

APPLICATIONS

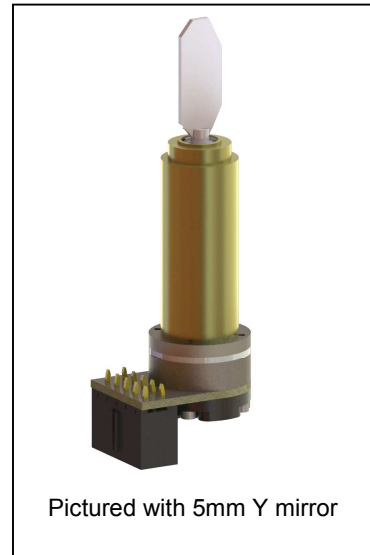
- Laser entertainment (light show) displays
- Optical Coherence Tomography (OCT)
- Confocal Microscopy / Raster Imaging
- Optical Layout Templates
- Laser Marking

UNIQUE ScannerMAX FEATURES

- Stronger magnetic field
- Stronger rotor and shafts
- Integrated back-supporting mirror mount design
- Long-life, SV30/silicon dioxide ceramic, hybrid bearings
- Trapezoidal position sensor with high output and low noise
- Cooler-running motor magnetic design

BENEFITS

- High speed mirror positioning
- Wide-angle scanning, up to 110 degrees optical
- Low coil resistance for low heat generation during scanning
- Low thermal resistance for enhanced heat removal
- Low wobble and jitter



Pictured with 5mm Y mirror

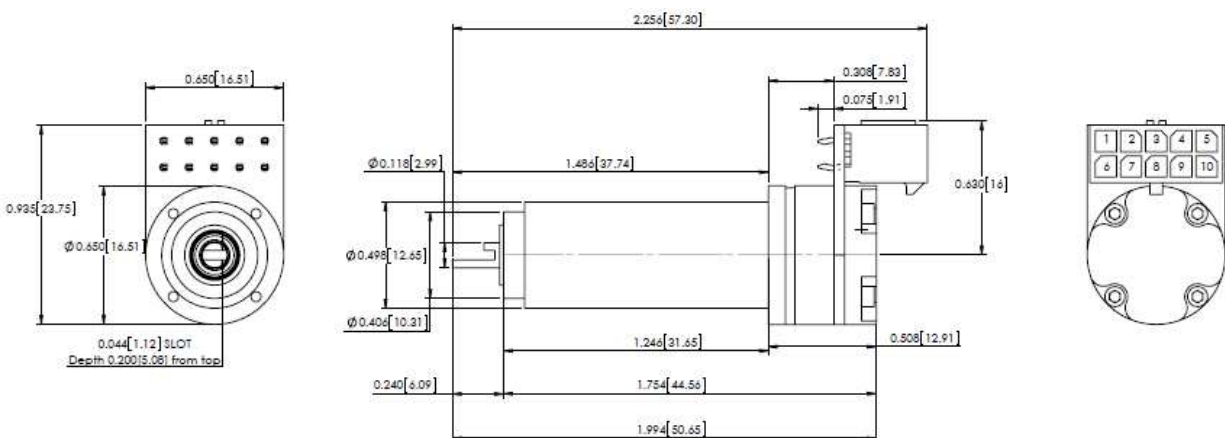
GENERAL DESCRIPTION

The *Saturn 5B* optical scanner is specifically designed to meet the high acceleration and high RMS duty cycle demands of projection and imaging applications such as laser entertainment displays, raster imaging, Confocal Microscopy and Optical Coherence Tomography. The *Saturn 5B* is capable of moving a 5mm beam through an optical angle of 40° at a frequency of over 1 kHz with a sinusoidal drive. Step response times with a 5mm beam can be as fast as 120 microseconds for a small optical step, and 600 microseconds for a 60° optical step, easily delivering scanning speeds of ILDA 60K / 5kHz small signal bandwidth, with a true 5mm beam.

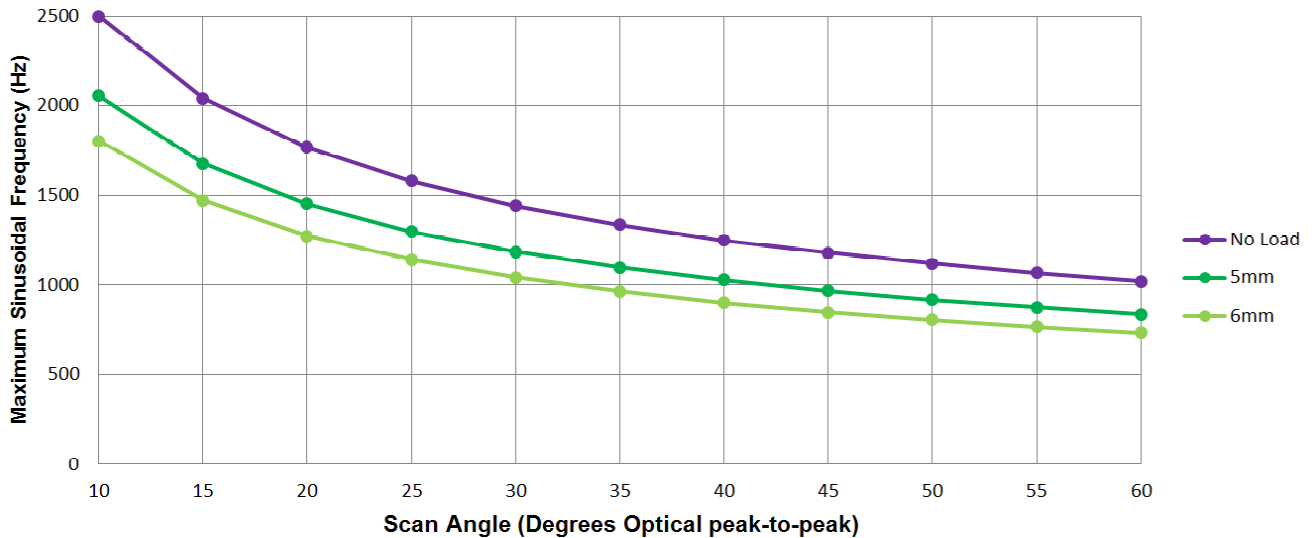
The patented X3 magnetic circuit boasts air gap flux densities of over 14,000 Gauss. The intense magnetic field strength, combined with the very low coil resistance and low rotor inertia, gives the *Saturn 5B* the highest RMS-torque-to-inertia ratio of any commercially-available optical scanner capable of moving a 5mm beam. The new -74S version utilizes a coil optimized for raster imaging, further reducing heat generated by both the scanner and driver.

The *Saturn 5B* incorporates all of the other design features of other ScannerMAX Saturn-family scanners, including a half-inch round body diameter, back-supporting mirror mount design, and high-output, low-noise position sensor.

OUTLINE DRAWING



Saturn 5B-74S Performance with selected ScannerMAX mirror sets⁽¹⁾



SPECIFICATIONS

Parameter	-46S	STD	-74S	Units
Optimal Mirror Size	4 – 8			Millimeters, clear aperture
Rotation Angle ⁽²⁾	+/- 27.5			Degrees, Maximum (110 degrees optical)
Rotor Inertia	0.026			Gram • Centimeters ²
Torque Constant ⁽³⁾	30,000	36,000	46,000	Dyne • Centimeters per Ampere
Maximum Rotor Temperature	110			°C
Thermal Resistance ⁽³⁾	0.8	0.9	0.8	°C per Watt, Maximum
Coil Resistance ⁽³⁾	0.9	1.95	2.6	Ohms
Coil Inductance ⁽³⁾	98	135	225	µh
Back EMF Voltage ^(2, 3)	52.3	62.8	80.2	µV per degree per second
Peak Current ⁽³⁾	25			Amperes, Maximum
RMS Current ⁽³⁾	7.2	4.7	4.3	Amperes at Tcase of 50°C
Electrical Power Handling Capacity ⁽³⁾	62	55	62	Watts at Tcase of 50°C
Small Angle Step Response ⁽³⁾	120	140	250	µS with ScannerMAX 5mm mirror set
PD Linearity over 20 degrees p-p ⁽²⁾	99.9			% Minimum
PD Linearity over 40 degrees p-p ⁽²⁾	99.5			% Typical
PD Output Signal (Common Mode) ⁽²⁾	600			µA with LED current of 20mA
PD Output Signal (Differential Mode) ⁽²⁾	43.6			µA per degree, with LED current of 20mA
Mass	30			Grams

NOTES

1. Graph denotes theoretical maximum performance of the scanner due to thermal limitations, with case at 50°C. Other factors may prevent the scanner from reaching this maximum, such as servo driver and power supply.
2. Angular specifications are in mechanical degrees. For most applications, optical angle = 2x mechanical angle.
3. Saturn 5B versions –46S and –74S use different coil configurations, beneficial for certain imaging applications. Saturn scanners can easily be fabricated with alternative coil configurations to achieve different specifications. Please contact us if you have different coil resistance, inductance, torque, current or connector requirements.

Specifications are at a temperature of 25° C. All mechanical and electrical specifications are +/-10%.



Saturn 5B Optical Scanner for 5mm - 6mm apertures

MORE INFORMATION

More information about the Saturn series of optical scanners, including additional application hints and tips can be found at www.ScannerMAX.com.

OEMs are strongly encouraged to work with us to make sure that the most appropriate scanner is chosen and designed-in.

LASER SCANNING BOOK AVAILABLE

Detailed information about galvanometer scanners, servo driver techniques, and scanner applications can be found in the #1 best-selling book *LASER SCANNERS: Technologies and Applications*, written by Pangolin's President William R. Benner, Jr. The book can be found at www.LaserScanningBook.com.

SCANNERS AND ACTUATORS AVAILABLE FROM SCANNERMAX

- *VRAD 506*: a low-cost, open-loop rotary actuator capable of wide-angle rotation – perfect for shutters
- *Compact 506*: the lowest-cost, lightest-weight, and most versatile galvo scanner for 3mm to 1-inch beams
- *Saturn 1B*: providing the highest-speed vector scanning available, for 1mm to 4mm beams
- *Saturn 2B*: a resonant-scanner substitute for high-frequency sinusoidal scanning of 1mm to 4mm beams
- *Saturn 5B*: for both vector and raster scanning of 5mm and 6mm beams
- *Saturn 9B*: providing the best large-signal vector scanning performance for 8mm to 10mm beams
- *Saturn 9B Plus*: for 10mm raster scanning with 40% less heat generation
- *Beam Brush*: a Z-axis focusing / divergence control device for 3D laser marking and lightshow applications

PATENT AND TRADEMARK INFORMATION

US Utility Patent Number: 10,539,433
US Utility Patent Number: 9,530,559
US Utility Patent Number: 9,366,860
US Utility Patent Number: 9,270,144
German Patent (Utility Model) Number: 20 2020 000 007
German Patent (Utility Model) Number: 20 2013 000 369.3
German Patent (Utility Model) Number: 20 2014 000 846.9
Chinese Utility Model No. ZL201420102156.6
Chinese Application for Invention No. 201310128586.5
Other US and International Patents Pending.

Compact 506, *Saturn 1B*, *Saturn 5B* and *ScannerMAX* are trademarks of Pangolin Laser Systems, Inc.

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