Model 633 Six-Degree of Freedom Sensor

schematic

Silicon MEMS 6DOF Sensor
±50 to ±6000g Acceleration Range
±500 to ±24,000°/sec Rate Range
Miniature Lightweight Package
Rugged Shock Resistant Housing



The Model 633 6-DOF Sensor is an analog sensor that includes outputs of three gyroscope/rate sensors and three DC accelerometers in one small package. The rate sensors and accelerometers are aligned orthogonally to each other which allow the user to measure motions in all 6 degrees of freedom (6 DOF). Designed specifically for product research and development in harsh environments, the Model 633 can maintain its precision under high shock condition.

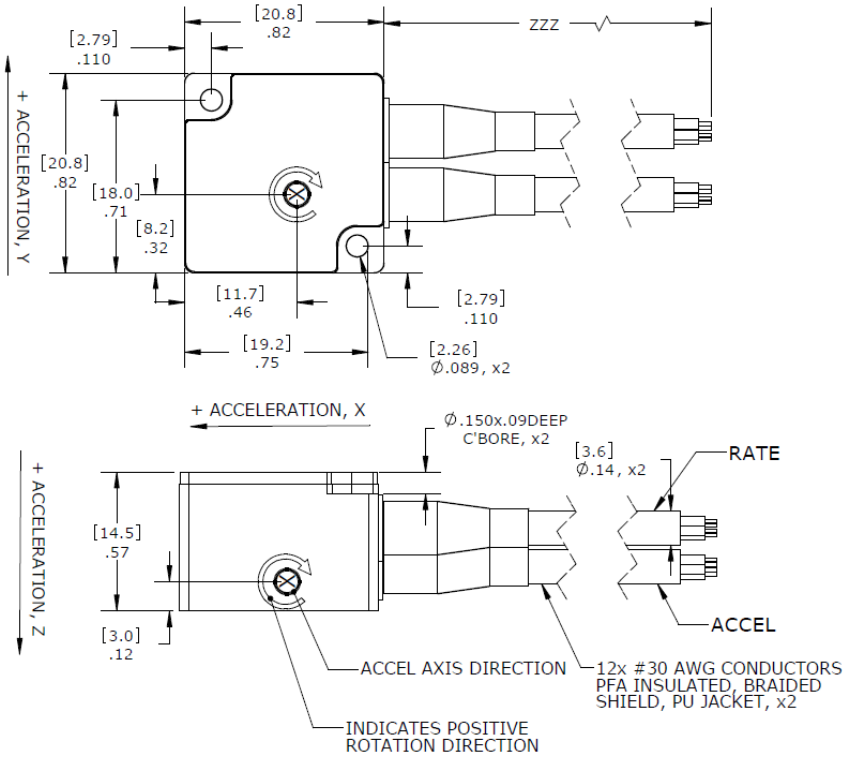
FEATURES

- Low Noise Jacketed Cables
- Rugged Integral Strain Relief
- Reliable Silicon MEMS Sensors
- -40 to +105°C Temperature Range
- Shock Resistant Package
- Low Cross-Axis Sensitivity
- SAE J211 Compliant Performance

APPLICATIONS

- Auto Safety Crash Testing
- Dummy Instrumentation
- Pedestrian Impact
- Rollover Testing
- Motorsports
- Biomechanics Testing
- Shock & Impact Testing

dimensions



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performance specifications

All values are typical at +24°C and 10Vdc excitation unless otherwise stated. Measurement Specialties reserves the right to update and change these specifications without notice.

Parameters							
DYNAMIC (RATE SENSORS)							**Notes**
Range (deg/sec)	±500	±1500	±6000	±12K	±18K	±24K	
Sensitivity (mV/deg/sec)	4.00	1.33	0.333	0.167	0.111	0.083	Not ratiometric
Frequency Response (Hz)	0-1000	0-1000	0-1000	0-2000	0-2000	0-2000	+1dB/-3dB
Non-Linearity (%FSO)	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	BFSL
Cross-Axis Sensitivity (%)	<1	<1	<1	<1	<1	<1	
Shock Limit (g)	3000	3000	3000	5000	5000	5000	
Residual Noise (mV RMS)	3.66	1.20	2.38	1.22	1.20	1.20	Passband
DYNAMIC (ACCELERATION SENSORS)							
Range (g)	±50	±100	±200	±500	±2000	±6000	
Sensitivity (mV/g)	2.0	1.1	0.8	0.4	0.15	0.10	Ratiometric [1]
Frequency Response (Hz)	0-1000	0-1200	0-1500	0-2000	0-5000	0-5000	±1/2dB
Natural Frequency (Hz)	4000	6000	8000	10000	23000	26000	
Non-Linearity (%FSO)	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	
Transverse Sensitivity (%)	<3	<3	<3	<3	<3	<3	
Shock Limit (g)	5000	5000	5000	10000	10000	10000	
Damping Ratio	0.5	0.5	0.5	0.3	0.05	0.05	Typical
ELECTRICAL							
Zero Acceleration Output (mV), Rate Sensors	±100						Differential
Zero Acceleration Output (mV), Accel Sensors	±25						
Excitation Voltage (Vdc), Rate Sensors	5 to 16						
Excitation Voltage (Vdc), Accel Sensors	2 to 10						
Excitation Current (mA), Rate Sensors	<8						
Influence of Linear Acceleration (deg/sec/g)	0.1						
Common Mode Voltage (Vdc), Rate Sensors	2.5						±5%
Full Scale Output Voltage (Vpk), Rate Sensors	±2						±15%
Output Resistance (Ω), Rate Sensors	400						
Input Resistance (Ω), Accel Sensors	2400 to 6000						
Output Resistance (Ω), Accel Sensors	2400 to 6000						
Insulation Resistance (MΩ)	>100						@100Vdc
Turn On Time (msec), Rate Sensors	<100						
Ground Isolation	Isolated from Mounting Surface						
ENVIRONMENTAL							
Thermal Zero Shift, Rate Sensors (%FSO)	±2.5						-40 to +105°C
Thermal Sensitivity Shift, Rate Sensors (%)	±2.0						-40 to +105°C
Thermal Zero Shift, Accel Sensors (mV/°C)	-0.11 ±0.11						-40 to +105°C
Thermal Sensitivity Shift, Accel Sensors (%/°C)	-0.25 ±0.25						-40 to +105°C
Operating Temperature (°C)	-40 to +105						
Humidity (Active Element & Electronics)	Hermetically Solder Seal						
Humidity (Housing)	Epoxy Sealed, IP65						
PHYSICAL							
Case Material	Anodized Aluminum						
Cable	2x Cables; 12x #30AWG Cond PFA Insulated, Braided Shield, PU Jacket						
Weight (cable not included)	8.5 grams						
Mounting	2x #2.56 or M2 Mounting Screw						
Mounting Torque	4 lb-in (0.45 N-m)						

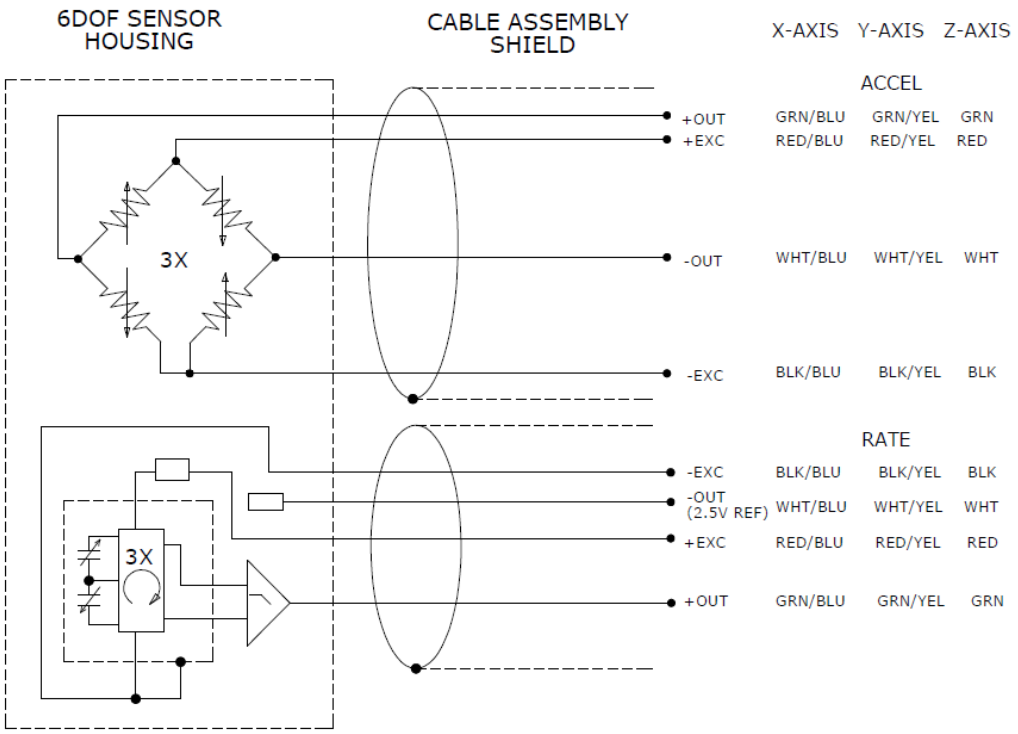
[1] Output is ratiometric to excitation voltage

Calibration supplied:	CS-ARLIN	NIST Traceable Linearity Calibration to FS Range
	CS-FREQ-0100	NIST Traceable Amplitude Calibration to FR Limit
Supplied accessories:	AC-D03548	2x #2-56 (3/4" length) Socket Head Cap Screw
Optional accessories:	121	3-Channel Precision Low Noise DC Amplifier
	140	Auto-zero Inline Amplifier

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ordering info

PART NUMBERING Model Number+Accel Range+Rate Range+Cable Length

633-GGG-RRR-ZZZ-XX
- I I I I_____Special requirements, otherwise leave blank
- I I I_____Cable (120 is 120 inches)
- I I_____Rate Range (-500 for 500deg/sec, -12K for 12000deg/sec)
- I_____Accel Range (-050 for 50g, -2K for 2000g)

Example: 633-500-6K-120
Model 633, 500g, 6000deg/sec, 120” Cable

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