

**APPLICATIONS**

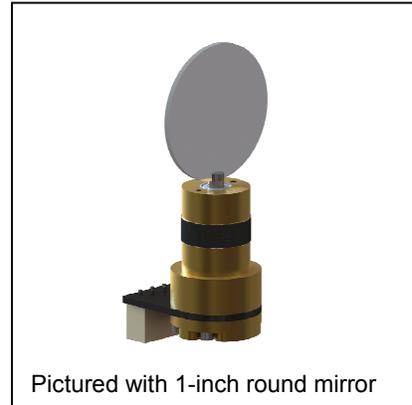
- Compact, portable displays
- Hand-held medical instruments

**UNIQUE ScannerMAX FEATURES**

- Stronger magnetic field
- Stronger rotor and shafts
- Stronger, integrated back-supporting mirror mount
- Stronger 6mm precision bearings
- Stronger position feedback with low noise
- Cooler-running motor magnetic design

**BENEFITS**

- Very compact, low-cost and lightweight design
- Wide-angle scanning, beyond 60 degrees optical
- Can be mounted from the front using two screws, or around the body



Pictured with 1-inch round mirror

**GENERAL DESCRIPTION**

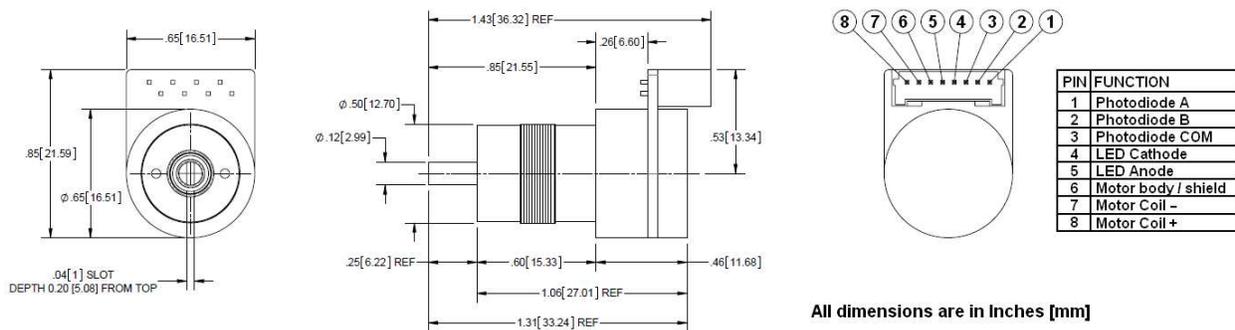
The ScannerMAX model “Compact 506” optical scanner is intended for applications where small package size, low cost and light weight are paramount concerns, such as compact portable displays and handheld medical instruments. Although the Compact 506 is very small, it is built upon the VRAD-506 actuator platform, which features very strong rotor construction and 6mm OD bearings. This construction allows the Compact 506 optical scanner to move small mirrors as well as unusually large mirrors up to 1 inch in diameter, and do so without a notch filter in the servo.

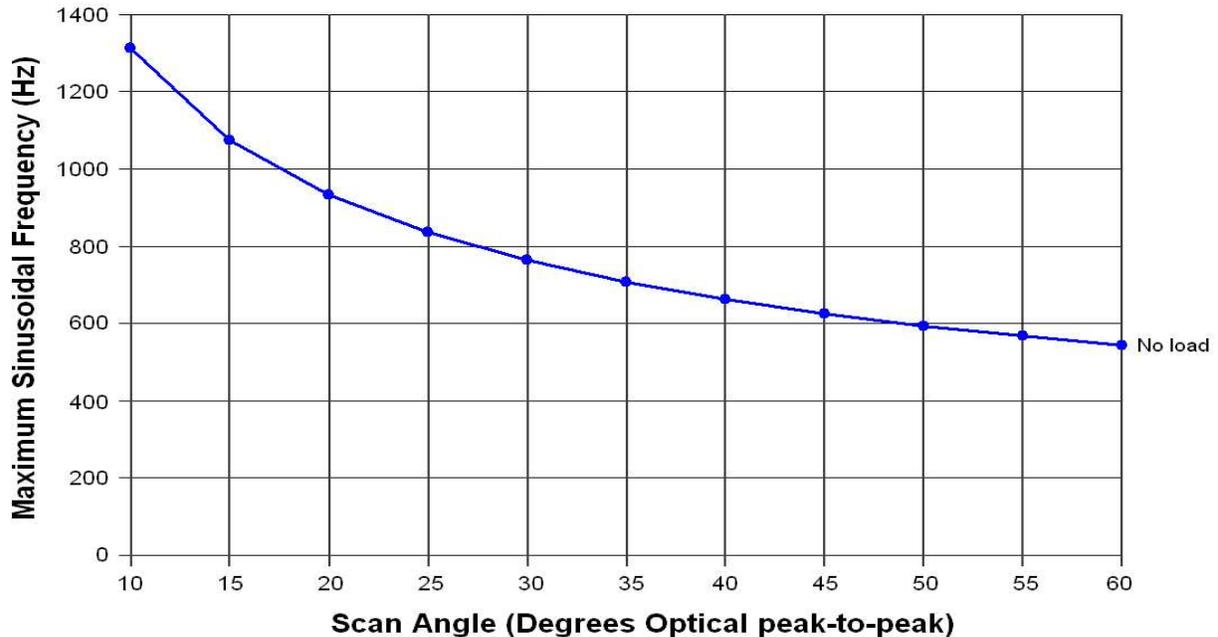
The Compact 506 optical scanner is available in two separate coil configurations: one with an impedance of 2.8 ohms and 440 microhenry; and another with an impedance of 1.85 ohms and 300 microhenry. The higher impedance coil makes the scanner easy to drive when power is limited, while the lower impedance coil provides a 30% speed improvement when used with higher drive current. Although the inductance figures seem relatively high, testing reveals speeds up to ILDA 60K (small signal bandwidth of 5kHz) with 3mm aperture mirrors, made possible because the rotor inertia is relatively low and torque-constant-to-inertia ratio is relatively high. Moreover, torque-per-watt is unsurpassed for this package size, allowing this galvo to run very cool.

Given that the body parts are made from aircraft aluminum, this allows us to deliver an optical scanner whose weight is among the lightest of all galvanometer scanners ever made. Moreover, being based on the VRAD-506 actuator, the mirror position is restored to a central rotation angle when power is removed, due to magnetic-spring-return action.

This scanner is available in two versions: Pro and Economy, with the difference being the connector, the position sensor, and the bearings, all of which affect cost and accuracy. Refer to the specifications for more information.

**OUTLINE DRAWING** (shown with the connector used on the Economy version)





**SPECIFICATIONS**

Parameter	Economy	Pro	Units
Optimal Mirror Size	up to 1 inch	up to 1 inch	Diameter
Rotation Angle	+/- 20	+/- 20	Mechanical degrees
Rotor Inertia	0.014	0.014	Gram • Centimeters <sup>2</sup>
Torque Constant *	23000 (18800)	23000 (18800)	Dyne • Centimeters per Ampere
Maximum Coil Temperature	110	110	degrees Celsius
Thermal Resistance, Coil to Case	< 6	< 6	degrees Celsius per Watt
Coil Resistance *	2.8 (1.85)	2.8 (1.85)	Ohms
Coil Inductance *	440 (300)	440 (300)	µh
Back EMF Voltage *	40.1 (32.8)	40.1 (32.8)	µV per degree per second
RMS Current *	1.3 (1.7)	1.3 (1.7)	Amperes maximum, at Tcase of 50°C
Peak Current *	8	8	Amperes maximum
Small Angle Step Response *	200 (150)	200 (150)	µS with ScannerMAX 3mm mirror set
PD Linearity over 20 degrees mech.	99.6	99.9	% Minimum
PD Linearity over 40 degrees mech.	98.6	99.9	% Typical
PD Scale Drift	.05%	50 PPM	per degree Celsius, maximum
PD Offset Drift	.01 degrees	15 µRad	per degree Celsius, maximum
PD Short-term Repeatability	20	8	µRad
PD Output Signal (Common Mode)	300 (@20mA)	900 (@60mA)	µA (at specified LED current)
PD Output Signal (Differential Mode)	20 (@20mA)	60 (@60mA)	µA per degree (at spec. LED current)
Mass	12.8	13.3	Grams

\* Specifications in parenthesis indicate Compact 506 version AW-50, which offers an alternative coil configuration.  
 \* Compact 506 version AW-50 has a lower coil impedance, and offers better performance with typical servo drivers.

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



**“Compact 506” Optical Scanner**  
*for low-cost and light-weight applications*

## **MORE INFORMATION**

More information about the Compact and Saturn series of optical scanners and VRAD series of actuators, including additional application hints and tips, can be found at [www.ScannerMAX.com](http://www.ScannerMAX.com).

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

## **PATENT AND TRADEMARK INFORMATION**

US Utility Patent Number: 8,508,726  
German Patent (Utility Model) Number: 20 2013 003 263.4  
German Patent (Utility Model) Number: 20 2012 009 275.8  
German Patent (Utility Model) Number: 20 2013 000 369.3  
Chinese Application for Invention No. 201210363949.9  
Chinese Application for Invention No. 201210363955.4  
Chinese Application for Invention No. 201310151544.3  
US Patent Application Publication No. 2013/0076194 A1  
US Patent Application Publication No. 2013/0181549 A1  
Other US and International Patents Pending.

*ScannerMAX, Compact 506 and VRAD* are trademarks of Pangolin Laser Systems.

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