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OSST Series Galvanometer Optical Scanners

Part number	OSST8162	OSST8161	OSST8062
Optical apertures supported, two-axis	≤5mm	≤10mm	≤12mm
Response time	0.2ms at 5mm beam	0.3ms at 10mm beam	0.6ms at 12mm beam
Max mechanical rotation angle	±20°-30	±20°	±20°
Linearity	99.9%, over ±20°	99.9%, over ±20°	99.9%, over ±20°
Average current	0.9A	0.9A	1.5A
Peak current	5A	5A	10A
Coil resistance	3Ω±10%	1.8Ω±10%	2Ω±10%
Coil inductance	180μH ±10%	280μH ±10%	260μH ±10%
Operation temp	0℃-40℃	0℃-40℃	0℃-40℃
Weight	80g	105g	180g
Dimension	ϕ18x33+ϕ30x20mm	ϕ18X33+ϕ22x16mm	ϕ22x47+ϕ35x21mm
Axis diameter	2mm	3mm	4mm
Application	Laser show, stage lighting	Super speed fly marking	Laser marking, rapid prototype, trimming, radar etc.

Part number	OSST2238	OSST8061	OSST3808
Optical apertures supported, two-axis	≤12mm	≤20mm	≤32mm
Response time	0.4ms at 12mm beam	0.7ms at 20mm beam	1ms at 32mm beam
Max mechanical rotation angle	±20°	±20°	±20°
Linearity	99.9% over ±20°	99.9% over ±20°	99.9% over ±20°
Average current	1.5A	2A	2.2A
Peak current	10A	15A	10A
Coil resistance	1.4Ω±10%	2.1Ω±10%	2Ω±10%
Coil inductance	420μH ±10%	360μH ±10%	260μH ±10%
Operation temp	0℃-40℃	0℃-40℃	0℃-40℃
Weight	180g	210g	520g
Dimension	ϕ22x47+ϕ35x21mm	ϕ28x57+ϕ39x21mm	ϕ39X72+ϕ35x21mm
Axis diameter	4mm	5mm	7mm
Application	High speed fly marking, high speed marking.	Precise marking, prototype, trimming, radar.	Precise marking, prototype, trimming, radar.

OSST8161 (driver board dimension L67xW34xH65)

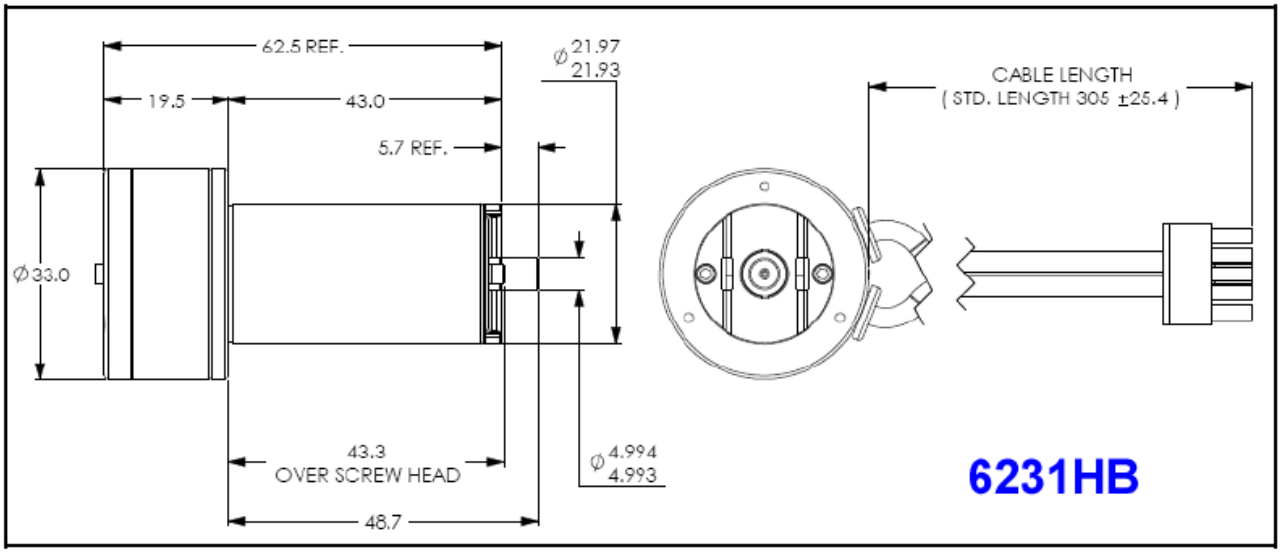
OSST8062 (driver board dimension L72xW34xH65)

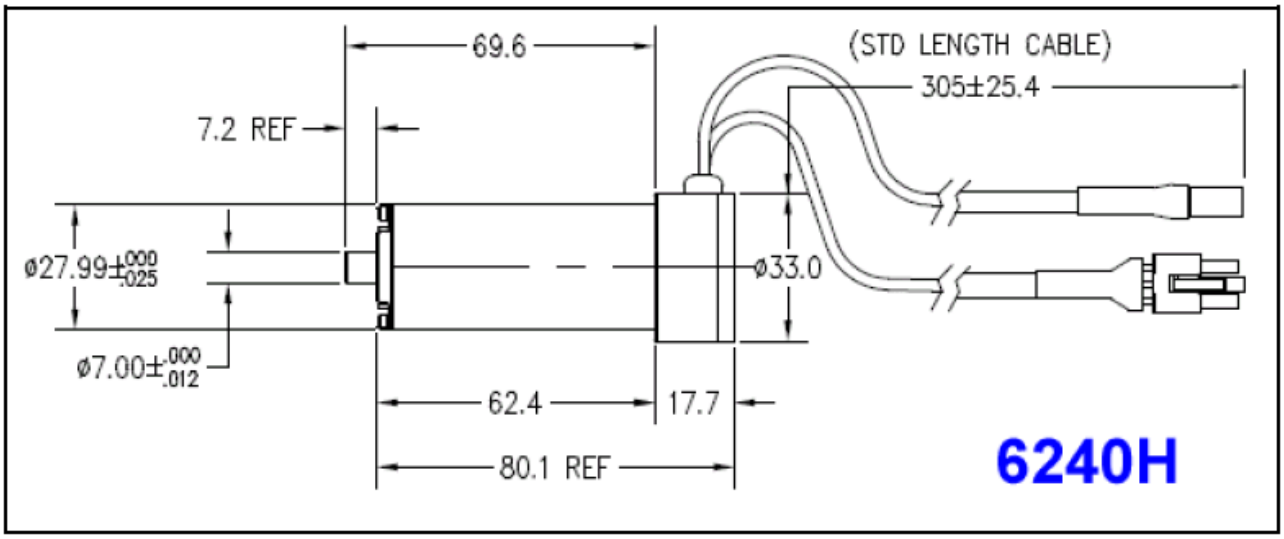
OSST2238 (driver board dimension L67xW34xH65)

OSST8061 (driver board dimension L72xW34xH65)

CT Series Optical Scanners (Galvanometer)

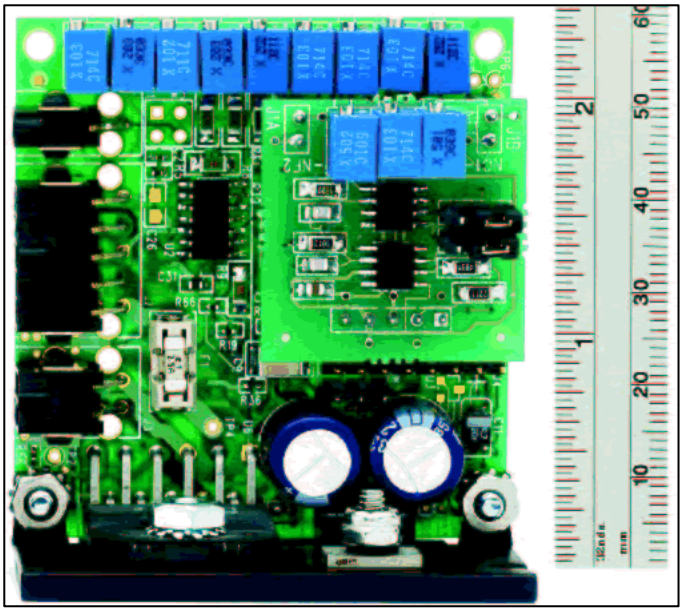
Model	6231HB	6240H	
Mechanical Specifications			
Optical Aperture, Two-Axis, Std	8, 10 & 12	12, 15, 20, 25 & 30	mm
Rated Angular Excursion	40	40	º
Rotor Inertia	0.82	2.4	gm*cm2, +/ - 10%
Torque Constant	11,100	190,000	dyne-cm/amp, +/ - 10%
Maximum Coil Temperature	110	110	ºC
Thermal Resistance (Coil to Case)	1.0	0.8	ºC/Watt, Max
Electrical Specifications Drive Mechanism			
Coil Resistance	1.27	1.2	Ohms, +/- 10%
Coil Inductance	176	340	µH, +/- 10%
Back EMF voltage	195	330	mV/degree/sec, +/- 10%
RMS Current	5.8	7.0	Amperes at Tcase of 50ºC, Max
Peak Current	25	25	Amperes, Max
Small Angle Step Response Time	0.25	0.30	ms, with balanced load of 0.3 gm*cm2
Position Detector			
Linearity	99.99	99.9	Minimum, over 20 degrees
Scale Drift	50	50	PPM/ºC, Maximum
Zero Drift	15	15	µrad/º C, Maximum
Repeatability, Short Term	8	8	microradians
Output Signal, Common Mode	155	155	µA with AGC current of 30 mA, +/-20%
Output Signal, Differential Mode	11.7	11.7	µA/º, at common mode current of 155 µA, +/-20%
Driver	67723	67724	


62.5 REF.
19.5
43.0
5.7 REF.
Ø21.97
21.93
Ø33.0
CABLE LENGTH
(STD. LENGTH 305 ±25.4)
43.3
OVER SCREW HEAD
Ø4.994
4.993
48.7
6231HB


69.6
(STD LENGTH CABLE)
305±25.4
7.2 REF
ø27.99±.000/.025
ø33.0
ø7.00±.000/.012
62.4
17.7
80.1 REF
6240H

MicroMax® Model 677XX

Board level single axis driver electronics



FEATURES:

- Smallest Servo Driver For Compact, Low Cost System Integration
- Position, Error and Velocity Output Signals
- Input Scale and Offset Adjustment
- On Board Protection Circuitry

The MicroMax Model 677XX driver provides an extremely compact, high performance and fully featured servo package at a very attractive price. At just 2 inches in width and 2.5 in length it is among the smallest servo drivers commercially available, bringing easier integration to your scanning solution. Featuring automatic gain control (AGC), low noise system damping, linearity compensation and high stability components, the 677XX servo provides high quality and stable positioning.

Designed with flexibility in mind, the MicroMax Model 677XX features differential analog inputs, flexible power supply configurations and positioning control allowing for optimization of system positioning angles, speed and accuracy. System position, velocity and error output signals make integrations into complex scanning system applications easy and accurate. Integral mounting hardware, low profile connectors and the overall small size allow for compact system designs with easy integration.

The New Smaller Size MicroMax 677XX single axis servo driver can be configured for optimal performance with Cambridge Technology's 6200 and 6800 line of closed loop, galvanometer based optical scanners. Used with Cambridge Technology's patented position detection galvanometer technology, the MicroMax 677XX provides improved time and temperature stability without the need for thermal compensation. On board protection circuitry ensures reliable system control during integration and operation. To guarantee safe operation and extended product lifetime, the MicroMax 677XX monitors and controls galvanometer rms power and features a socketed fuse for added system protection. It also utilizes servo signal conditioning to maintain controlled performance within rated angular excursion limits. This combination of size, flexibility and price make the MicroMax Model 677XX the ideal choice where high levels of speed and performance are required in the most compact environment.

Specifications:

Analog Input Impedance	400K +/-1% ohms (Differential) 200K +/-1% ohms (Single Ended)
Analog Output Impedance	1K +/-1% ohms (for all other observation outputs)
Position Input Scale Factor	0.5 volt/mechanical degree (40^{o} System), 0.67 volt/degree (30^{o} System)
Position Input Range	+/-10 volts, maximum
Position Offset Range	+/-10 volts
Position Output Scale Factor	0.5 volt/degree
Error Output Scale Factor	0.5 volt/degree
Velocity Output Scale Factor	Analog output (scaled by position differentiator gain)
Power Supply Requirements	+/-15 to +/-28VDC configurations available
Maximum Drive Current Limit	10 amps peak 5 amps rms (power supply and load dependent)
Operating Temperature Range	0 -50 ^{o}C
Size	5.08 cm x 6.35 cm x 2.69 cm

The 6200H Series Scanners：

Closed Loop Galvanometer Series: The 6200H Moving Magnet Scanner with Advanced Optical Position Detector

	6200H	6210H	6215H	6220H	Units and Tolerances
Optical Apertures Supported, Two Axis	3, 5, 6	3, 5, 6	3, 5 ,6	5, 8, 10	MM
Maximum Recommended Inertial Load	0.13	0.2	0.28	1.25	$gm*cm^2$, +/10%
Mechanical Specifications					
Rated Angular Excursions	± 20	± 20	± 20	±20	Degrees
Rotor Inertia	0.013	0.018	0.028	0.125	$gm*cm^2$, +/10%
Torque Constant	1.2	2.79	3.78	6.17	10^4 Dynecm/Amp, +/10%
Coil Temperature	110	110	110	110	ºC, Maximum
Thermal Resistance, Coil to Case	3.8	2	1	1	ºC/Watt, Maximum
Electrical Specifications, Drive Armature					
Coil Resistance	2.1	3.72	2.53	2.79	Ohms, +/10%
Coil Inductance	52	109	94	180	µH, +/10%
Back EMF Voltage	20.9	48.7	66	108	µV/Degree/Second, +/10%
Current, RMS	2.3	2.4	4.1	3.9	A, Maximum
Current, Peak	6	8	20	20	A, Maximum
Small Angle Step Response	130	100	130	200	µs, with appropriate CTI Y mirror
Electrical Specifications, Position Detector					
Linearity	99.9	99.9	99.9	99.9	%, minimum, over 40° optical
Scale Drift	50	50	50	50	PPM/^{o}C, Maximum
Zero Drift	15	15	15	15	Microradians/^{o}C, Maximum
Repeatability	8	8	8	8	Microradians, Maximum
Output Signal, Common Mode	155	155	155	155	µA, with AGC Current of 30mA, +/-20%
Output Signal, Differential Mode	12	12	12	12	µA/Deg,, with Common Mode of 155µA,±20%

	6231HB	6231HC	6230H	6240H	Units and Tolerances
Optical Apertures Supported, Two Axis	8,10,12	8,10,12,15	8,10,12,15	12,15,20,25	MM
Maximum Recommended Inertial Load		8	10	24	$gm*cm^2$, +/10%
Mechanical Specifications					
Rated Angular Excursions	±20	±20	±20	±20	Degrees
Rotor Inertia	0.82	0.82	0.97	2.4	$gm*cm^2$, +/10%
Torque Constant	1.11	1.11	1.31	2.00	10^5 Dynecm/Amp, +/-10%
Coil Temperature	110	110	110	110	ºC, Maximum
Thermal Resistance, Coil to Case	1	1	0.80	0.62	ºC/Watt, Maximum
Electrical Specifications, Drive Armature					
Coil Resistance	1.2	1.2	1.07	1.03	Ohms, +/10%
Coil Inductance	176	176	173	350	µH, +/10%
Back EMF Voltage	195	195	229	346	µV/Degree/Second, +/-10%
Current, RMS	5.8	5.8	7.1	8.2	A, Maximum
Current, Peak	25	25	25	25	A, Maximum
Small Angle Step Response	250	250	250	350	µs, with appropriate CTI Y mirror
Electrical Specifications, Position Detector					
Linearity	99.9	99.9	99.9	99.9	%, minimum, over 40° optical
Scale Drift	50	50	50	50	PPM/^{o}C, Maximum
Zero Drift	15	15	15	15	Microradians/^{o}C, Maximum
Repeatability	8	8	8	8	Microradians, Maximum
Output Signal, Common Mode	155	155	155	155	µA, with AGC Current of

					30mA, +/20%
Output Signal, Differential Mode	12	12	12	12	µA/Deg,, with Common Mode of 155µA,±20%

The 6860 Series Scanners：

Closed Loop Moving Magnet Scanners with Capacitive Position Detector

	6860	6870	6880	Units and Tolerances
Optical Apertures Supported, Two Axis	5, 10	12, 15	20, 30	MM
Mechanical Specifications				
Rated Angular Excursions	± 20	± 20	± 20	Degrees
Rotor Inertia	0.6	2.0	6.4	$gm*cm^2$, +/10%
Torque Constant	9.3	18	25.4	10^4 Dynecm/Amp, +/10%
Coil Temperature	110	110	110	ºC, Maximum
Thermal Resistance, Coil to Case	1.5	1.0	0.75	ºC/Watt, Maximum
Electrical Specifications, Drive Armature				
Coil Resistance	1.5	1.4	1	Ohms, +/10%
Coil Inductance	160	275	280	µH, +/10%
Back EMF Voltage	0.17	0.3	0.44	mV/Degree/Second, +/10%
Current, RMS	4.6	5.3	7.5	A at Tcase of 50°C, Maximum
Current, Peak	25	25	25	A, Maximum
Small Angle Step Response	0.5	0.7*	0.9	ms, with balanced inertia matched load
				*with balanced 2.0$gm*cm^2$ load
Electrical Specifications, Position Detector				
Linearity	99.9	99.9	99.9	%, minimum, over 40° optical
Scale Drift	50	50	50	PPM/^{o}C, Maximum
Zero Drift	15	15	10	Microradians/^{o}C, Maximum
Repeatability, Short term	8	8	8	Microradians, Maximum
Output Signal, Common Mode	585	585	970	mA, with AGC Voltage of 10VDC, +/20%
Output Signal, Differential Mode	14.5	14.5	22	µA/Deg,, with Common Mode Current, ±20%

The 6800 Series Scanners：

Closed Loop with Moving Magnet Dual LED Optical Position Detector

	6800HP	6810P	6850P	Units and Tolerances
Optical Apertures Supported, Two Axis	3	5	10	MM
Mechanical Specifications				
Rated Angular Excursions	± 20	± 20	± 20	Degrees
Rotor Inertia	0.018	0.1	0.5	$gm*cm^2$, +/10%
Torque Constant	2.5	5.7	9.5	10^4 Dynecm/Amp, +/10%
Coil Temperature	110	110	110	ºC, Maximum
Thermal Resistance, Coil to Case	4.0	2.0	1.5	ºC/Watt, Maximum
Electrical Specifications, Drive Armature				
Coil Resistance	4.2	3.4	1.5	Ohms, +/10%
Coil Inductance	96	160	160	µH, +/10%
Back EMF Voltage	0.04	0.10	0.16	mV/Degree/Second, +/10%
Current, RMS	1.6	2.6	4.3	A at Tcase of 50°C, Maximum
Current, Peak	6	12	25	A, Maximum
Small Angle Step Response	0.3	0.4	0.5	ms, with balanced load
Electrical Specifications, Position Detector				
Linearity	98	98	98	%, minimum, over 30° optical
Scale Drift	0.05	0.05	0.05	%/^{o}C, Maximum
Zero Drift	0.01	0.01	0.01	degrees/^{o}C, Maximum
Repeatability, Short term	20	20	20	Microradians, Maximum
Output Signal, Common Mode	50	50	50	mA, with AGC current of 20mA, +/20%
Output Signal, Differential Mode	3.2	3.2	3.2	µA/Deg,, with Common Mode Current of 50 µA,±20%

Moving Coil Galvo Series Scanners:

Closed Loop with Moving Coil Capacitive Front End Position Detector

	6350	6450	6650	6900	6400	Units and Tolerances
Optical Apertures Supported, Two Axis	5, 10	12	20, 30	50	＞50	MM
Mechanical Specifications						
Rated Angular Excursions	40	40	40	40	40	Degrees
Rotor Inertia	0.3	2.3	9.0	70	1300	$gm*cm^2$, +/10%
Torque Constant	0.18	0.45	0.65	1.63	4.5	10^6 Dynecm/Amp, +/10%
Coil Temperature	150	150	150	150	150	ºC, Maximum
Thermal Resistance, Coil to Case	10	5	2.8	1.25	0.45	ºC/Watt, Maximum
Electrical Specifications, Drive Armature						
Coil Resistance	5.5	4.0	3.5	2.2	0.9	Ohms, +/10%
Coil Inductance	300	450	800	750	4500	µH, +/10%
Back EMF Voltage	0.32	0.8	1.15	2.85	9.2	mV/Degree/Second, +/10%
Current, RMS	1.1	1.8	2.8	5.0	14	A at Tcase of 50°C, Maximum
Current, Peak	4	6.1	10	25	60	A, Maximum
Small Angle Step Response	1.5	2.0	3.5	6.0	8	ms, with balancedinertia matched load
Electrical Specifications, Position Detector						
Linearity	99.9	99.9	99.9	99.9	99.9	%, minimum, over 30° optical
Scale Drift	50	50	50	50	50	PPM/^{o}C, Maximum
Zero Drift	15	15	10	10	15	microradians/^{o}C, Maximum
Repeatability, Short term	2	2	1.5	1.5	2	Microradians, Maximum
Output Signal, Common Mode	585	970	1600	1730	1570	mA, with AGC Voltage of 10VDC, +/20%
Output Signal, Differential Mode	14.5	21.5	45	48	26.5	µA/Deg,, with Common Mode Current, ±20%

Required Information for Custom-made Scanners

All of our scanners can purchased alone or they can be configured in a one or a two axis system that include one or two scanners, servo-drivers, open frame mounts, cables and mirrors. I can make a recommendation of the correct scanner if you can help with the following information:

1. What is the diameter of the beam that you are steering?
    - As noted above we make systems that with clear apertures of 3mm to 75mm and greater. Generally the size of the system will not effect the accuracy, but will effect the scanning speed and step response of the scanners.
2. What type of scanning will you be doing?
    - Are you doing random vector scanning where the beam is moved to random locations and then the laser is operated?
    - Are you doing a raster scan where the scanner is continuously moving while the laser is operation? Are you using a modified sawtooth ramp or a structured cycloidal drive?
    - Are you doing a raster step scan where the scanner is moved linearly through the field but is stopped at every location before the laser is operated?
    - Are you doing static positioning where the scanner is moved to position and that position must be held for a certain amount of time?
    - Are you doing sinusoidal scanning?
3. What is the scanning speed requirements?
    - For vector scanning, what is the small angle step response requirement? How many moves are required per second?
    - For raster scanning, what is the scan rate in lines per second and what is the scan efficiency (ration of active scan time vs. retrace)?
    - For static positioning, is the speed of operation important?
    - For sinusoidal scanning, what is the frequency of operation?
4. What is the accuracy requirements?
    - For vector scanning, what is required for repeatability? What is the requirement for wobble and jitter?
    - For raster scanning, what repeatability required from scan to scan? What is the positional “noise” requirement for the scan position in the line? What is the cross axis wobble requirement?
    - For static positioning, what is repeatability requirement of the position? What is the positional “noise” or dither requirement?
    - Are there any temperature drift requirements for scanning field offset or scale drift?
5. Is this a one or two axis application?
6. What is maximum scan angle?
    - What is maximum X scan angle in optical degrees?
    - What is maximum Y scan angle in optical degrees?
7. Will you be using your own mirrors or are you interested in our mirrors?
8. What is the coating required for the mirror?
    - What is the wavelength of the laser?
    - What is the power of the laser?
    - Is the laser pulsed or continuous?
    - If pulsed laser, what is the frequency and duration of the pulse?
    - If pulsed laser, what is the pulse energy in joules or mJ?
    - What is the reflectance requirements?
    - Is the scanner polarized or unpolarized? Is polarization important?
9. What is the application?
10. Is this for a product development or an in-house instrument or equipment product?