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Galvo Scanning Mirror

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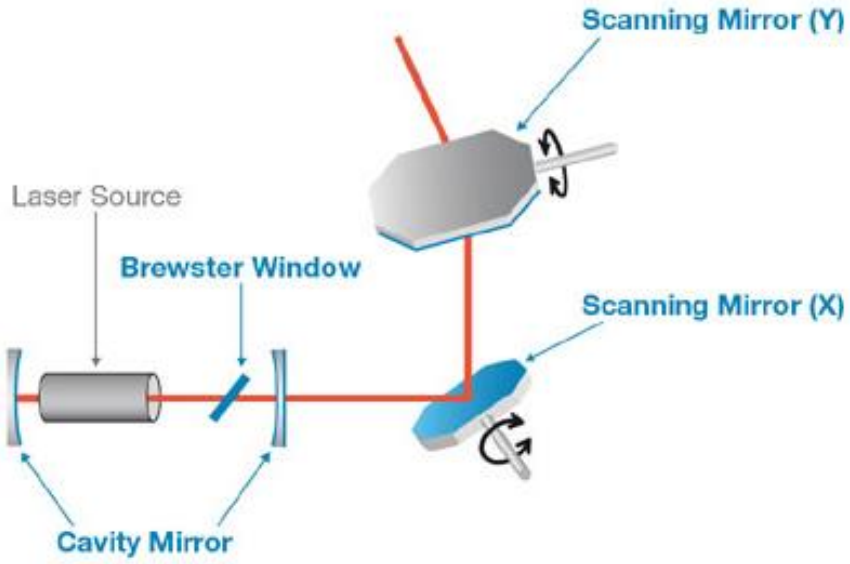
PART ONE

OVERVIEW GALVO SCANNING

GALVO SCANNING

Galvo-scanner heads have so far mainly been used for marking and rapid prototyping applications with lasers. They provide a good beam quality, but a rather moderate average power in the range of a few dozen watts. however, with the emergence of highly brilliant lasers – such as fiber and disk lasers – and even for some applications with less brilliant high power diode lasers, the application field of scanners has been extended into the multi kilowatt range. The scanning unit needs to be capable of handling this higher power range – but without compromising on accuracy and speed!



		Quartz	Silicon	SiC
Specific Density	(g/cm^3)	2.2	2.33	3.2
Heat conductivity	(W/m*K)	1.38	150	120
Bending strength	(N/mm^2)	68	300	500
Therm. Exp. Coeff.	(ppm/K)	0.55	2.5	4.3
Abs. coeff@1µm	(1/cm)	10^{-5}	46.5	12.5
Hardness HV10	(GPa)	8.8	13	25.2

PART TWO

Silicon Carbide Mirror for High-end Laser

Silicon carbide Mirror for High-end Laser

Silicon carbide is a very hard material similar to diamond, with good thermal conductivity and chemical stability. Silicon carbide mirrors take advantage of these properties of silicon carbide materials to achieve light reflection and focusing.

Silicon carbide mirror is the core component of high-performance optical system, and its performance is very important to the observation effect.

1

improve the resolution

silicon carbide mirror has high specific stiffness and excellent thermal stability, these characteristics make it can obtain excellent image quality over a wide spectrum, thus greatly improving the resolution of the telescope or satellite

2

material properties

As a new generation of optical mirror material, silicon carbide has high specific stiffness, high thermal conductivity, low thermal expansion coefficient and other excellent comprehensive properties, these characteristics make silicon carbide mirror in the environmental adaptability at the same time, can obtain excellent imaging quality in a wide spectrum.

Processing & inspecting SiC mirror

1

Grind & Polishing

Bena Optics has several large ring - polishing machines and the know-how to overcome the hard surfaces of SiC. Compared with the ordinary optical polishing equipment, it is not only fast but also stable.

2

Light weight

Bena Optics uses an advanced CNC machining center for lightweight processing, the whole process is designed by computer and can be designed and processed at multiple levels according to customer requirements.

3

Coating

Usually metal coating, covering aluminum, silver, gold. Mainly depends on the customer's requirements, from UV to deep infrared can be met.

4

Quality control

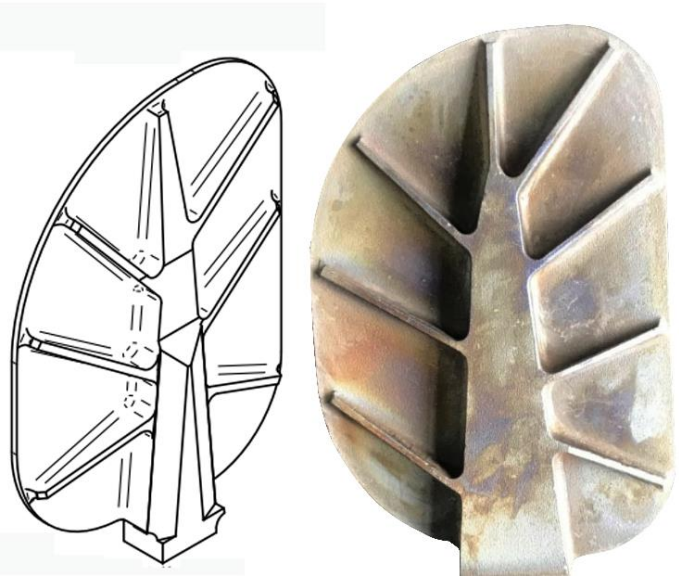
1, Dimension measurement: using CMM to ensure the accuracy of component measurement, and the perfect size.

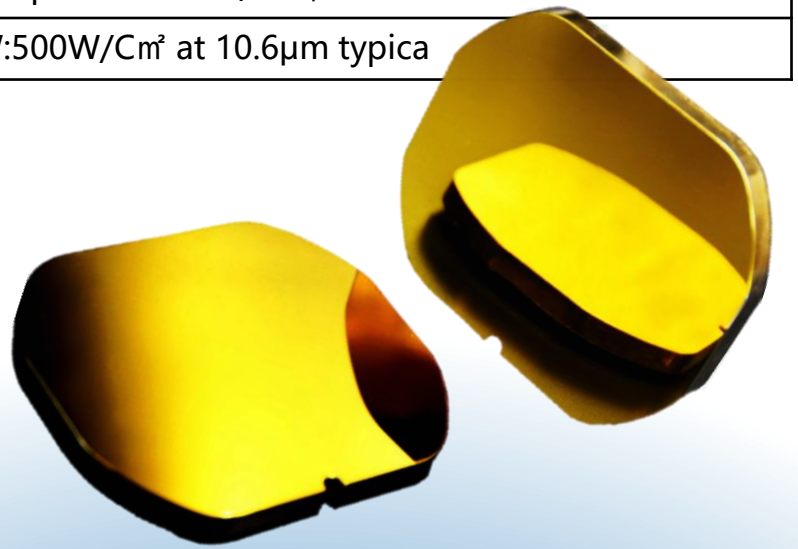
2, Surface accuracy: Using laser interferometer was used to detect the surface flatness.

3, Coating measurement: Use an advanced spectrophotometer.

Specification

Size (mm)	Upon customers' request
Clear aperture	>95% of Dim
Surface quality	40/20 laser quality
Surface figure	Better than λ/2 @632.8nm
Reflected Wavefront Error	λ/10 PV @ 632,8nm
Light weight	Upon customers' request
Coating	355nm, 532nm, 1064nm, 1080nm, Gold, Silver, or customized
Damage Threshold	10ns pulse:400MW/C㎡;
	CW:500W/C㎡ at 10.6μm typica





PART THREE

Silicon Mirror for High Laser

Silicon Mirror for High Laser

Silicon scanning mirror is generally made of monocrystalline silicon material, which is a kind of high-performance optical element with excellent thermal stability and optical properties. Silicon scanning mirror is widely used in laser radar, optical measurement, laser processing and other fields.

Silicon scanning mirror is generally made of precision machining technology such as cutting, grinding and polishing, and has the characteristics of high precision and high surface finish. In LiDAR, the silicon scanning mirror can be used as a scanning element to complete the scanning and positioning of the policy by manipulating the direction of the reflected light. In optical measurement, the silicon scanning mirror can be used as a scanning or modulating element to complete the accurate control and measurement of the beam. In laser processing, the silicon scanning mirror can be used to control the power and beam shape of the laser to complete the precision machining of various materials.

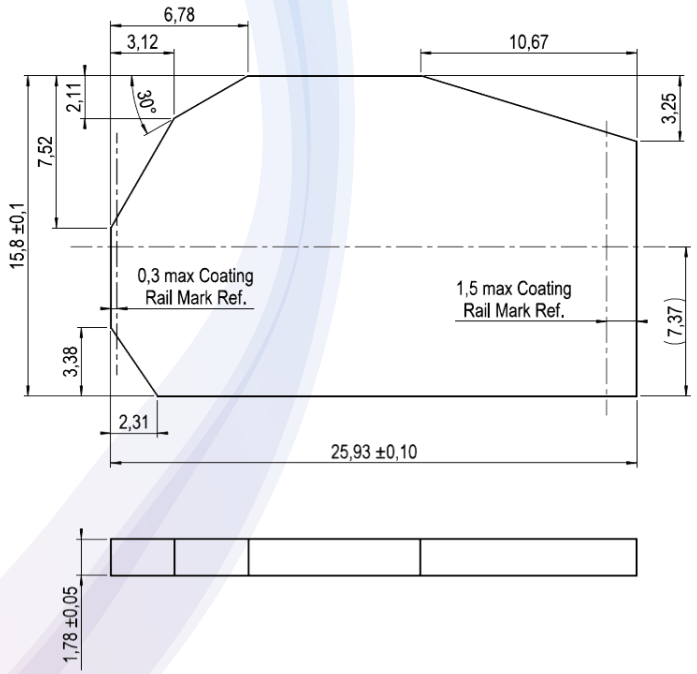
The silicon scanning mirror is controlled by the direction of the reflected light to complete the scanning and positioning of the policy. Specifically, when the laser announces the laser beam, the beam hits the surface of the silicon scanning mirror and is reflected off through the effect of the mirror. By manipulating the rotation or translation motion of the silicon scanning mirror, the direction of the reflected beam can be changed, and then the scanning and positioning of the beam can be completed. In LiDAR, the scanning motion of the silicon scanning mirror can complete the 3D scanning and imaging of the surrounding environment, so as to complete the detection and positioning of the policy. In optical measurement, the scanning and modulation effects of the silicon scanning mirror can complete the accurate control and measurement of the light beam, so as to complete the measurement of the size, shape, spacing and other parameters of the object.

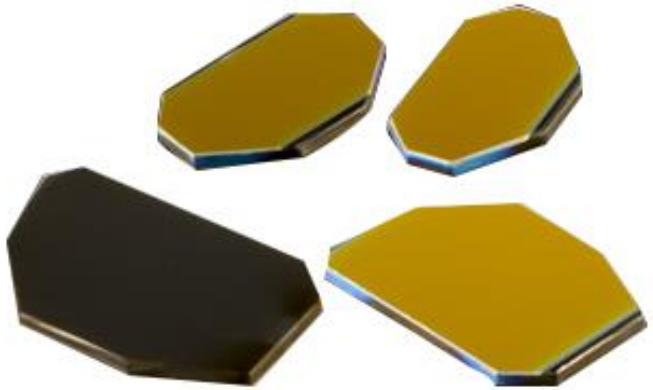
In short, the silicon scanning mirror completes the scanning and positioning of the policy by accurately manipulating the direction of the reflected light, providing a high-precision and high-reliability solution for a variety of applications.

Specification & List

Dimension L * W * T (mm)	Beam size
8.4x11.5x1.05	5
9x12x1.05	5
12.6x15x1.7	8
10.6x25.4x1.7	8
13.7x20.3x2	10
13.69x20.32x1.5	10
20x25x2	12
19x32x2	12
17.78x24.43x1.5	12
17.2x22.5x1.2	12
24.8x39.4x3.2	16
23x34x2	16
23x30x2	16
21x30x2	16
30x35x2	20
27x32x2	20
25x30x2	20
35x45x2	25
34x55x4	25
46.7x70.1x4	30
45x70x4	30
43x63x4	30
42x65x2	30
60x80x4	40
47x76x5	40

Material	Si crystal P or N
Purity	5N-9N
Crystal orientation	<100> or <111>
Dimension tolerance	± 0.02 / ± 0.1mm
Parallelism	Better than 3 arc min
Surface quality	60/40 or better
Flatness:	λ/8@632nm





PART FOUR

Quartz & Glass Mirror for Standard Laser

Quartz & Glass Mirror for Standard Laser

The base material of the vibrating lens is usually Schott N-BK7 glass, fused silica, quartz and monocrystalline silicon, which is used in the interior of the vibrating lens system. The other working principle is that the expanded laser beam is incident on the X and Y vibrating lenses, and the reflection angle of the vibrating lenses is controlled by software, so that the two vibrating lenses are offset along the X and Y axis respectively, so as to achieve the deflection of the laser beam.

Advantage:

- Fastest motor speeds in the industry, delivering low drift and long-term stability
- Superior precision and accuracy that ensure high-quality scanning output
- Extensive range of aperture sizes and mirror coatings
- Compact models with small footprint ensure easy integration for small spaces
- Broad range of product offerings from high-performance to cost-effective

Specification

- LXW Tolerance: +0/-0.1
- Clear Aperture: >90%
- Thickness Tolerance:+/-0.1mm
- Surface Quality:40/20
- Surface Figure: lambda/425mm2(at)632.8nm
- Coating

266nm	Fused silica	Aluminum Reflector Coating
1064nm/650nm/532nm	N-BK7	Dielectric Reflector Coating

Bena Optics hold that a company should be as tolerant / encompassing as the vast ocean which admits hundreds of rivers and should draw upon other's strengths.

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