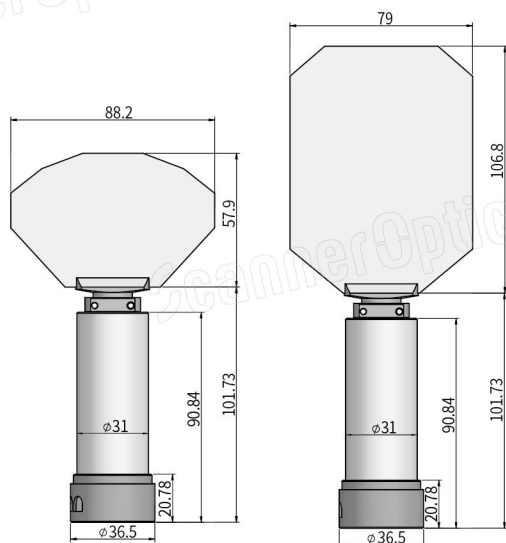
ST230 (14mm)



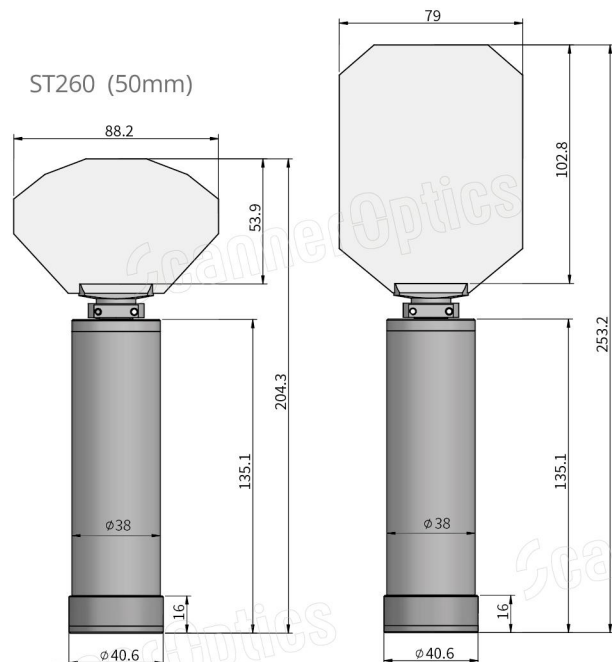
ST240 (30mm)



ST250 (50mm)



ST260 (50mm)



ULTRAGALVO MOTOR

光电振镜电机

技术参数

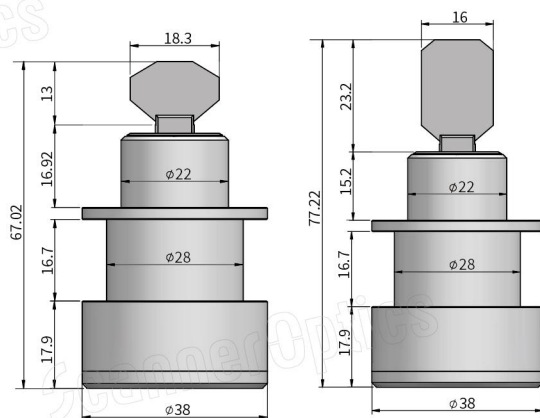
TECHNICAL PARAMETERS

UltraGalvo		S	M	L
入口光斑	Input Beam Aperture (mm)	10	14	20-30
转动惯量	Moment of Inertia (g·cm ²)	0.34	1.2	5.1
转矩常数	Torque Constant (N·mm/A)	7.5	15	24
线圈电阻	Coil Resistance (Ω)	2.7	2.6	1.58
线圈电感	Coil Inductance (μH)	165	275	420
最大连续电流	Max. Continuous Current (A)	2.5	3.5	5
峰值电流	Peak Current (A)	10	10	10
1%小角度响应时间	1% Angle Response Time (ms)	0.18	0.3	0.7
质量	Weight (g)	220	300	400

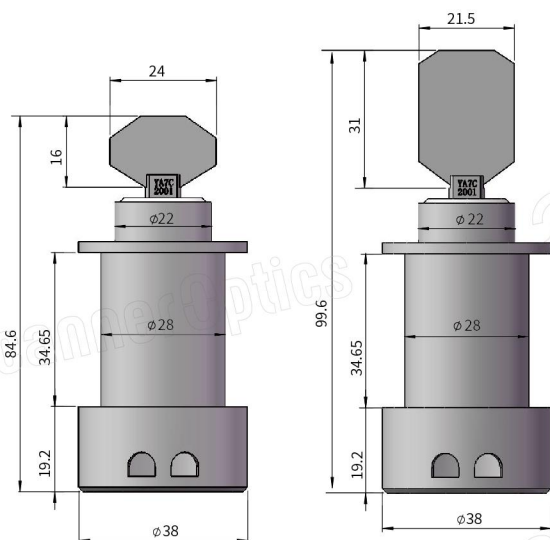
外形尺寸图

TECHNICAL DRAWING

UltraGalvo S (10mm)



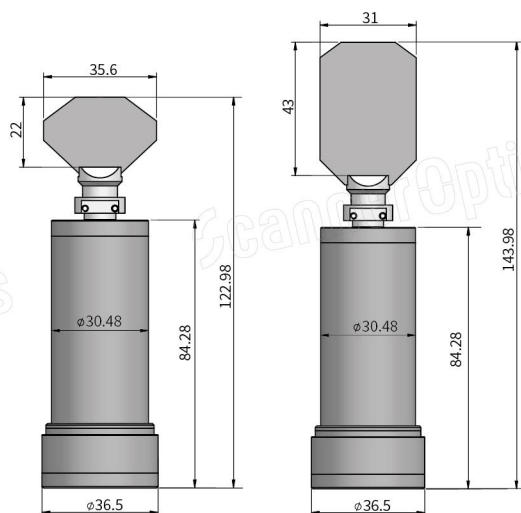
UltraGalvo M (14mm)



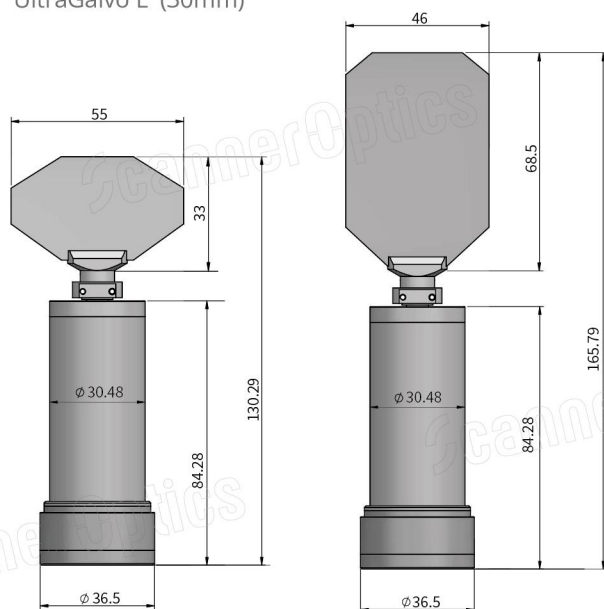
外形尺寸图

TECHNICAL DRAWING

UltraGalvo L (20mm)



UltraGalvo L (30mm)

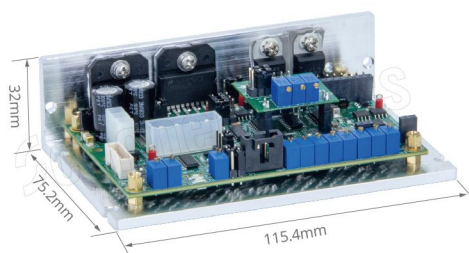


模拟驱动板

ANALOG DRIVER



STServo I 模拟驱动板
STServo I Analog Driver



STServo II 模拟驱动板
STServo II Analog Driver



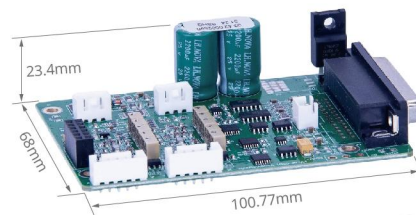
STServo III 模拟驱动板
STServo III Analog Driver



UltraServo I 模拟驱动板
UltraServo I Analog Driver



UltraServo II 模拟驱动板
UltraServo II Analog Driver



三合一模拟驱动板
3-in-1 Analog Driver

EXTRAGALVO MOTOR

光栅振镜电机

技术参数

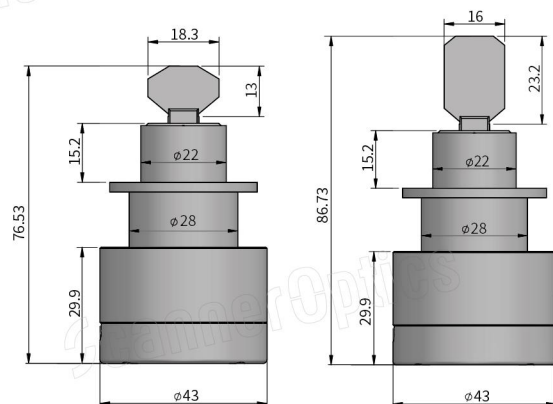
TECHNICAL PARAMETERS

ExtraGalvo		S	M	L
入口光斑	Input Beam Aperture (mm)	10	14	20-30
转动惯量	Moment of Inertia ($\text{g}\cdot\text{cm}^2$)	0.6	1.5	7.2
转矩常数	Torque Constant ($\text{N}\cdot\text{mm}/\text{A}$)	7.5	15	24
线圈电阻	Coil Resistance (Ω)	2.7	2.6	1.58
线圈电感	Coil Inductance (μH)	155	275	385
最大连续电流	Max. Continuous Current (A)	2.5	3.5	5
峰值电流	Peak Current (A)	10	10	10
1%小角度响应时间	1% Angle Response Time (ms)	0.2	0.3	0.7
质量	Weight (g)	220	300	400

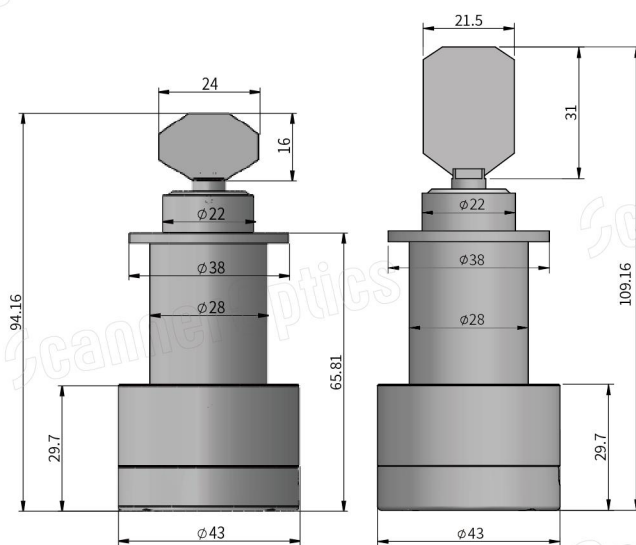
外形尺寸图

TECHNICAL DRAWING

ExtraGalvo S (10mm)



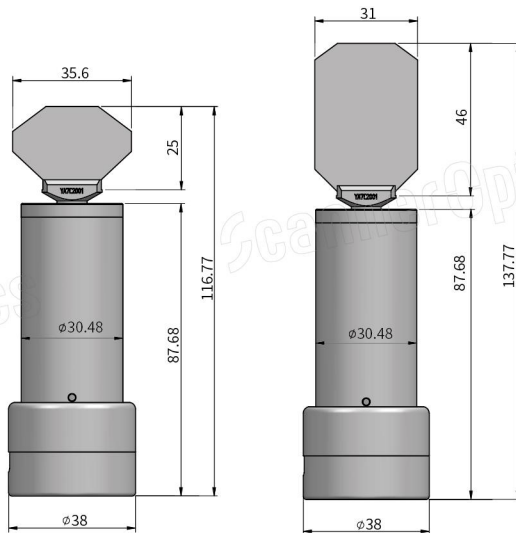
ExtraGalvo M (14mm)



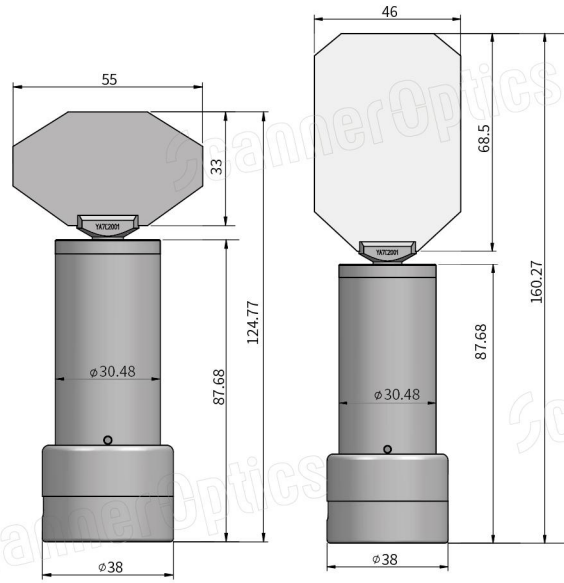
外形尺寸图

TECHNICAL DRAWING

ExtraGalvo L (20mm)



ExtraGalvo L (30mm)

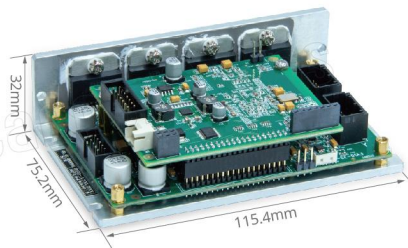


数字驱动板

DIGITAL DRIVER



ExtraServo (A) Light Load 数字驱动板
ExtraServo (A) Light Load Digital Driver



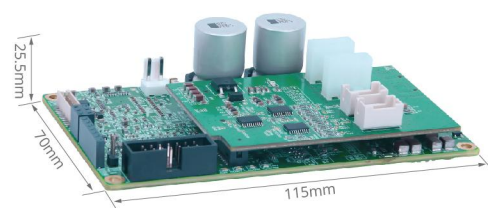
ExtraServo (A) Heavy Load 数字驱动板
ExtraServo (A) Heavy Load Digital Driver



ExtraServo (D) 数字驱动板
ExtraServo (D) Digital Driver



ExtraServo IV (A) 数字驱动板
ExtraServo IV (A) Digital Driver



ExtraServo IV (D) 数字驱动板
ExtraServo IV (D) Digital Driver

DYNAMIC FOCUSING MODULE

动态聚焦模块

产品特点

FEATURES



采用高精度的光栅编码器作为位置反馈，位置解析度达23位。

A high-precision grating encoder is used as position feedback system, with up to 23 bits position resolution.



极低的噪声、极好的线性度和最低的漂移。

Minimized noise and drift, high linearity.



采用基于FPGA的数字处理驱动器技术，具有优秀的抗干扰能力和优秀的动态性能。

Using FPGA-based digital processing driver technology, the product has excellent anti interference ability and dynamic performance.



主要用于动态调焦，能与2D扫描方头结合组成3D扫描振镜系统。

It is mainly used for dynamic focusing, and can be combined with a 2D scan head to form 3D scanning system.

行业应用

INDUSTRY APPLICATIONS

能与扫描头结合组成3D模组，广泛用于3D打标、大幅面加工等激光标记应用，更可应用于超快速3D加工、微加工、曲面标记和深度雕刻。

Combined 2D scan head with dynamic focus module, which has been widely used in laser marking applications such as 3D marking and large field processing, as well as ultra-fast 3D machining, micro-machining, curved surface marking and deep engraving .



3D打标
3D Marking



3D打印
SLM



激光模切
Laser Module Cutting

技术参数

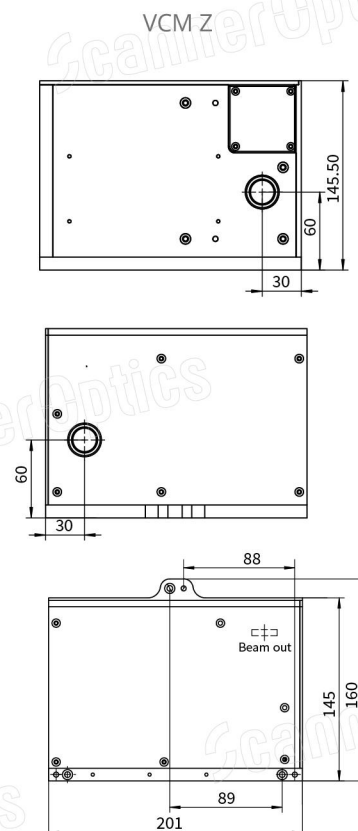
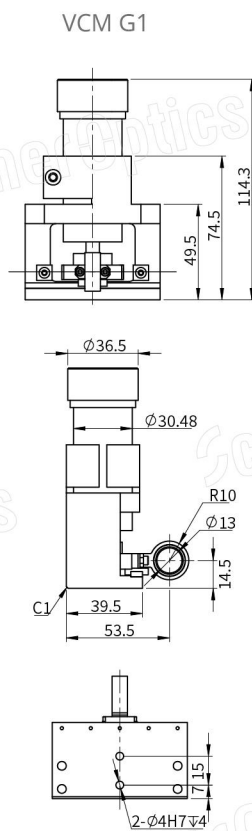
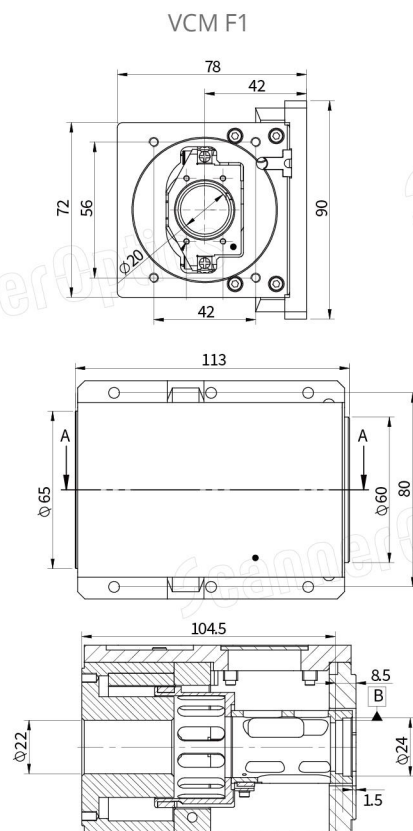
TECHNICAL PARAMETERS



		VCM F1	VCM G1	VCM Z
入口光斑	Input Beam Aperture (mm)	20	≤16	14
出口光斑	Output Beam Aperture (mm)	40	/	14
行程	Travel Length (mm)	≤20	9	±15 (Focus Range)
跟随误差	Tracking Error (ms)	0.7	1.5	≥0.15
典型速度	Typical Speed (mm/s)	≤180	≤100	/
调焦速度	Focus Speed(m/s)	/	/	up to 20 (F=160mm)
重复精度	Repeatability (μm)	<0.5	<2	<1
非线性度	Nonlinearity (%)	0.05	2	0.4
>8小时长期漂移	Long-term Drift over 8h (μm)	<3	<10	<6
电源要求	Power Requirements	±15VDC, ≥3A	±15VDC, ≥3A	±15VDC, ≥3A
通讯协议	Communication Protocol	XY2-100	XY2-100	XY2-100
工作温度	Operating Temperature (°C)	25±10	25±10	25±10

外形尺寸图

TECHNICAL DRAWING



ULTRASCAN SCAN HEAD

光电振镜方头



产品特点

FEATURES



低噪声、高线性度和低漂移。

Low noise, high linearity and low drift.



适配多种F-theta镜头。

Applicable to a variety of F-theta lenses.



模块化设计，易于安装维护。

Modular design, easy integration and maintenance.



标准通讯协议：16bit XY2-100, 20bit ST2-100。

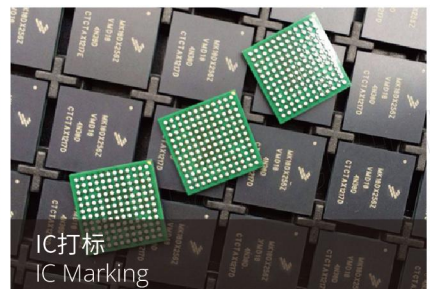
Standard protocol: 16bit XY2-100, 20bit ST2-100.

行业应用

INDUSTRY APPLICATIONS

主要应用于非金属和部分金属材料加工，现广泛应用于食品包装、饮料包装、医药包装、建筑陶瓷、钮扣、工艺礼品、电子元件、手机外壳、笔记本及平板外壳、剥线、薄膜切割、PCB条码、外壳铭牌等激光加工领域。

The product is mainly used for the processing of non-metallic and partial metallic materials, and it has been widely used in the laser processing fields such as food packaging, beverage packaging, medicine packaging, building ceramics, buttons, craft gifts, electronic components, mobile phone shells, laptop and tablet shells, wire stripping, film cutting, PCB barcodes, shell nameplate, etc.



技术参数

TECHNICAL PARAMETERS

UltraScan I	10mm ^①	10mm ^②	10mm ^③	14mm	20mm	30mm	50mm
入射光斑直径 Input Beam Aperture (mm)	10	10	10	14	20	30	50
光柱位移 Beam Displacement (mm)	12.54	12.54	12.54	16.42	25.25	35.61	62.25
跟随误差 Tracking Error (ms)	0.14	0.14	0.14	0.23	0.45	0.70	1
重复精度 Repeatability (μrad)	<2	<3	<2	<2	<2	<2	<2
零位漂移 Offset Drift (μrad/K)	<15	<15	<15	<15	<15	<15	<15
增益漂移 Gain Drift (ppm/K)	<80	<80	<80	<80	<80	<80	<80
>8小时长时间漂移 Long-Term Drift over 8h (mrad)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
1%全行程 1% of Full Travel (ms)	0.40	0.30	0.35	0.65	0.80	1.20	1.5
10%全行程 10% of Full Travel (ms)	1.20	1.00	1.10	1.60	2.50	4.50	6.5
定位速度 ^④ Positioning Speed (m/s)	10.0	20.0	15.0	10.0	5.0	3.0	1
扫描角度 ^⑤ Scan Angle (°)				±25			
增益误差 Gain Error (mrad)				<5			
零位误差 Zero Offset (mrad)				<5			
非线性度 Nonlinearity (%)				<0.4			
电源要求 Power Requirements	±15VDC, ≥3A						
通讯协议 Communication Protocol	16bit: XY2-100			20bit: ST2-100 ^⑥			
工作温度 Operation Temperature (°C)	25±10						
重量 Weight (kg)	1.9	1.9	1.9	2.3	5.0	5.2	8.8

① 针对精密打标定制 Customization for precision marking

② 针对飞行打标定制 Customization for marking on the fly

③ 针对FPC及SLA应用定制 Customization for FPC and SLA applications

④ 使用焦距F=160mm的场镜测试 Test using F-theta lens with focal length F=160mm

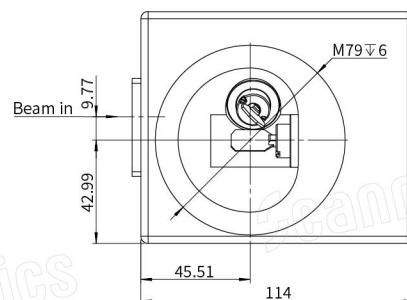
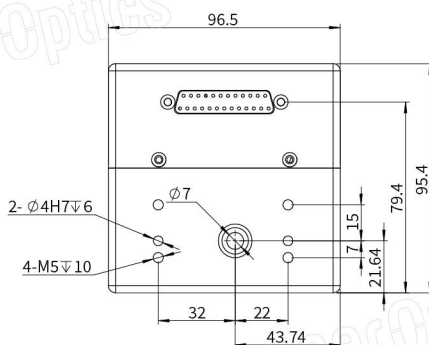
⑤ 以上角度均为光学角度 All angles above are optical angles

⑥ 10-50mm支持ST2-100协议 10-50mm supports ST2-100 protocol

外形尺寸图

TECHNICAL DRAWING

UltraScan II 7mm



技术参数

TECHNICAL PARAMETERS

UltraScan II	7mm	10mm	14mm	20mm	30mm
入射光斑直径 Input Beam Aperture (mm)	7	10	14	20	30
光柱位移 Beam Displacement (mm)	9.77	12.54	16.42	25.25	35.53
跟随误差 Tracking Error (ms)	0.12	0.12	0.15	0.35	0.6
重复精度 Repeatability (μrad)	<2	<2	<2	<2	<2
零位漂移 Offset Drift (μrad/K)	<12	<12	<12	<12	<12
增益漂移 Gain Drift (ppm/K)	<50	<50	<50	<50	<50
>8小时长时间漂移 Long-Term Drift over 8h (mrad)	<0.1	<0.1	<0.1	<0.1	<0.1
1%全行程 1% of Full Travel (ms)	0.22	0.3	0.35	0.70	1.10
10%全行程 10% of Full Travel (ms)	0.76	0.8	0.90	2.40	4.40
定位速度 ^① Positioning Speed (m/s)	25	18.0	14.0	6.0	4.0
扫描角度 ^② Scan Angle (°)	±25				
增益误差 Gain Error (mrad)	<5				
零位误差 Zero Offset (mrad)	<5				
非线性度 Nonlinearity (%)	<0.4 <0.2(UltraScan III)				
电源要求 Power Requirements	±15VDC, ≥3A				
通讯协议 Communication Protocol	16bit: XY2-100				
工作温度 Operation Temperature (°C)	25±10				
重量 Weight (kg)	1.6	1.9	2.3	5.0	5.2

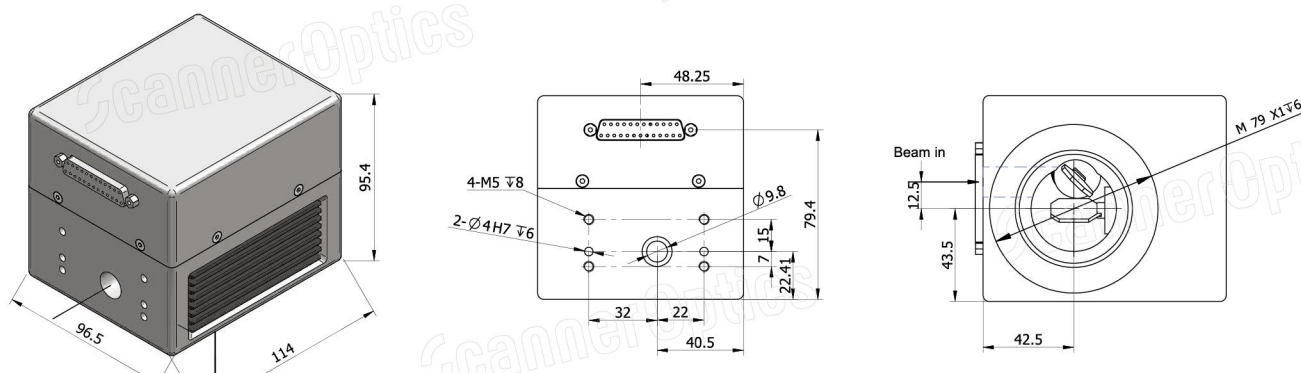
① 使用焦距F=160mm的场镜测试 Test using F-theta lens with focal length F=160mm

② 以上角度均为光学角度 All angles above are optical angles

外形尺寸图

TECHNICAL DRAWING

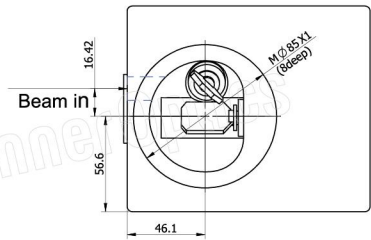
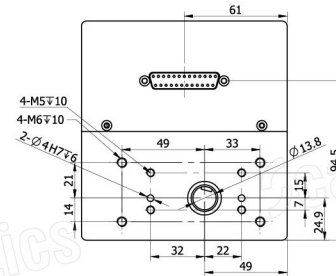
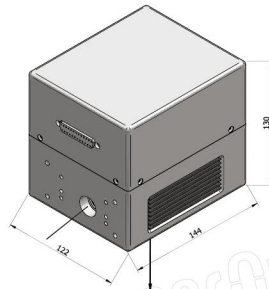
UltraScan I(II)10mm



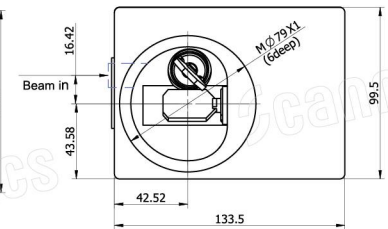
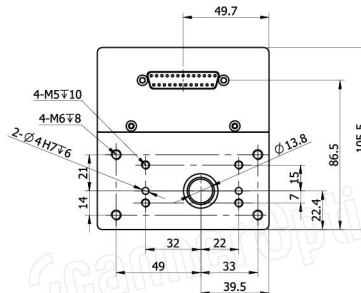
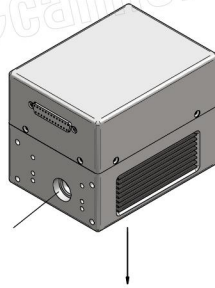
外形尺寸图

TECHNICAL DRAWING

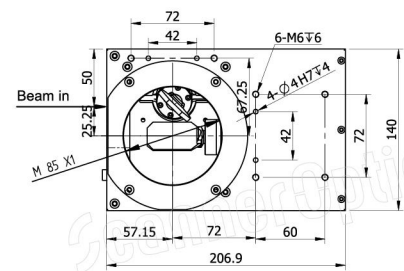
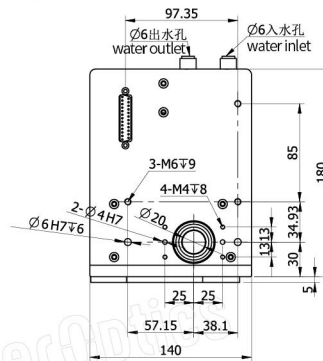
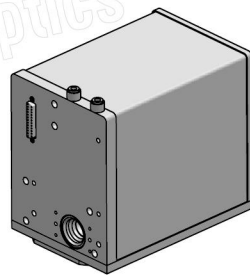
UltraScan I 14mm



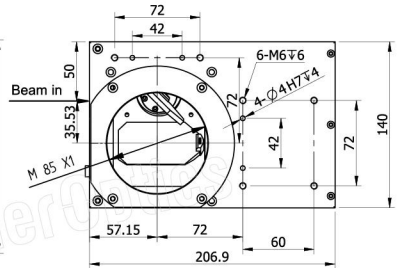
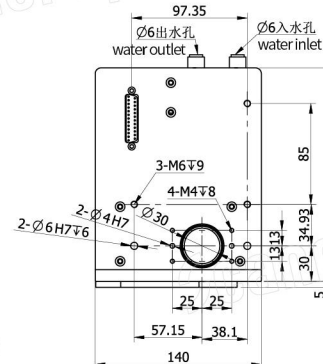
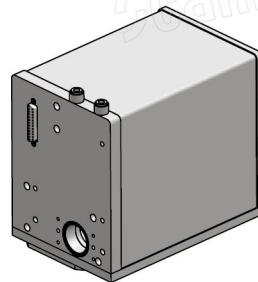
UltraScan II(III) 14mm



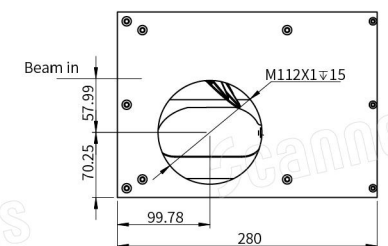
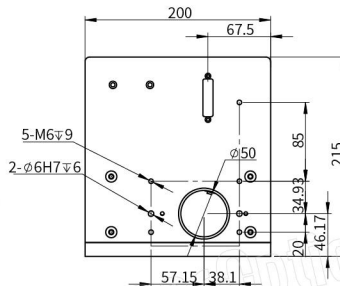
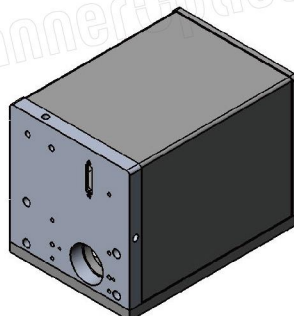
UltraScan I(II) 20mm



UltraScan I(II) 30mm



UltraScan 50mm



EXTRASCAN SCAN HEAD

光栅振镜方头



产品特点

FEATURES



自主研发高精度光栅编码器。

Self-developed high-precision grating encoder.



23bit位置分辨率数字电机实现卓越的定位精度和重复定位精度。

23bit position resolution digital motor achieves excellent positioning accuracy and repeatability.



实时检测振镜状态, 确保振镜安全可靠运行。

Real-time detection of galvanometer status to ensure its safety and reliable operation.



全数字设计保证极低的漂移和极高的稳定性。

All digital design ensures minimized drift and maximized stability.

行业应用

INDUSTRY APPLICATIONS

主要应用于各种高端激光扫描应用, 现已广泛应用于3D打印、光伏划线、OLED、半导体等精密微加工领域。

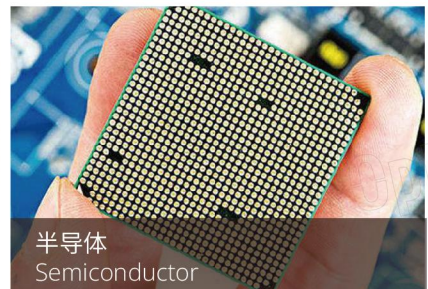
Mainly used in a variety of high-end laser scanning applications, such as 3D printing, photovoltaic scribing, OLED, semiconductor and other precision micro machining fields.



3D打印
SLM



光伏划线
Photovoltaic Scribing



半导体
Semiconductor

技术参数

TECHNICAL PARAMETERS

ExtraScan I	10mm	14mm	20mm	30mm
入射光斑直径 Input Beam Aperture (mm)	10	14	20	30
光柱位移 Beam Displacement (mm)	12.54	16.42	25.25	35.53
加速时间 Acceleration Time (ms)	0.3	0.4	0.65	1.2
跟随误差 Tracking Error (ms)	0.21	0.24	0.24	0.5
重复精度 Repeatability (μrad)	<1	<1	<1	<1
零位漂移 Offset Drift (μrad/K)	<15	<15	<15	<15
增益漂移 Gain Drift (ppm/K)	<8	<8	<8	<8
>8小时长时间漂移 Long-Term Drift over 8h (mrad)	<0.08	<0.08	<0.08	<0.08
1%全行程 1% of Full Travel (ms)	0.45	0.6	0.85	1.3
10%全行程 10% of Full Travel (ms)	1.3	1.5	2.6	4.8
定位速度 ^① Positioning Speed (m/s)	12.5	10	5	3
扫描角度 ^② Scan Angle (°)	±25			
增益误差 Gain Error (mrad)	<5			
零位误差 Zero Offset (mrad)	<5			
电源要求 Power Requirements	±15VDC, ≥3A			
通讯协议 Communication Protocol	16bit: XY2-100		20bit: ST2-100	
工作温度 Operation Temperature (°C)	25±10			
水冷要求 Typical Water Requirements	5l/min at Δp<0.1 bar, p<4 bar			
重量 Weight (kg)	1.9	2.3	5.0	5.2

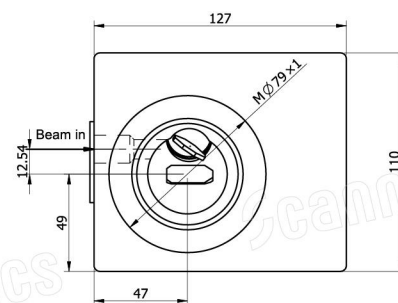
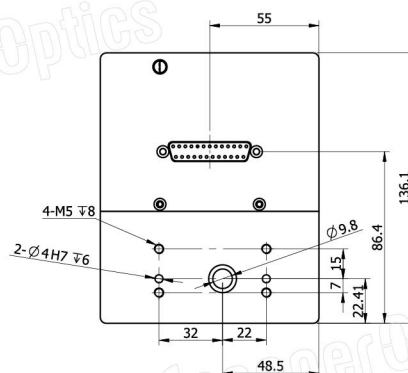
① 使用焦距F=160mm的场镜测试 Test using F-theta lens with focal length F=160mm

② 以上角度均为光学角度 All angles above are optical angles

外形尺寸图

TECHNICAL DRAWING

ExtraScan I(II) 10mm



技术参数

TECHNICAL PARAMETERS

ExtraScan II	10mm	14mm	20mm	30mm
入射光斑直径 Input Beam Aperture (mm)	10	14	20	30
光柱位移 Beam Displacement (mm)	12.54	16.42	25.25	35.53
加速时间 Acceleration Time (ms)	0.2	0.25	0.5	0.8
跟随误差 Tracking Error (ms)	0.21	0.24	0.24	0.5
重复精度 Repeatability (μ rad)	<1	<1	<1	<1
零位漂移 Offset Drift (μ rad/K)	<15	<15	<15	<15
增益漂移 Gain Drift (ppm/K)	<8	<8	<8	<8
>8小时长时间漂移 Long-Term Drift over 8h (mrad)	<0.05	<0.05	<0.05	<0.05
1%全行程 1% of Full Travel (ms)	0.35	0.6	0.75	1.5
10%全行程 10% of Full Travel (ms)	0.75	1	1.2	5
定位速度 ^① Positioning Speed (m/s)	12	10	8	5
扫描角度 ^② Scan Angle ($^{\circ}$)	± 25			
增益误差 Gain Error (mrad)	<5			
零位误差 Zero Offset (mrad)	<5			
电源要求 Power Requirements	± 15 VDC, ≥ 3 A			
通讯协议 Communication Protocol	16bit: XY2-100 20bit: ST2-100			
工作温度 Operation Temperature ($^{\circ}$ C)	25 ± 10			
水冷要求 Typical Water Requirements	5l/min at $\Delta p < 0.1$ bar, $p < 4$ bar			
重量 Weight (kg)	1.9	2.3	5.0	5.2

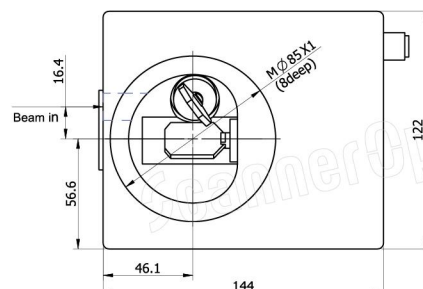
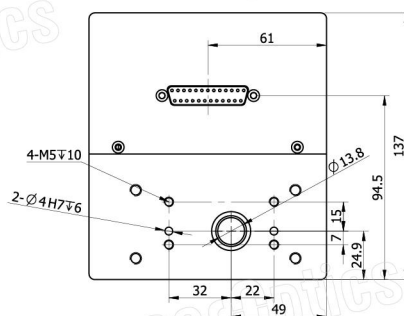
① 使用焦距F=160mm的场镜测试 Test using F-theta lens with focal length F=160mm

② 以上角度均为光学角度 All angles above are optical angles

外形尺寸图

TECHNICAL DRAWING

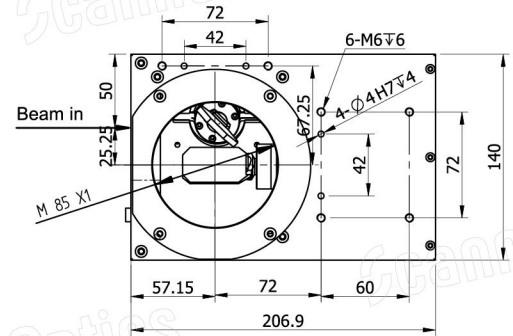
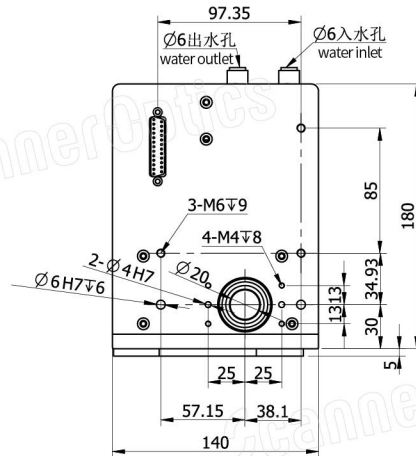
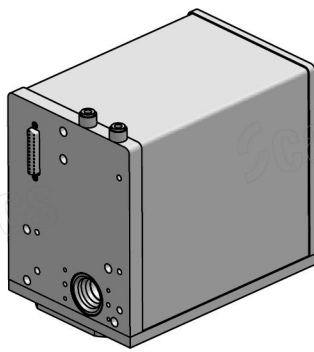
ExtraScan I(II) 14mm



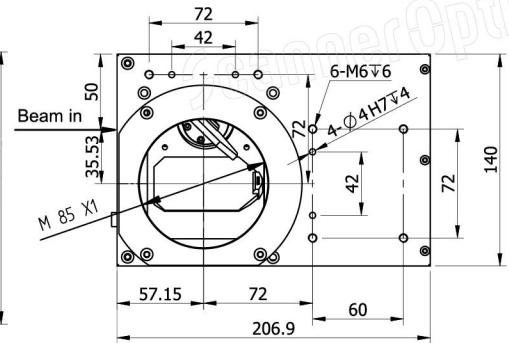
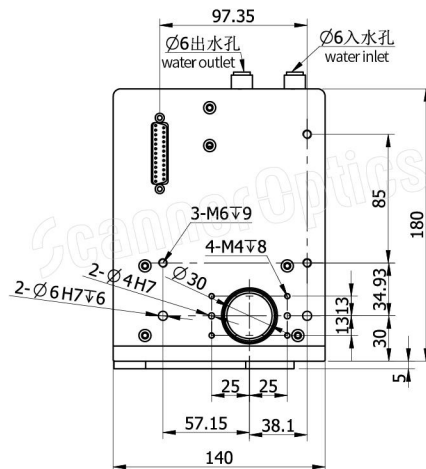
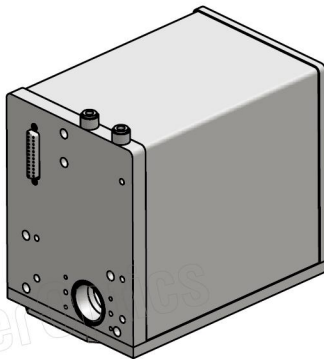
外形尺寸图

TECHNICAL DRAWING

ExtraScan I(II) 20mm



ExtraScan I(II) 30mm



THUNDER HIGH POWER GALVO WELDING SYSTEM

雷霆高功率振镜焊接系统



机柜 Cabinet (可选配 Optional)

产品特点

FEATURES



自主研发的高精度高速度数字光栅振镜、准直及场镜。

Independently developed high precision and high speed digital extra-galvo, collimation and F-theta lens.



自主设计上位机软件, 有能量波形、摆动功能、焊接参数等功能, 具有调试、自动焊接模式。

Self-designed GUI, integrating energy waveform, swing function, welding parameters, with both debugging mode and automatic welding mode.



拥有闭环控制系统, 可时刻监控振镜位置状态。

Closed-loop control system, monitoring the position and state of the galvanometer in real time.



高级别的系统安全机制, 可在10ms内关掉激光。

High-level system security mechanism, which can turn off laser within 10ms.

技术参数

TECHNICAL PARAMETERS

	雷霆 Thunder 6000	雷霆 Thunder 8000	雷霆 Thunder 12000
最大激光功率 Max. Laser Power (W)	6000	8000	12000
激光波长 Laser Wavelength (nm)	1070±10	1070±10	1070±10
场镜有效焦距 Effective Focal Length of F-theta Lens (mm)	254 / 330 / 400 / 460 / 500 / 600	254 / 330 / 400 / 460 / 500 / 600	460
焊接范围 Welding Range (mm)	120×120 (F=254) / 170×170 (F=330)	120×120 (F=254) / 170×170 (F=330)	
	195×195 (F=400) / 220×220 (F=460)	195×195 (F=400) / 220×220 (F=460)	220×220 (F=460)
	240×240 (F=500) / 320×320 (F=600)	240×240 (F=500) / 320×320 (F=600)	
准直器有效焦距 Effective Focal Length of Collimator (mm)	116 / 120 / 140 / 150 / 200	116 / 120 / 140 / 150 / 200	120 / 150
工作高度 Working Distance (mm)	318 (F=254) / 420 (F=330) / 495 (F=400)	318 (F=254) / 420 (F=330) / 495 (F=400)	
	570 (F=460) / 606 (F=500) / 620 (F=600)	570 (F=460) / 606 (F=500) / 620 (F=600)	570 (F=460)
光纤连接方式 Fiber Connection Method	QBH / Q+ / QD	QBH / Q+ / QD	QBH / Q+ / QD
通光孔径 Aperture Size (mm)	30	30	30
最大焊接速度 Max. Welding Speed (mm/s)	3000	3000	3000
工作温度 Operating Temperature (°C)	25±10	25±10	25±10
重量 Weight (kg)	20	20	20
选配 Optional	监视模块 / 功率检测模块 Monitoring Module / Power Detection Module		
OCT组件适配 OCT Component Adaptation	支持自研或第三方OCT组件 Adapte self-developed or third-party OCT Component		

上位机软件界面 SOFTWARE INTERFACE



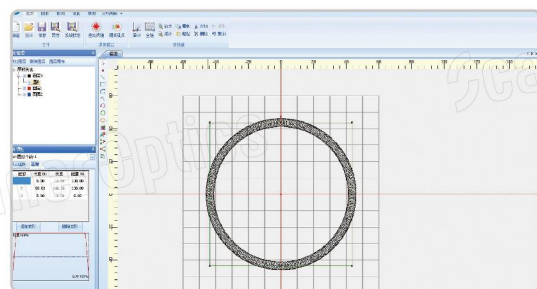
系统状态
System Status



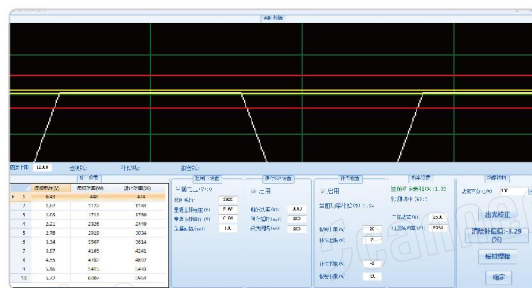
日志
Log



能量波形
Energy Waveform



调试、自动焊接模式
Debugging Mode and Automatic Welding Mode

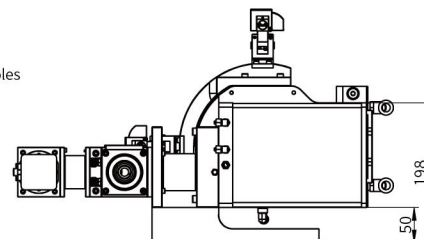
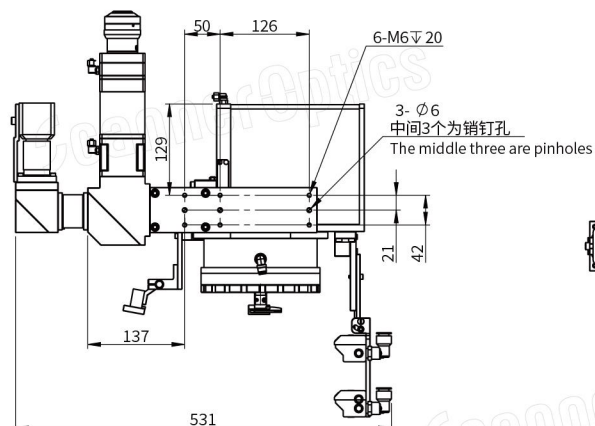


功率检测
Power Detection



功率检测模块 (可选配)
Power Detection Module (Optional)

外形尺寸图 TECHNICAL DRAWING



THUNDER MEDIUM POWER GALVO WELDING SYSTEM

雷霆中功率振镜焊接系统



机柜 Cabinet (可选配 Optional)

技术参数

TECHNICAL PARAMETERS

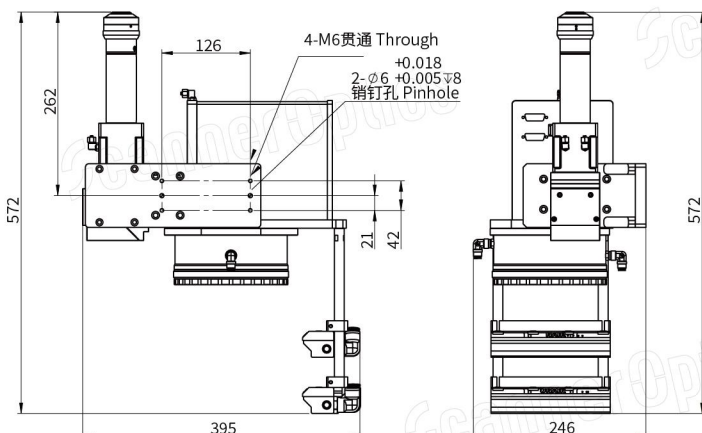
雷霆 Thunder 2000		
最大激光功率	Max. Laser Power (w)	≤ 2000
激光波长	Laser Wavelength (nm)	1070±10
场镜有效焦距	Effective Focal Length of F-theta Lens (mm)	254 / 330 / 460
焊接范围	Welding Range (mm)	120×120 (F=254) / 170×170 (F=330) / 220×220 (F=460)
工作高度	Working Distance (mm)	318 (F=254) / 420 (F=330) / 570 (F=460)
准直器有效焦距	Effective Focal Length of Collimator (mm)	100 / 125 / 150 / 200
光纤连接方式	Fiber Connection Method	QBH
通光孔径	Aperture Size (mm)	30
最大焊接速度	Max. Welding Speed (mm/s)	3000
工作温度	Operating Temperature (°C)	25±10
重量	Weight (kg)	16
选配	Optional	监视模块 / 功率检测模块 Monitoring Module / Power Detection Module
OCT组件适配	OCT Component Adaptation	支持自研或第三方OCT组件 Adapte self-developed or third-party OCT Component

外形尺寸图

TECHNICAL DRAWING

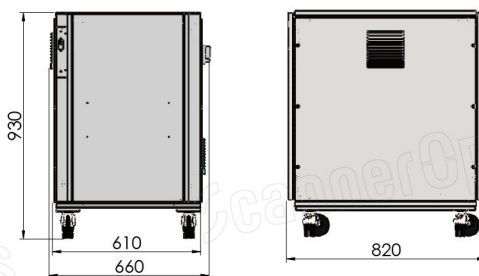
中功率焊接振镜外形安装尺寸

Installation dimension of medium power welding galvo



机柜外形尺寸图

Technical drawing of cabinet

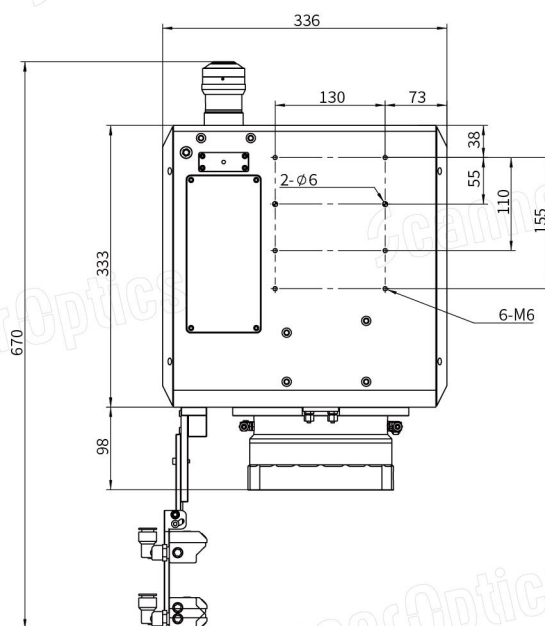




TECHNICAL PARAMETERS

高功率三维飞行焊接系统		
最大激光功率	Max. Laser Power (w)	6000
激光波长	Laser Wavelength (nm)	1070±10
场镜有效焦距	Effective Focal Length of F-theta Lens (mm)	460
焊接范围	Welding Range (mm)	220×220
工作高度	Working Distance (mm)	570
Z轴方向工作高度	Z-axis Working Distance (mm)	±70
准直器有效焦距	Effective Focal Length of Collimator (mm)	125 / 142
光纤连接方式	Fiber Connection Method	QBH
通光孔径	Aperture Size (mm)	30
NA值	NA Value	0.11
最大焊接速度	Max. Welding Speed (mm/s)	3000
工作温度	Operating Temperature (°C)	25±10
重量	Weight (kg)	32

TECHNICAL DRAWING

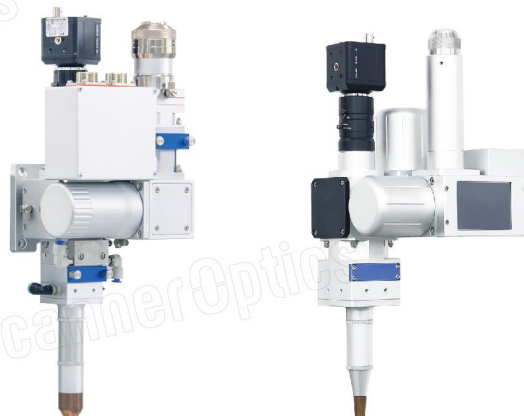


WOBBLE WELDING HEAD

摆动头

技术参数

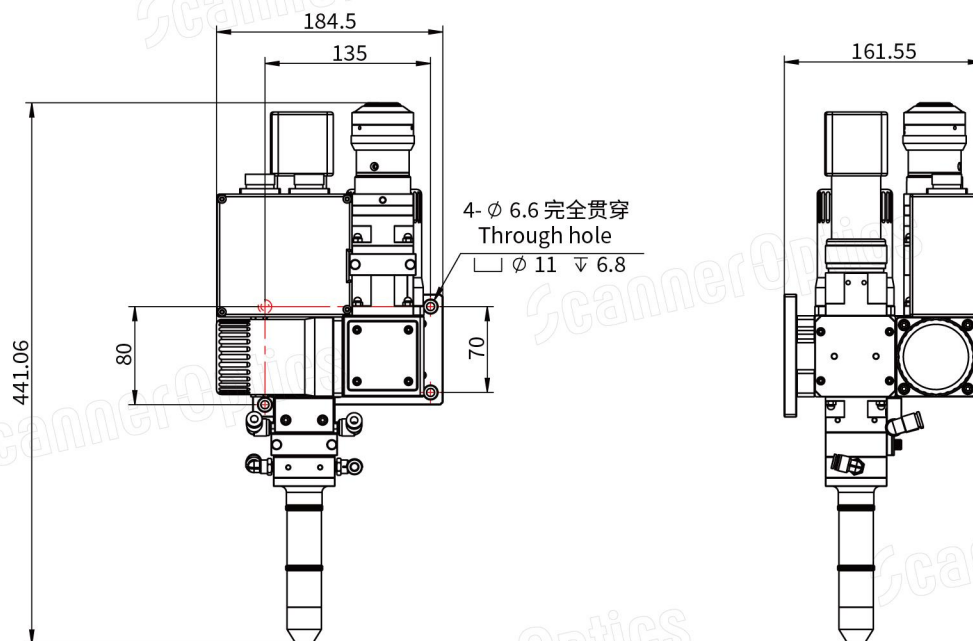
TECHNICAL PARAMETERS



摆动头 Wobble Welding Head		6000W	2000W
最大激光功率	Maximum laser power (W)	6000	2000
激光波长	Laser wavelength (nm)	1070±10	1070±10
准直镜焦距	Collimating Lens focal length (mm)	100	100
聚焦镜焦距	Focal length (mm)	200/250/300	200/250/300
焊接范围	Welding range (mm)	5×5	5×5
最大焊接频率	Maximum welding frequency (Hz)	500	150
光纤连接方式	Fiber connection type	QBH	QBH
通光孔径	Clear aperture (mm)	20	20
工作温度	Operating temperature (°C)	25±10	25±10
重量	Weight (Kg)	7	7

外形尺寸图

TECHNICAL DRAWING



14MM 3D&2.5D SCANNING SYSTEM

14mm3D&2.5D系统

技术参数

TECHNICAL PARAMETERS



2.5D系统 2.5D Scanning System	绿光 Green	紫外 UV	红外 Infrared	二氧化碳 CO ₂
激光类型 Laser Type	Green	UV Laser	IR	CO ₂
波长 Wavelength (nm)	532	355	1064	10600
镀膜 Coating	抗反射膜 Anti-reflective Film			
2D振镜方头通光孔径 Aperture Of 2D Scan Head (mm)	φ14	φ14	φ14	φ14
Z轴模块入射光斑 Input Beam Aperture of Z-axis module (mm)	φ3.5	φ9	φ7	φ3.5
工作范围 ① Field Size (mm)	70x70	210x210	210*210	175x175
Z轴聚焦范围 ② Z-axis Focusing Range (mm)	±5	±15	±20	±20
场镜离工作面距离 ③ F-theta Lens Working Distance (mm)	93.03	330	330	242.8
聚焦光斑直径(基于光束质量M ² =1) ④ Focal Spot Diameter (Based On Beam Quality M ² =1) (mm)	0.01	15.3	45	351.9

①②③④ 配置不同焦距场镜的参数 Configuring parameters for different focal length

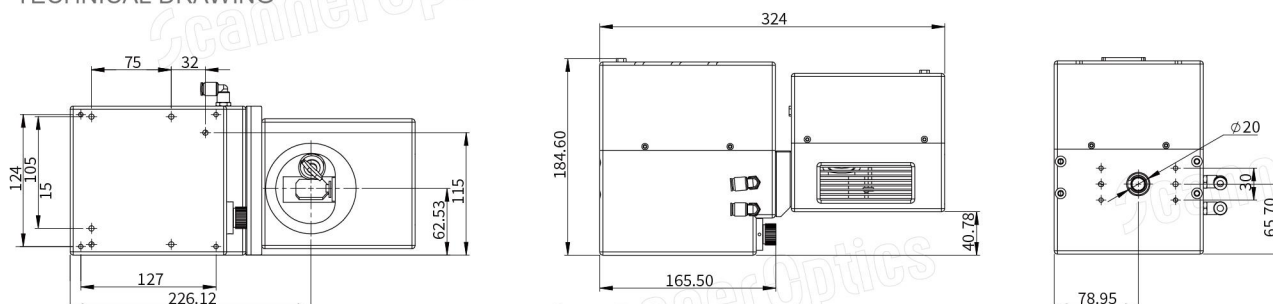
14mm红外激光配置实例 Configuration Example of Infrared Laser (14mm)

工作范围 Field Size (mm*mm*mm)	最小光斑直径1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)
200*200*40	45.2	177.4
250*250*60	52.1	239.3
300*300*80	60.7	301.2
350*350*100	70	363.0
400*400*120	79.3	425.0

以上角度均为光学角度 All angles above are optical angles

外形尺寸图

TECHNICAL DRAWING



□ 技术参数

TECHNICAL PARAMETERS

振镜参数 Galvo Parameters		
扫描角度	Scan Angle (°)	±22
重复精度	Repeatability (μrad)	5
最大增益漂移	Max.Gain Drift (ppm/K)	12
>8小时长时间漂移	Long-term Drift Over 8h (mrad)	0.3
最大位置漂移	Max.Offset Drift (μrad/K)	30
最大加工速度	Maximum Processing Speed (字符 characters/s)	650
小步距阶跃响应时间	Small Step Response Time (ms)	≤0.35

动态变焦系统参数 Dynamic Focus System Parameters		
小步距阶跃响应时间	Small Step Response Time (ms)	≤1.6

环境要求 Environmental Requirements		
工作温度	Operating Temperature (°C)	0~+40
存储温度	Storage Temperature (°C)	-10~+60
湿度	Humidity	≤75% 无凝结 No Condensation

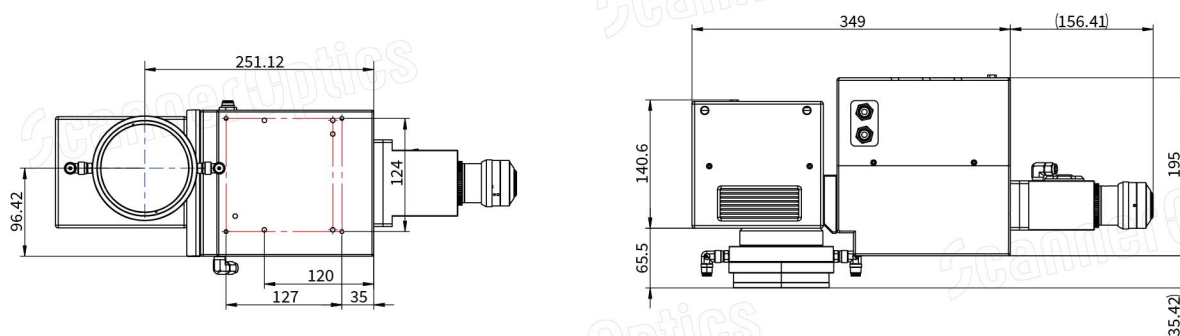
电源参数 Power Supply Parameter		
电源要求	Power Requirements	±(15+1.5)VDC, max.10A

结构参数 Structure Parameters		
重量	Weight (Kg)	8
尺寸	Dimensions (mm)	324x140x181.5

□ 外形尺寸图

TECHNICAL DRAWING

CO₂ 2.5D Scanning System



3D LARGE FIELD PROCESSING SYSTEM

3D大幅面加工系统

产品特点

FEATURES



利用振镜电机和音圈电机的组合，实现三维曲面及大幅面的快速扫描。

Integrated 2D scan head and voice motor, to realize the fast 3D curved surface scanning and large field scanning.



系统集成度高，安装及使用简便。

High integration for easy installation and use.



与电脑通信采用TCP/IP通信协议，可实现1台电脑同时控制多台3D振镜系统。

Using TCP/IP communication protocol, one computer can realize the control of multiple 3D galvo scanning systems at the same time.



光路设计中考虑了不同幅面的激光聚焦效果，保证在不同工作范围内实现最小激光聚焦光斑，使能量更加集中。

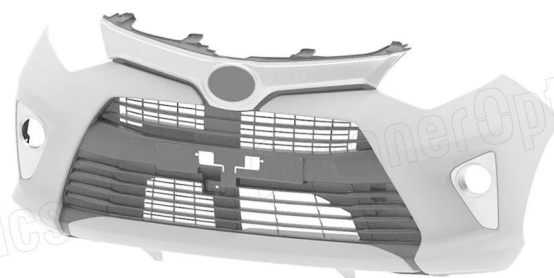
Considering laser focusing effect of different field in the optical design, which ensures the minimum laser focusing spot in different field sizes and realizes maximized concentration of energy.

行业应用

INDUSTRY APPLICATIONS

利用振镜电机和音圈电机的组合，实现三维曲面及大幅面的快速扫描，广泛用于较大幅面的激光精密标刻、激光浮雕、激光深雕、激光切割、激光焊接等高端加工领域。

Galvo and voice motor realize the fast 3D curved surface scanning and large field scanning. It has been widely used in high-end processing fields such as laser precision marking, laser relief, laser deep carving, laser cutting and laser welding.



汽车零部件打标
Auto parts marking



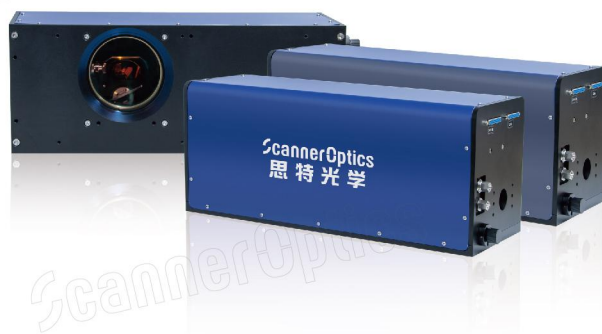
激光模切
Laser die cutting



大幅面激光加工
Large Field laser processing

※以上图片来源于网络

All the above pictures are from the Internet



□ 技术参数

TECHNICAL PARAMETERS

		二氧化碳 CO ₂	紫外 UV	红外 Infrared
扫描角度	Scan Angle (°)	±22	±22	±22
系统校正精度	System Calibration Accuracy ^①		≤0.1mm	
重复标刻精度	Marking Repeatability (μrad)	2	5	2
最大增益漂移	Max. Gain Drift (ppm/k)	80	8	80
最大零位漂移	Max. Offset Drift (μrad/k)	15	15	15
>8小时长时间漂移	Long-term Drift Over 8h (mrad)	≤0.3	≤0.1	≤0.3
跟随误差	Tracking Error (ms)	≤0.70	≤0.45	≤0.30/≤0.45/≤0.7
波长	Wavelength (nm)	10600	355	1064
入射光斑直径	Input Beam Aperture (mm)	15	6	7/10
通光孔径	Aperture Size (mm)	30	20	14/20/30
最大激光功率	Max. Laser Power Cw(W/cm²)	1000	300	1500

注：① 当工作范围≤800x800mm 时的校正精度
② 以上角度均为光学角度

Note: ① Calibration accuracy at ≤ 800*800mm field size
② All angles above are optical angles

CO ₂ 激光配置实例	CONFIGURATION EXAMPLE OF CO ₂ LASER		
工作范围 Field Size (mm*mm*mm)	最小光斑直径 1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)	
100*100*0	181	96.5	
250*250*10	304	241.5	
500*500*150	568.2	550.5	
750*750*300	832	860.5	
1000*1000*500	1096	1169.5	
1250*1250*700	1360	1478.5	
1500*1500*900	1625	1788.5	
2000*2000*1400	2145	2407.5	

紫外激光配置实例	CONFIGURATION EXAMPLE OF ULTRAVIOLET LASER		
工作范围 Field Size (mm*mm*mm)	最小光斑直径 1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)	
200*200*30	11	212	
300*300*50	15	309	
500*500*100	26	556	
700*700*150	34	804	
1000*1000*240	46	1175	
1200*1200*320	55	1423	

14mm红外激光器配置实例 CONFIGURATION EXAMPLE OF INFRARED LASER (14mm)

工作范围 Field Size (mm*mm*mm)	最小光斑直径1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)
200*200*40	45.2	177.4
250*250*60	52.1	239.3
300*300*80	60.7	301.2
350*350*100	70	363.0
400*400*120	79.3	425.0

20mm红外激光器配置实例 CONFIGURATION EXAMPLE OF INFRARED LASER (20mm)

工作范围 Field Size (mm*mm*mm)	最小光斑直径1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)
200*200*30	25.75	184.7
400*400*70	49	432.2
500*500*100	65	618.8
600*600*120	77	679.7
700*700*150	89	866.3
800*800*180	101	927.2
900*900*220	113	1113.8
1000*1000*240	125	1174.7
1200*1200*320	148.5	1422.2

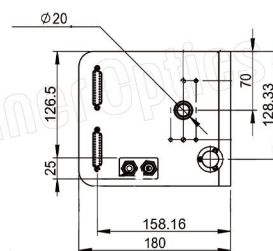
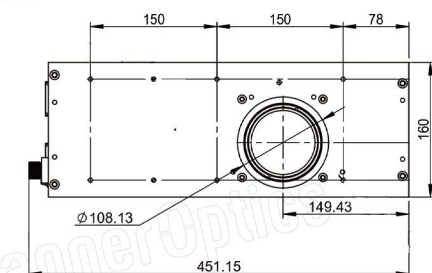
30mm红外激光器配置实例 CONFIGURATION EXAMPLE OF INFRARED LASER (30mm)

工作范围 Field Size (mm*mm*mm)	最小光斑直径1/e ² Focal Spot Diameter 1/e ² (μm)	工作距离 Work Distance (mm)
800*800*50	70	921.6
1000*1000*200	84	1169.1
1200*1200*450	100	1416.6
1300*1300*550	108	1540.3
1400*1400*700	116	1664.1
1500*1500*850	124	1787.9

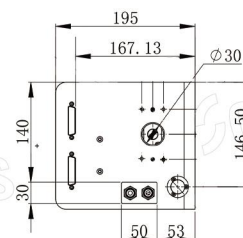
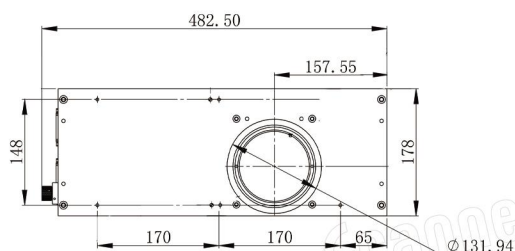
外形尺寸图

TECHNICAL DRAWING

紫外/20mm 红外
Ultraviolet/20mm Infrared



CO2/30mm 红外
CO2/30mm Infrared



LARGE FIELD METAL 3D PRINTING SYSTEM

大幅面金属3D打印系统



□ 技术参数

TECHNICAL PARAMETERS

振镜参数	GALVO PARAMETERS	红外 Infrared
扫描角度	Scan Angle (°)	±10
位置分辨率	Position Resolution	2 ²³
重复精度	Repeatability (μrad)	1
最大增益漂移	Max.Gain Drift (ppm/k)	8
最大零位漂移	Max.Offset Drift(μrad/k)	15
>8小时长时间漂移	Long-term Drift Over 8h (mrad)	≤0.08
跟随误差	Tracking Error (ms)	≤0.70
增益误差	Gain Error (mrad)	< 5
零位误差	Offset Error (mrad)	< 5
波长	Wavelength(nm)	1064
通光孔径	Aperture Size (mm)	30
最大激光功率	Max. Laser Power CW(W/cm ²)	3000

光学参数	OPTICAL PARAMETERS							
单振镜工作范围 (mm*mm)	Field size of single scan head	300*300	350*350	400*400	450*450	500*500	550*550	600*600
双振镜工作重合区域 (mm*mm)	Overlap area of two scan heads	250*250	300*300	350*350	400*400	450*450	500*500	550*550
工作高度(系统底座距加工面)(mm)	Working distance(System base to Marking Work-surface)	341.6	410.4	479	547.8	616.5	685.1	753.7
工作面最小光斑直径 (1/e ²) μm ^①	Diameter of focal spot on working field	51.4-57.2	59.2-70	66.9-74.7	74.7-83.5	82.5-92.2	90.3-100.9	98-109.6
工作面最小光斑直径 (1/e ²) μm ^②	Diameter of focal spot on working field	30	34.4	39.2	43.6	48	52.8	57.6
工作面最小光斑直径 (1/e ²) μm ^③	Diameter of focal spot on working field	40.4	46.4	52.8	58.4	64.8	71.2	76.8

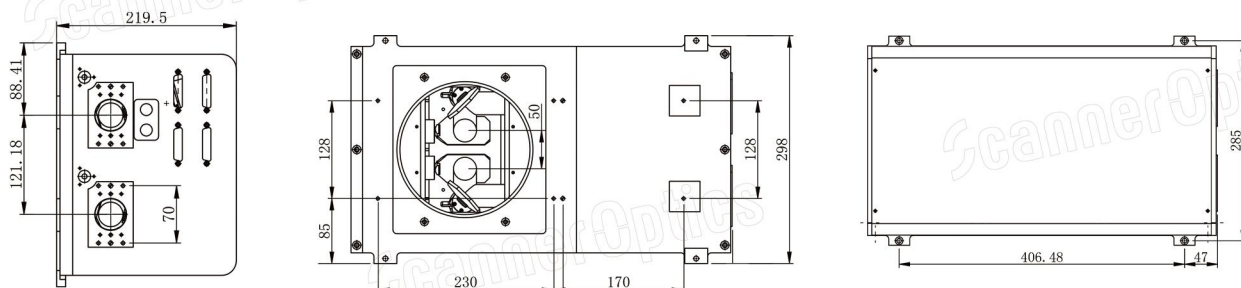
注：① 光斑按照芯径20μm换算 Spot diameter is calculated with fiber core diameter of 20μm

② 按照平行光10mm入射计算 Calculated with incident beam diameter of 10mm

③ 按照平行光7.5mm入射计算 Calculated with incident beam diameter of 7.5mm

□ 外形尺寸图

TECHNICAL DRAWING



SAILING-3D SYSTEM

启航3D振镜系统

产品特点

FEATURES



思特光学全数字振镜技术，自研数字驱动板和光栅编码器，分辨率23bit。

Full digital galvanometer technology of Scanner Optics, self-developed digital driver and optical encoder, up to 23 bit resolution.



搭配GMC控制卡组成一体化3D打印解决方案，解决多头校正、拼接和协同工作难题。

3D printing solution combined with GMC controller solve the difficulties of multi-head correction, stitching and collaboration.



紧凑型的外形结构设计，适合3D多头拼接需求。

Compact structure design, suitable for 3D multi-head stitching.



自研光学设计组件，保证多种不同加工范围下光斑圆度和光斑一致性。

Self-developed optical modules, ensure spot roundness and spot consistency in different processing fields.



高精度音圈电机Z轴调焦模块，定位精度高，漂移小。

High precision Z-axis voice coil motor dynamic focusing module, high positioning accuracy and low drift.



针对大型、复杂SLM 3D打印系统而设计。

Designed for large and complex SLM 3D printing systems.

技术参数

TECHNICAL PARAMETERS

Sailing-3D		
电机摆动角度	Scan Angle (°)	±10
位置分辨率	Position Resolution	23
重复标刻精度	Repeatability (μrad)	1
最大增益漂移	Max.Gain Drift (ppm/k)	5
最大零位漂移	Max.Offset Drift (μRad/k)	10
8小时连续工作漂移	Long-term Drift over 8h (mRad)	≤0.04
跟随误差	Tracking Error (ms)	≤0.7
增益误差	Gain Error (mrad)	<5
零位误差	Zero Offset (mrad)	<5
波长	Wavelength (nm)	1064
通光直径	Aperture Size (mm)	30
最大激光功率	Maximum Laser Power Cw (W/cm²)	3000

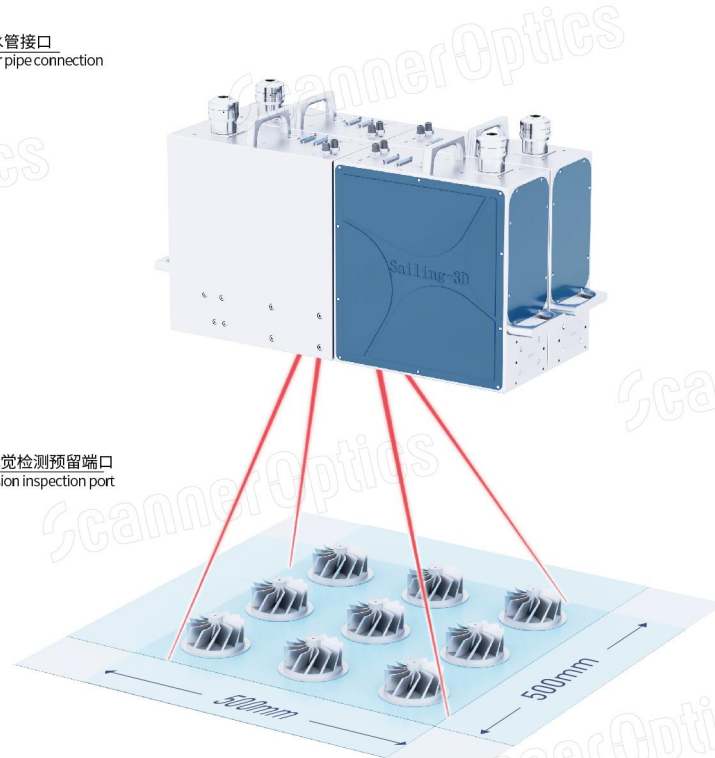
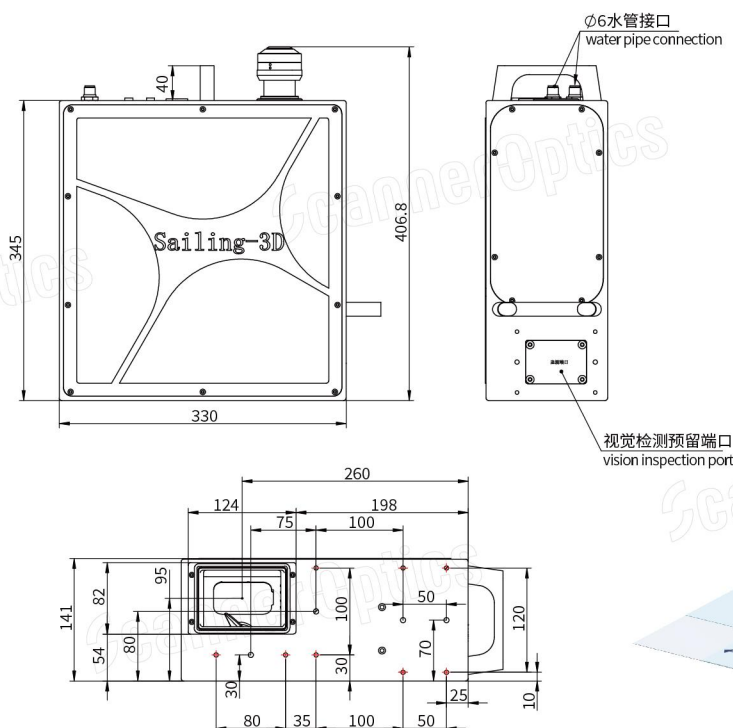
光学参数

OPTICAL PARAMETERS

单振镜工作范围 Field Size of Single Scan Head (mm)	四振镜工作重合区域 Overlap Area of Four Scan Heads (mm)	工作高度(系统底座距加工面) Working Distance (mm) (system base to processing surface)	工作面最小光斑直径 Minimum Diameter of Focal Spot (1/e ²) (μm)
300*300	150*150	344.4	28.8
350*350	200*200	413.1	32.8
400*400	250*250	481.8	37.2
450*450	300*300	550.4	41.6
500*500	350*350	619.1	45.6
550*550	400*400	687.8	50
600*600	450*450	756.5	54.4
650*650	500*500	825.2	64.8

外形尺寸图

TECHNICAL DRAWING



FOUR-AXIS SYNCHRONIZING MOTION SYSTEM

四轴联动系统



工作原理

WORKING PRINCIPLE

四轴联动系统主要由XY振镜、XY运动平台、平台驱动器、GMC控制卡以及定制加工软件组成，拥有无限视野加工功能，可同步XY运动平台与振镜方头。将扫描振镜的高动态性能与XY运动平台的大行程范围相结合，解决了传统2D振镜对加工范围受限的问题，而且不存在拼接误差，适合于大尺寸、高精度的激光加工应用。

The four-axis synchronizing motion system is mainly composed of an XY scan head, an XY motion platform, a platform driver, a GMC controller and customized processing software. It has infinite field processing function and can synchronize the XY motion platform and scan head. The combination of scan head with high dynamic performance and the XY motion platform with large stroke range solves the problem of limited machining range of traditional 2D galvo scanning system, and there is no stitching error, which is suitable for large-size and high-precision laser machining applications.

产品特点

FEATURES



使用思特光学自主研发的GMC控制卡，可实现高速度、高精度、大幅面的激光加工。
GMC controller independently developed by Scanner Optics, realizing high-speed, high-precision and large field laser processing.



支持多种文件格式；支持二次开发，提供C++和C#开发例程。
Support multiple file formats; Support secondary development and provide C++ and C# development routines.



适用于思特光学各个系列振镜方头，以及兼容XY2-100通讯协议的第三方振镜方头。
Applicable to all series of scan heads of Scanner Optics and compatible with third-party galvo scan heads with XY2-100 communication protocol.



只需要一张控制卡即可实现振镜与平台的实时同步联动控制。
Only one controller is needed to realize the real-time synchronous control between scan head and 2 axis gantry.

应用情景

APPLICATION SCENARIOS



UV钻孔
UV drilling



OLED切割
OLED cutting

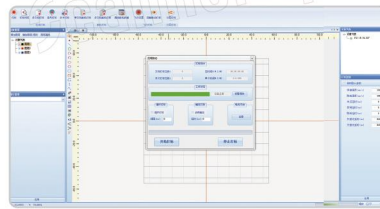


FPC切割
FPC cutting

※以上图片来源于网络
All the above pictures are from the Internet

四轴联动方案组成

FOUR-AXIS SYNCHRONIZING MOTION SYSTEM SCHEME



打标软件
Marking Software



控制卡
Controller



XY平台 / 驱动器
XY Motion Platform / Driver



定制振镜 / 场镜
Customized Galvo / F-theta lens



打标图案
Marking Pattern

加工精度为5μm@130mm行程
5μm processing accuracy @ 130mm travel length

FIVE-AXIS LASER MICROMACHINING SYSTEM

五轴微加工系统

产品特点

FEATURES



使用传统2D扫描振镜只能加工正锥孔，而且无法控制锥孔的锥度，更不用说加工标准直孔和倒锥孔。思特光学开发的五轴激光微加工系统，不仅可以加工标准直孔，锥孔，还能控制加工锥度，极大的扩展了激光钻孔的灵活性。搭配不同波长及超快激光器，不仅可以降低钻孔热效应，还可以提高孔壁光滑度。

The standard 2D scan head can only be used to process the positive taper hole, and the taper of the hole cannot be controlled, let alone the standard straight hole and inverted taper hole. The five-axis laser micromachining system developed by Scanner Optics can not only machine standard straight holes and taper holes, but also control the taper of machining, which greatly improves the flexibility of laser drilling. With different wavelengths and ultrafast lasers, the system lowers thermal effect of drilling and improves the smoothness of the wall of holes.

技术参数

TECHNICAL PARAMETERS

五轴微加工系统 Five-Axis Laser Micromachining System		
工作范围	Field Size (mm)	$\phi 0.025$ to $\phi 1$
Z方向最大变焦范围	Max. Focus Range In Z Direction (mm)	± 1
入射光斑	Input Beam Aperture (mm)	10
聚焦光斑直径	Focal Spot Diameter ($1/e^2$) $M^2=1$	25
最大进给角度	Max. Angle Of Incident ($^\circ$)	± 9
旋进频率	Precession Frequency (HZ)	200-600 (12000-36000rpm)
物镜焦距	Objective Focal Length (mm)	50
重复精度	Repeatability (μm)	≤ 0.5 (常温老化8H aging at room temperature for 8h)
入射角分辨率	Incidence Angle Resolution (μrad)	2
尺寸	Dimensions (L*W*H) (mm)	601 $\times$ 280 $\times$ 274
重量	Weight (Kg)	23.5

应用场景

APPLICATION SCENARIOS

汽车工业（喷油嘴孔钻削），航空航天工业（涡轮叶片的冷却气膜孔），半导体探针卡，钟表行业，过滤行业，医疗技术行业（冠状动脉支架切割）。

Automotive industry (fuel spray nozzle hole drilling), aerospace industry (cooling film hole of turbine blades), semiconductor probe card, watch and clock industry, filtration industry, medical technology industry (coronary stent cutting).

POLYGON SCAN SYSTEM

转镜扫描系统

产品简介

PRODUCT INTRODUCTION



思特光学校镜面扫描系统采用一维棱镜加一维振镜设计方案，无需外加运动轴即可实现二维面扫描。自主设计的高精度棱镜和高速直流无刷电机，匹配高性能数字驱动板，实现超高速度的同时保证高速度稳定性。扫描起始点检测模块可检测棱镜面的起始点，配合思特光学GMC控制卡和专用打标软件，简化客户系统集成的难度。

思特光学校镜面扫描头适用于各种高重频的皮秒、飞秒激光器以及高功率连续激光器等应用场景，可达到260米/秒的扫描速度，实现振镜无法比拟的加工效率。

Scanner Optics polygon scan system is designed with a one-dimensional polygon mirror and a one-dimensional galvanometer, which can realize two-dimensional surface scanning without a motion axis. Self-designed high-precision polygon mirror and high-speed brushless DC motor working with a high-performance digital driver board realize ultra-high-speed scanning while ensuring high-speed stability. The scanning starting point detection module can detect the starting point of polygon mirror surface, and it works with Scanner Optics GMC controller and special marking software to simplify the system integration for customers.

Scanner Optics polygon scan head is applicable to various application scenarios such as picosecond, femtosecond lasers with high repetition frequency and high-power continuous lasers. It can achieve a scanning speed of 260 m/s and an incomparable processing efficiency for galvanometers.

产品特点

FEATURES



高速、高速度稳定性。
High speed and high speed stability.



高激光功率。
High laser power.



低漂移、高精度。
Low drift and high precision.



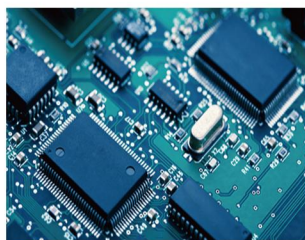
模块化设计，易于集成。
Modular design, and easy integration.

应用 场景

APPLICATION SCENARIOS



高速划线、飞行打标
High speed marking
Marking on the fly



PCB高速表面处理
High-speed surface processing of PCB



高功率激光清洗
High power laser cleaning



玻璃、塑料钻微孔
Micro-drilling of glass and plastic

※以上图片来源于网络
All the above pictures are from the Internet

技术 参数

TECHNICAL PARAMETERS

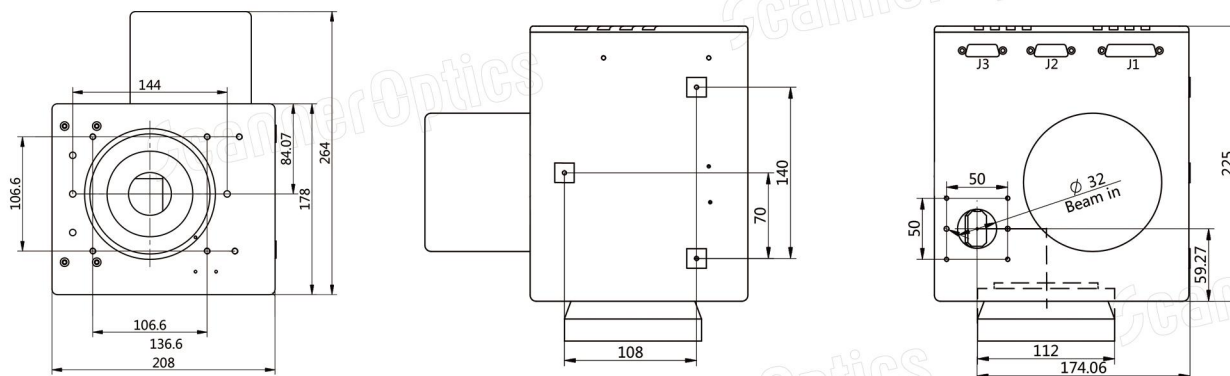
转镜扫描系统 Polygon Scan System		
入口光斑	Input Beam Aperture (mm)	≤15
波 长	Wavelength (nm)	355/532/1064
扫描速度(线/秒) ^①	Scan Speed (line/s)	150-5300
扫描线速度 ^①	Scanning Speed (m/s)	18-660
线重复定位-Y轴	Line Positioning Repeatability Accuracy - Y axis (μrad)	±50
打标重复定位-X轴	Marking Positioning Repeatability Accuracy - X axis (μrad)	±50
电源要求	Power Requirements	±15VDC@7Amax 48VDC@10Amax
扫描角度 ^②	Scan Angle (°)	±14 (X轴axis) , ±14 (Y轴axis)
工作温度	Operating Temperature (°C)	25±10

注：① 使用焦距F=255mm的场镜测试 Test using F-theta lens with focal length F=255mm

② 以上角度均为光学角度 All angles above are optical angles

外形 尺寸图

TECHNICAL DRAWING



OPTICAL COHERENCE TOMOGRAPHY SCAN MODULE

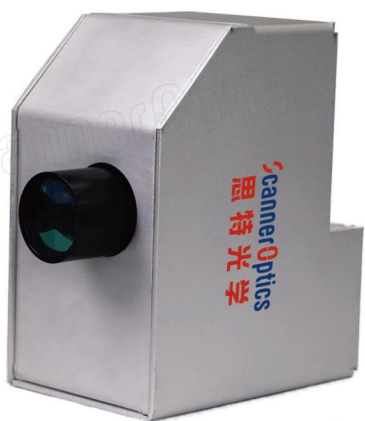
光学相干断层扫描模块

产品描述

PRODUCT DESCRIPTION

光学相干断层扫描 (Optical Coherence Tomography Scan, 简称OCT) 技术是近年来新兴的一种测量技术, 其通过检测发射光线与返回光线的光程差, 得出探测头到被测表面的相对距离, 再经过一系列数学变换, 即可形成一张包含实际物理距离信息的三维图像或二维图像。

Optical Coherence Tomography Scan (OCT) is a new distance measurement technology that has emerged in recent years. By measuring the optical path difference between the emitted light and the returned light, the relative distance between the probe and the measured surface can be obtained. After a series of mathematical manipulation, a 3D or 2D image containing the actual physical distance information can be obtained by the device.



产品特点

FEATURES



具备深度信息测量能力, 高度信息不受烟尘及颜色干扰。

Have the ability of depth measurement, and the height measurement is not interfered by smoke, dust and color.



同时支持镜面与非镜面物体测量, 且精度不因镜面损失。

Support both mirror and non-mirror surface measurement without accuracy decline.



支持透明物体透视测量。

Support measurement through transparent object.



无需辅助光源, 不受环境光干扰。

No auxiliary light is needed, free from ambient light interference.

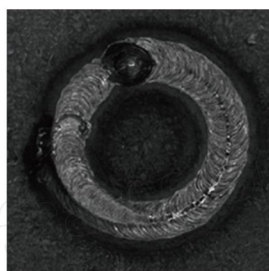
□ 技术参数

TECHNICAL PARAMETERS

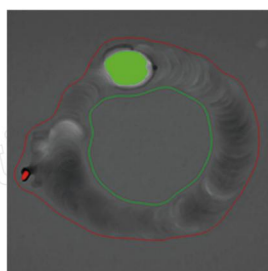
OCT		
测量范围	Measuring Range (mm x mm)	40*40
测量深度	Measuring Depth (mm)	3
分辨率	Resolution (μm)	X/Y方向 direction: 10 Z方向 direction: 6
测量速度	Measuring Speed (mm/s Max)	1600

□ 行业应用

INDUSTRY APPLICATIONS



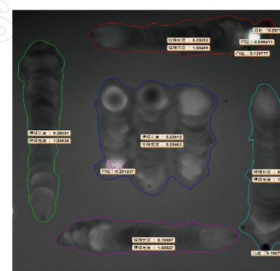
普通相机拍摄铜板焊接轨迹图
Copper plate welding path photo taken by a normal camera



OCT检测，无惧激光干扰
Copper plate welding path photo taken by OCT, free from laser interference.

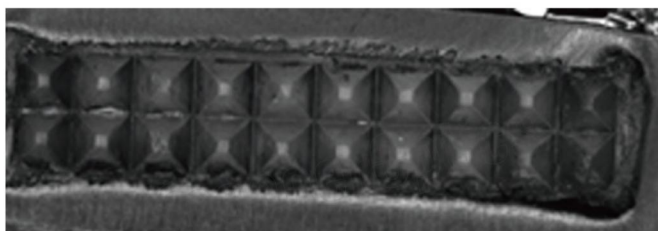


普通相机拍摄铝板焊接轨迹图
Aluminum plate welding path photo taken by an ordinary camera.

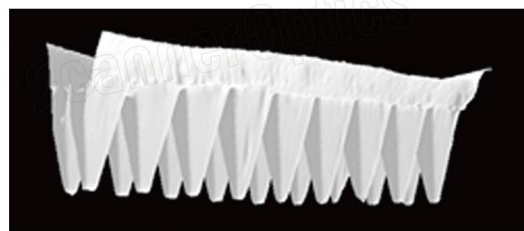


OCT设备自动扫描并计算
Automatic scanning and calculation by OCT equipment.

OCT设备不仅自动完成焊缝识别，同时对焊缝的长度，宽度，缺陷点高度和深度都进行了测算并显示。
OCT equipment can automatically identify the weld seam, measure and display its length and width, and the height and depth of defect points.



超声波焊缝图
Ultrasonic image of welding seam taken by normal industrial camera.



OCT检测3D模型侧视图
Side view of 3D model detected by OCT.

LASER PROJECTION SYSTEM

激光投影系统

工作原理

WORKING PRINCIPLE



思特光学激光投影系统使用定制化的控制软件控制高速扫描振镜，将激光光束按1:1的比例准确的投射到物体表面，描绘出工件/物品的外形轮廓和定位点，辅助操作人员对大型工件/物品高效、准确的定位，减少了布局、设置和装配时间，显著提高生产效率。同时，最大限度的减少装配过程中的操作人员失误造成的影响，减小制造失误，返工和不合格品。经过专门优化投影系统定制化软件，支持各种常见格式的3D图形文件，支持超大范围的校正，操作简单，容易上手。

Scanner Optics laser projection system employs customized control software to control the high-speed galvo scanning system. It accurately projects the laser beam to the surface of object in a ratio of 1:1 to display the outline and positioning point of the workpiece or item and assist the operator to locate the large workpiece or item efficiently and accurately, reducing the time for layout, setting and assembly and significantly improving the production efficiency. At the same time, it minimizes the impact caused by operator errors in the assembly process to reduces manufacturing errors, rework and nonconforming products. The specially optimized software of the projection system supports 3D graphics files in various common formats and large-scale correction, featuring easy operation.

产品特点

FEATURES



自主设计扫描振镜，速度快，精度高，稳定性好。

Self-designed galvo scanning system, with high speed, high precision and good stability.



高功率绿光激光器，传输距离远。

High power green laser, with long transmission distance.



以太网通讯，抗干扰能力强，多机协同工作方便。

Communication via Ethernet, with strong anti-interference ability, easy multi-machine collaboration.



校正操作简单，上位机软件界面友好、上手快。

Simple correction operation, and user-friendly upper computer software interface.

应用场景

APPLICATION SCENARIOS



水泥预制件
Concrete prefabricated parts



大型工件铺装定位
Pavement positioning of large workpieces



木材家具加工
Wood furniture production



飞机、轮船喷涂定位
Painting positioning of aircraft and ships

※以上图片来源于网络
All the above pictures are from the Internet

技术参数

TECHNICAL PARAMETERS

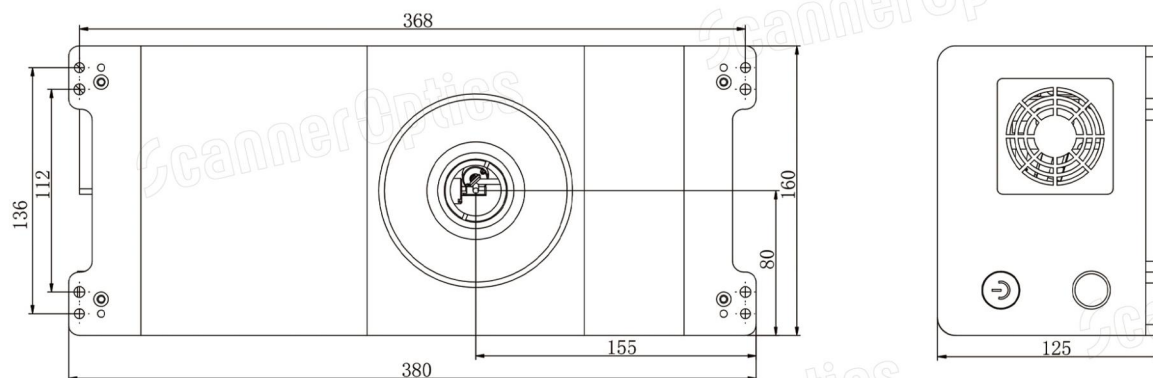
激光投影系统 Laser Projection System

激光光斑直径	Laser Beam Diameter(mm)	≤2.5
激光波长	Laser Wavelength(nm)	532nm Green Laser
定位精度	Positioning Accuracy(mm/m)	±0.1
重复定位精度	Positioning Repeatability accuracy(mm/m)	±0.025
投影角 ^①	Projection Angle(°)	80x80
通讯方式	Communication Mode	Ethernet
电源要求	Power Requirement	±15V 5A max.
激光器功率	Laser Power(mW)	100
工作温度	Operating Temperature(°C)	0-40
尺寸	Dimensions (L*W*H) (mm)	380*160*125
重量	Weight (Kg)	4.5

注：① 以上角度均为光学角度 All angles above are optical angles

外形尺寸图

TECHNICAL DRAWING



MEDICAL FRACTIONAL TREATMENT SYSTEM

医疗点阵系统

产品特点

FEATURES



操作界面友好，主要以图形选择和参数设置相结合的方式。

User-friendly operation interface, featuring graphic selection and parameter setting.



多样化的治疗方案，包括点阵模式、妇科模式和手术切割模式。

Diversified treatment schemes, including fractional mode, gynecological mode and surgical cutting mode.



采用数字/模拟系统，有多种报警功能和安全处理机制，确保设备的正常运行和安全使用。

Digital/analog system, with various alarm functions and safety processing mechanisms to ensure the normal operation and safe use of the equipment.



非顺序扫描模式，大幅度降低对周边组织的热损伤。

Non-sequential scanning mode, greatly reducing the thermal damage to peripheral tissues.



手具电缆采用双层屏蔽机制，传输可靠，抗干扰能力强。

Double-layer shielded cables for handpiece, with reliable transmission and strong anti-interference ability.



采用高性能航空插头，便于手具的维修和更换。

High-performance aviation plug, convenient for maintenance and replacement of handpiece.

系统简介

SYSTEM INTRODUCTION

	控制系统 Control System	驱动器 Driver	人机交互界面 Man-Machine Interface	手具 Handpiece	备注 Remarks
数字系统 Digital System			 电容屏 10寸 10" capacitive screen	 HS1608	支持多种点阵模式 Support a variety of fractional modes
模拟系统 Analog System			 电容屏 10寸 10" capacitive screen	 HS1608	只支持深层模式 Only support the deep mode

技术参数

TECHNICAL PARAMETERS

数字系统 DIGITAL SYSTEM		模拟系统 ANALOG SYSTEM
工作温度	Operating Temperature (°C)	0 ~ 45
非线性度	Nonlinearity (%)	<0.4
小步距阶跃响应时间	Small Step Response Time (ms)	≤0.25
增益漂移	Gain Drift (PPM/°C)	<80
零位漂移	Offset Drift (μRad /°C)	<15
>8小时长时间漂移	Long-Term Drift over 8h (mrad) ^①	<0.3
平均工作电流	Average Working Current (A)	0.65
峰值电流	Peak Current (A (Max))	1.7
最大扫描角度	Max. Scan Angle (°)	±15
存储温度	Storage Temperature (°C)	-10 ~ +50
分辨率	Resolution (μrad)	8
重复精度	Repeatability (μrad)	<5
输入孔径	Input Aperture (mm)	5.0 ~ 7.0
光束位移	Beam Displacement (mm)	10.7
重量	Weight (g)	13
频率	Frequency (Hz)	≤500 ^②

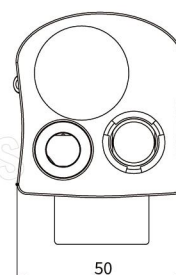
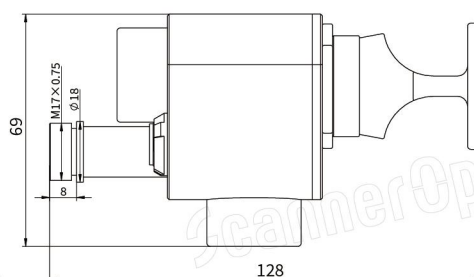
注：① 连续工作8小时 Continuously working for 8h

② 输入指令为正弦波，电机光学摆角±4° Sine wave input command at optical scan angle of ±4°

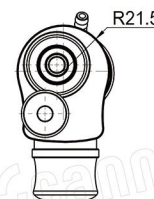
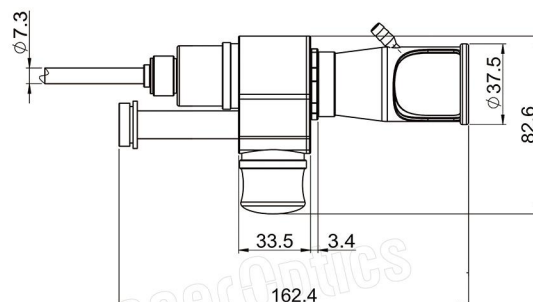
外形尺寸图

TECHNICAL DRAWING

HS1606



HS1608



GMC CONTROLLER

GMC控制卡

产品简介

PRODUCT INTRODUCTION

思特光学GMC控制卡兼具高精度, 高分辨率, 功能强大, 易于集成等特点, 各种强大的功能可以协助客户完成各种富有挑战的工作, 包括20bit的ST2-100通讯协议、Skywriting轨迹优化功能、位置闭环功能、状态监测功能以及温度监测功能等。高精度校正算法保证大幅面加工时的定位精度; 提供C#/C++二次开发库, 兼容32位/64位的各种windows操作系统, 方便客户灵活开发上位机软件。

GMC controller combines high precision, high resolution, and powerful functionality, while being easy to integrate. Various powerful functions can help customers complete a variety of challenging tasks, including the 20bit ST2-100 communication protocol, Skywriting trajectory optimization, position feedback loop, status and temperature monitoring. High-precision calibration algorithm ensures the positioning accuracy in large field machining. The product provides C#/C++ secondary development library, which compatible with 32bit/64bit Windows operating system for flexible development of host computer software.

行业应用

INDUSTRY APPLICATIONS

思特光学GMC控制卡主要应用于医疗、通用打标、2D&3D激光加工、高功率焊接、光伏、3D打印、转镜扫描、飞切、四轴联动等激光加工领域。

GMC controller is mainly used in medical, general marking, 2D&3D laser processing, high power welding, photovoltaic, 3D printing, rotating mirror scanning, flying cutting, four-axis linkage and other laser processing fields.



3D打印
SLM



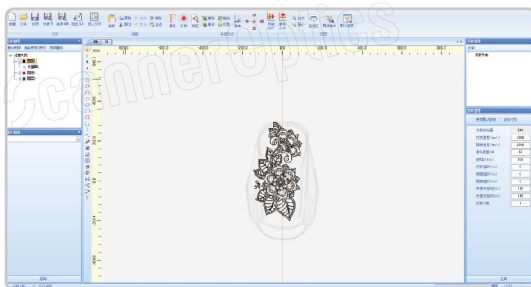
光伏
Photovoltaic



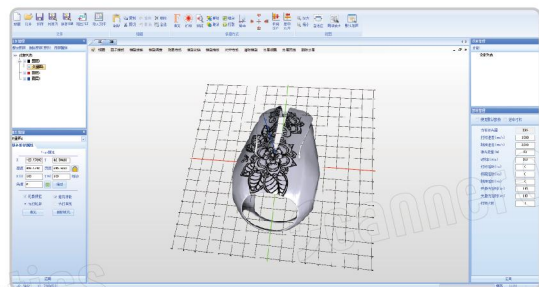
锂电池焊接
Lithium Battery Welding

软件界面

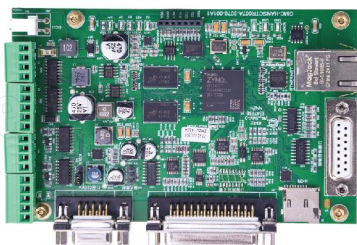
SOFTWARE INTERFACE



二维软件界面
2D Interface



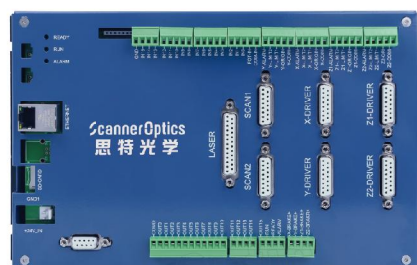
三维软件界面
3D Interface



A3
L145.35xW97.14xH17.7mm



A4
L145.0xW125.0xH30.0mm



A5
L278.07xW188.07xH28.0mm

技术参数

TECHNICAL PARAMETERS

	A3	A4	A5
工作电源 Working power supply	15V - 24V, 3A	15V - 24V, 3A	15V - 24V, 3A
通信协议 Protocol	XY2-100 / ST2-100	XY2-100 / ST2-100	XY2-100 / ST2-100
方头数量 Scan Head quantity	2D方头 x1 2D Scan Head x1	2D方头 x2 / 3D方头 x1 2D Scan Head x1	2D方头 x2 2D Scan Head x2
通讯方式 Communication mode	以太网 / 串口通信 Ethernet / Serial communication	以太网 Ethernet	以太网 Ethernet
控制伺服电机数量 Control the number of servo motors	—	1	4
连接屏幕控制 Connect screen control	√	—	—
动态聚焦Z轴控制 Dynamic Focus Module control	—	√	—
Skywriting Skywriting	√	√	√
RS-232 RS-232	√	√	√
最多连接控制卡数量 ^① Max. No. of controllers	252	252	252
激光控制信号 Laser control signal	2路 0-10V模拟量 2 channels 0-10V analog 5V激光控制电压 5V laser control voltage	2路 0-10V模拟量, 功率波形编辑 2 channels 0-10V analog, Power waveform editing 5V / 24V激光控制电压 5V / 24V laser control voltage	2路 0-10V模拟量 2 channels 0-10V analog 5V激光控制电压 5V laser control voltage
支持激光器类型 Supported laser types	脉冲光纤激光器 / 高功率连续激光器 / CO ₂ / 超快激光器等 Pulsed fiber laser / high power continuous laser / CO ₂ / ultrafast laser, etc.		
旋转电机 Rotary motor	—	√	—
脱机打标 Off-line marking	√	√	√
IO I/O	8路输入 / 8路输出 8 inputs / 8 outputs 5V / 24V, 500mA输出 5V / 24V, 500mA output	16路输入 / 16路输出 16 inputs / 16 outputs 5V / 24V, 500mA输出 5V / 24V, 500mA output	16路输入 / 16路输出 16 inputs / 16 outputs 5V / 24V, 500mA输出 5V / 24V, 500mA output
振镜反馈 ^② Galvanometer feedback	√	√	√
外加SD卡 Additional SD card	√	√	√
系统要求 System requirement	Windows 10 / 8 / 7 (32bit & 64bit)		
应用接口 Application interface	ScanWorld打标软件 / ScanWorld API (支持C++和C#开发环境) ScanWorld Marking Software / ScanWorld API (supports C++ and C# development environments)		

① 单台振镜通过交换机最多可连接的控制卡数量。

The maximum number of controller that can be connected to a single galvanometer through a switch.

② 反馈内容包含：X位置反馈、Y位置反馈、初始化找零报警、过流闪报警、编码器错误报警。

The feedback includes: X position feedback、Y position feedback、Initialization alarm、Overcurrent alarm、Encoder error alarm.

F-THETA LENS

F-Theta 镜头

产品简介

PRODUCT INTRODUCTION

思特光学拥有经验丰富的光学设计团队，专长于不同应用领域的场镜设计和定制化光学设计。设计的F-theta镜头经过不断优化改进，产品性能不断提升，已达到国际先进水平。目前，我们设计的产品除了应用于通用打标之外，还应用到消费电子，微加工，锂电，光伏和3D打印等高端制造行业。

Scanner Optics has an experienced optical design team, specializing in F-theta lens design and customized optical design for different applications. After continuous optimization and improvement, the performance of our F-theta lens has reached international advanced level. At present, besides general marking, our products are also used in high-end manufacturing industries such as consumer electronics, micromachining, lithium battery, photovoltaic and LAM industry.

应用场景

APPLICATION SCENARIOS



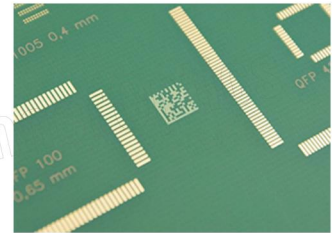
精密切割、焊接、清洗
Precision cutting, Welding, Cleaning



激光微加工
Laser Micromachining



锂电行业加工
Lithium battery industry processing

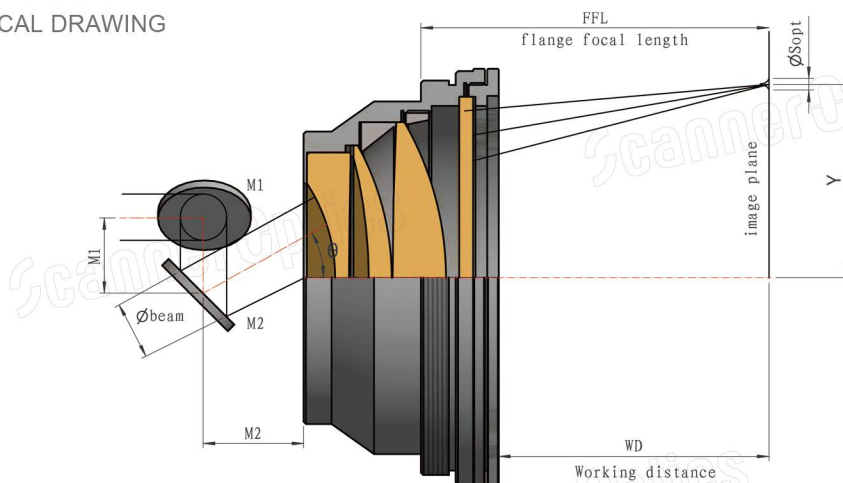


PCB、FPC激光打标
For PCB, FPC laser marking

※以上图片来源于网络
The above pictures are from the Internet

外形尺寸图

TECHNICAL DRAWING



□ 技术参数

TECHNICAL PARAMETERS

绿激光F-Theta场镜 Green Laser F-Theta Lens											
规格型号 Part Number	焦距 Focal Length (mm)	通光孔径 Aperture Size (mm)	扫描角度 Scan Angle	打标范围 Marking Field (mm)	适用波长 Wavelength (nm)	聚焦光斑 Focal spot (μm)	外形尺寸 Outer Dimensions (mm*mm)	M1距离 M1 Distance (mm)	M2距离 M2 Distance (mm)	工作距离 Work Distance (mm)	连接方式 Connection Method
GF071004GY	74	Φ10	±21.5°	40*40	532	8	Φ90* 70	12.6	15.5	91.2	M85*1.0
GF101506GY	100	Φ15	±22°	58*58	532	7	Φ103* 72	17	18	135.5	M85*1.0
GF121206GY	115	Φ12	±21°	65*65	532	8.5	Φ112* 93	14.7	23.5	147.2	M85*1.0
GF652041G	650	Φ20	±24°	410*410	532	35	Φ135* 124.5	25.5	24.8	530	M85*1.0
紫外激光F-Theta场镜 Ultraviolet Laser F-Theta Lens											
规格型号 Part Number	焦距 Focal Length (mm)	通光孔径 Aperture Size (mm)	扫描角度 Scan Angle	打标范围 Marking Field (mm)	适用波长 Wavelength (nm)	聚焦光斑 Focal spot (μm)	外形尺寸 Outer Dimensions (mm*mm)	M1距离 M1 Distance (mm)	M2距离 M2 Distance (mm)	工作距离 Work Distance (mm)	连接方式 Connection Method
GF101205UVY	100	Φ12	±22°	55*55	355	7	Φ90* 65	14.7	15	123	M85*1.0
GF131265UVY	135	Φ14	±20°	65*65	355	8	Φ125* 105	17	20	168.8	M85*1.0
HF161010UVO	161	Φ10	±25°	100*100	355	10	Φ90* 53	12.6	15.8	196	M85*1.0
GF251016UV	254	Φ10	±25°	165*165	355	17	Φ95* 54	12.6	21.35	309.5	M85*1.0
红外F-Theta场镜 Infrared Laser F-Theta Lens											
规格型号 Part Number	焦距 Focal Length (mm)	通光孔径 Aperture Size (mm)	扫描角度 Scan Angle	打标范围 Marking Field (mm)	适用波长 Wavelength (nm)	聚焦光斑 Focal spot (μm)	外形尺寸 Outer Dimensions (mm*mm)	M1距离 M1 Distance (mm)	M2距离 M2 Distance (mm)	工作距离 Work Distance (mm)	连接方式 Connection Method
GF101005RY	100	Φ12	±25°	55*55	1030-1080	16	Φ90* 70.5	12.6	16.5	122.5	M85*1.0
JZ161010IR	164	Φ10	±25°	100*100	1030-1080	30	Φ90* 53	12.5	15	206.4	M85*1.0
GF161010IR	164	Φ10	±25°	100*100	1030-1080	30	Φ90* 53	12.6	15.35	203.5	M85*1.0
GF161410IR	164	Φ14	±25°	105*105	1030-1080	25	Φ95* 63	14.7	15.4	208.2	M85*1.0
GF251416SIR	254	Φ14	±25°	165*165	1030-1080	35	Φ105* 63.5	17	22	313	M85*1.0
GF252016IR	254	Φ20	±25°	160*160	1030-1080	25	Φ125* 73	25	18.25	322.4	M85*1.0
GF271417IR	275	Φ14	±25°	170*170	1030-1080	40	Φ120* 71	17	22.85	335.7	M85*1.0
GF262018IRWAT	260	Φ20	±25°	160*160	1030-1080	32	Φ173* 100	26	22	332.9	M85*1.0
GF352021IR	350	Φ20	±25°	215*215	1030-1080	37	Φ125* 20	25	19.7	424	M85*1.0
F392425R	390	Φ24	±25°	250*250	1030-1080	32	Φ95* 46	35	25.7	420.8	M85*1.0
GF341622IRWAT	340	Φ16	±25°	215*215	1030-1080	43	Φ139* 100	26	22.41	283	M85*1.0
GF422026IR	420	Φ20	±25°	260*260	1030-1080	40	Φ120* 64	26	18.5	499	M85*1.0
4KGF652041IR	650	Φ20	±25°	410*410	1030-1080	65	Φ112* 84	25.6	21.55	563.8	M85*1.0
红外高(中)功率F-Theta场镜 Infrared Laser High (Medium) Power F-Theta Lens											
规格型号 Part Number	焦距 Focal Length (mm)	通光孔径 Aperture Size (mm)	扫描角度 Scan Angle	打标范围 Marking Field (mm)	适用波长 Wavelength (nm)	聚焦光斑 Focal spot (μm)	外形尺寸 Outer Dimensions (mm*mm)	M1距离 M1 Distance (mm)	M2距离 M2 Distance (mm)	工作距离 Work Distance (mm)	连接方式 Connection Method
XSF173010RY	170	Φ30	±25°	105*105	650/1064	10	Φ147* 111	35.6	29	194	M112*1.0
DGF333016IRWAT-KZ	330	Φ30	±21°	175*175	1030-1080	23	Φ162* 90	37	30	417	Flange
DGF463023IRWAT-KZ	460	Φ30	±21°	245*245	1030-1080	30	Φ162* 90	37	29	566	Flange
DGF173009IRYWAT-KZ	170	Φ30	±21°	95*95	1030-1080	22	Φ162* 115.5	37	29	214.4	Flange
DGF253013IRWAT-KZ	254	Φ30	±20°	135*135	1030-1080	20	Φ162* 90	36	28.5	194	Flange
DGF283015IRWAT-KZ	285	Φ30	±21°	145*145	1030-1080	20	Φ162*90.5	37	30	369.7	Flange
DGF403021IRWAT-KZ	400	Φ30	±21°	205*205	1030-1080	30	Φ162* 90	37	28.5	490.5	Flange
DGF503026IRWAT-KZ	500	Φ30	±21°	260*260	1030-1080	33	Φ162*90	37	29	608.2	Flange
DGF603035IRWAT-KZ	600	Φ30	±22°	345*345	1030-1080	40	Φ162*115.5	37	28	600.2	Flange

* 更多F-Theta场镜、远心镜头、扩束镜, 多种型号欢迎咨询。 F-Theta lenses, telecentric lenses, and beam expanders are available in various models. Feel free to inquire.

OPTICAL ENCODER

光学编码器

产品特点

FEATURES

思特光学的Smart Incremental系列是一种开放式非接触通用光栅尺系统。

读数头紧凑小巧, 内置安装用的LED指示灯, 输出低至32nm分辨率的数字量指示信号并内置集成光学Index mark感应探头。

Smart Incremental Series is the non-contact open linear optical encoder system.

The reading head is compact and has a built-in LED indicator for installation. The resolution of the digital output is up to 32nm.

The index detector is integrated in the readhead.



标准银读数头
Standard Silver Readhead



标准黑读数头
Standard Black Readhead



超薄银读数头
Ultrathin Silver Readhead



超薄黑读数头
Ultrathin Black Readhead



圆弧型读数头
Arc-shaped Readhead



转接头
Connector



圆形光栅尺
Rotary Optical Scale



直线光栅尺
Linear Optical Scale

技术参数

TECHNICAL PARAMETERS

温度 Temperature	湿度 Humidity
操作 Operating: - 20°C - 70°C	操作 Operating: 10% to 90% RH, 非凝结 non condensing
贮存 Storage: - 20°C - 85°C	存储 Storage: Up to 85% RH, 非凝结 non condensing
加速 Acceleration	振动 Vibration
50g; EN60068-2-7	10g, 55 Hz - 2 KHz; EN60068-2-6
信号水平 Signal Output	
A/B/I (差分 differential): RS-422	
A/B/I (单端 single-end, 无负载 no load): 高电平 Voh max>3VDC, 低电平 Voh min<0.2 VDC	
Sin/Cos: 1 Vpp 跨接 Across 120Ω 负载 esistor	

系统规格 Technical Parameters

读数头尺寸	Readhead dimensions (mm)	标准 standard: 36×13.5×10.2; 超薄 ultrathin: 40×15×6.4
信号输出	Output	Differential 1Vpp sin/cos and Index Index signal or Differential A-quad-B and Index Index signal
分辨率 (数字型)	Resolution(Digital output)	直线 Linear: 4um - 32 nm 圆形 Rotary: Up to 8,000,000cpr
直线精度等级	Linear accuracy	+/-3um (短玻璃光栅 the glass scale ≤135mm) +/-5um (长玻璃光栅 the glass scale >135mm, ≤680mm) < +/-3um /米(两点线性化 Two points linearity) < +/-50um /米(斜坡 Slope)
圆形精度等级	Rotary accuracy	≤ ±2.1arc-sec
电源	Power supply	5VDC±5% @165mA (120Ω across A, B, I) 5VDC±5% @105mA (120Ω across Sin/Cos, I)
最大速度	Maximum velocity	10m/s
Index信号	Index Signal	1/4Pitch period(Differential 1Vpp sin/cos output) 1LSB(Differential A-quad-B output)
状态指示灯	Signal status indicator	There are
操作环境	Operating Environment	Atmosphere
栅距	Pitch	≤256 μm and other options
重复精度	Repeatability	1 LSB(>50nm resolution) ; 72nm(≤50nm resolution)
典型细分精度误差	Typical cyclical error (SDE)	72 nm
重量	Mass	<18g (读数头 Readhead) , <100g/m (电缆线 Cable)

最大速度 Maximum Velocity (数字量输出型 Digital output)

分辨率(um) Resolution 实际读数头A/B的 最大输出频率 (MHz) Max A/B output frequency of the readhead	8	4	2	1	0.5	0.2	0.1	0.08	0.064	0.05	0.04	0.032
12.5	10	10	10	10	10	10	5	4	3.2	2.5	2	1.6
6.25	10	10	10	10	10	5	2.5	2	1.6	1.25	1	0.8
4	10	10	10	10	8	3.2	1.6	1.28	1.024	0.8	0.64	0.512
3	10	10	10	10	6	2.4	1.2	0.96	0.768	0.6	0.48	0.384
2.5	10	10	10	10	5	2	1	0.8	0.64	0.5	0.4	0.32
2	10	10	10	8	4	1.6	0.8	0.64	0.512	0.4	0.32	0.256
1.5	10	10	10	6	3	1.2	0.6	0.48	0.384	0.3	0.24	0.192
1	10	10	8	4	2	0.8	0.4	0.32	0.256	0.2	0.16	0.128

* 支持其它分辨率的设置, 细节请与当地技术支持工程师联系。Other resolution options are supported.

* 在10米/秒以内的运行速度, 最大运行速度(米/秒)=分辨率(μm)*4*最高频率(MHz)。

Within 10m/s moving speed, the max moving speed (m/s)=resolution (μm)*4*the max output frequency.

例如0.1μm分辨率, 最高频率为4MHz, 则0.1*4*4=1.6米/秒。

e.g. The resolution is 0.1μm, and the max output frequency is 4MHz, then 0.1*4*4=1.6m/s.

* 上面的频率仅指A相或B相波形的最高频率。The frequency above is that of the A or B signal.



微信公众号



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ScannerOptics 思特光学

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Scanner Optics Co., Ltd.

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