MODEL 633
SIX-DEGREE OF FREEDOM SENSOR

SPECIFICATIONS

- Silicon MEMS Gyro, DC Response
- ±500°/sec to ±24,000°/sec Rate Ranges
- Silicon PR MEMS Accels, DC Response
- ±50g to ±6000g Acceleration Ranges
- SAE J211 & ISO 6487 Compliant
- NHTSA FMVSS 202a Compliant

FEATURES

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

APPLICATIONS

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

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 testing in harsh environments, the Model 633 maintains its precision under high shock conditions. The sensor utilizes silicon MEMS Gyro sensing elements with custom electronics and packaging to produce an angular rate sensor that is highly reliable even under excessive shock and vibration environments. The piezo-resistive MEMS acceleration sensors feature a full bridge output configuration with ideal gas damping tailored for outstanding shock survivability and a flat frequency response to >6kHz

For a similar sensor with lower acceleration and angular rate ranges, TE Connectivity also offers the model 634 6-DOF Sensor.

PERFORMANCE SPECIFICATIONS

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

Parameters							
DYNAMIC (ACCELERATION SENSORS)							**Notes**
Dash Number	-050	-100	-200	-500	-2K	-6K	See Ordering Info
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	0-2500	0-5000	0-6000	±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	BFSL
Transverse Sensitivity (%)	<3	<3	<3	<3	<3	<3	<1% Typical
Shock Limit (g)	5000	5000	5000	5000	10000	10000	
Damping Ratio	0.5	0.5	0.5	0.3	0.15	0.05	Typical

DYNAMIC (RATE SENSORS)							
Dash Number	-500	-1K5	-6K	-12K	-18K	-24K	See Ordering Info
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	±15%
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)	10,000	10,000	10,000	10,000	10,000	10,000	
Residual Noise (mV RMS)	3.66	1.20	3.30	1.22	1.50	1.20	Passband

ELECTRICAL		
Zero Acceleration Output (mV), Rate Sensors	±100	Differential
Zero Acceleration Output (mV), Accel Sensors	±25	
Excitation Voltage (Vdc), Rate Sensors	4.9 to 16.0	Per channel
Excitation Voltage (Vdc), Accel Sensors	2 to 10	Per channel
Excitation Current (mA), Rate Sensors	<8	Per channel
Influence of Linear Acceleration (deg/sec/g)	0.1	For rate sensors
Common Mode Voltage (Vdc), Rate Sensors	2.5	±5%
Full Scale Output Voltage (Vpk), Rate Sensors	±2	
Output Resistance (Ω), Rate Sensors	400	
Input Resistance (Ω), Accel Sensors	3000 to 5000	
Output Resistance (Ω), Accel Sensors	3000 to 5000	
Insulation Resistance (MΩ)	>100	@100Vdc
Turn On Time (msec), Rate Sensors	<100	
Ground Isolation	Isolated from Mounting Surface	

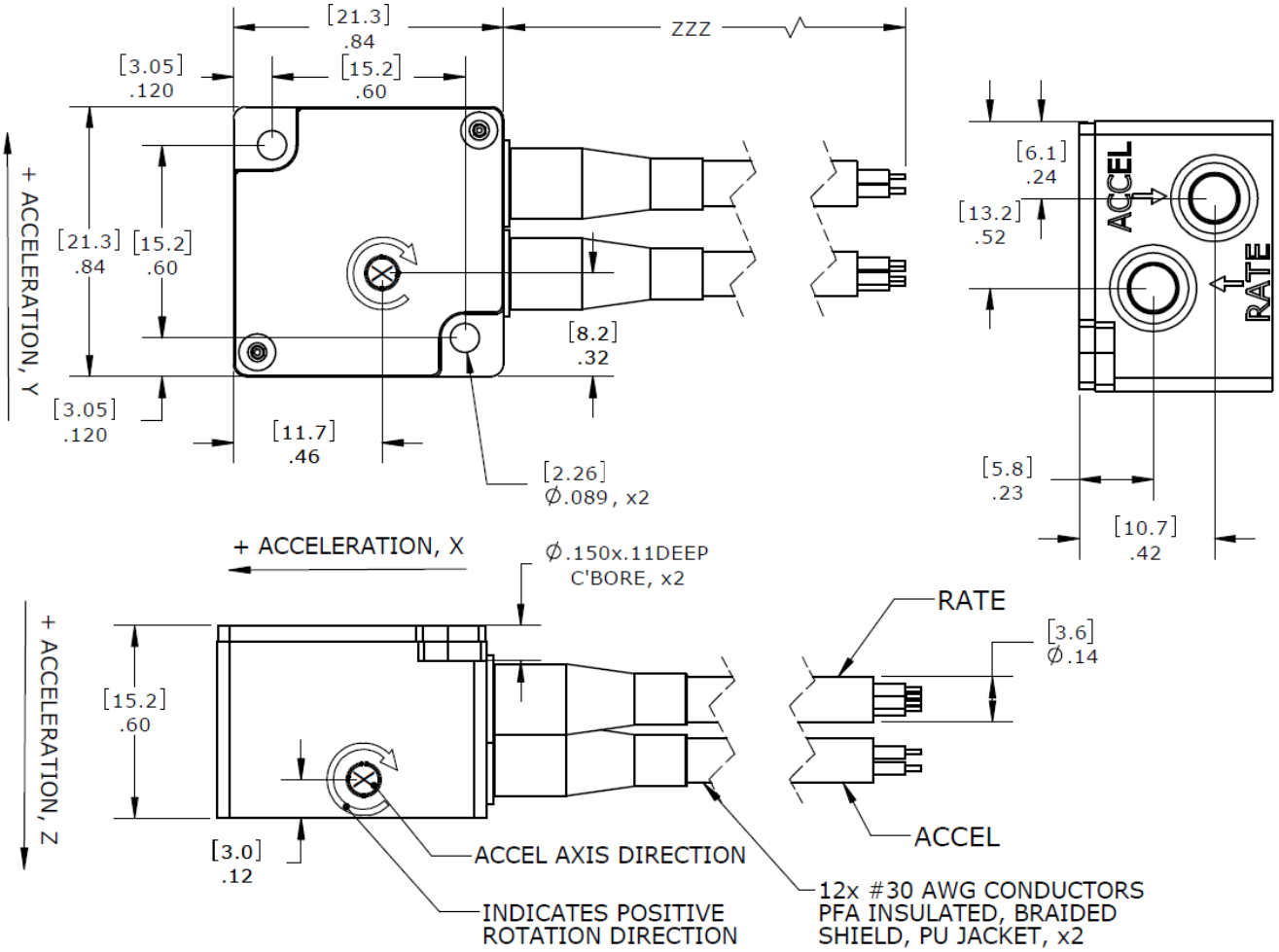
ENVIRONMENTAL		
Thermal Zero Shift, Rate Sensors (%FSO)	±2.5	-40 to +105°C
Thermal Sensitivity Shift, Rate Sensors (%)	±2.0	-40 to +105°C
Thermal Zero Shift, Accel Sensors (mV/°C)	-0.11 ±0.11	-40 to +105°C
Thermal Sensitivity Shift, Accel Sensors (%/°C)	-0.25 ±0.25	-40 to +105°C
Operating Temperature (°C)	-40 to +105	
Humidity (Active Element & Electronics)	Hermetically Solder Seal	
Humidity (Housing)	Epoxy Sealed, IP65	

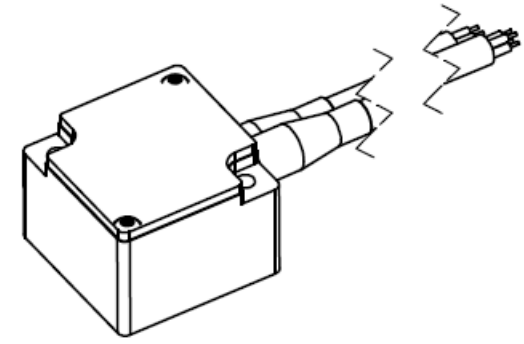
PHYSICAL	
Case Material	Stainless Steel
Cable	2x Cables; 12x #30AWG Cond PFA Insulated, Braided Shield, PU Jacket
Weight (cable not included)	35 grams
Mounting	2x #2.56 or M2 Mounting Screw
Mounting Torque	4 lb-in (0.45 N-m)

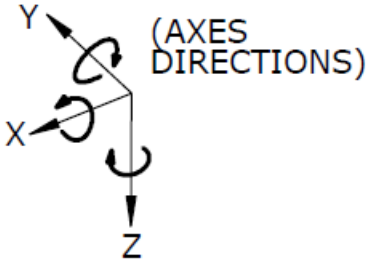
[1] Output is ratiometric to excitation voltage

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

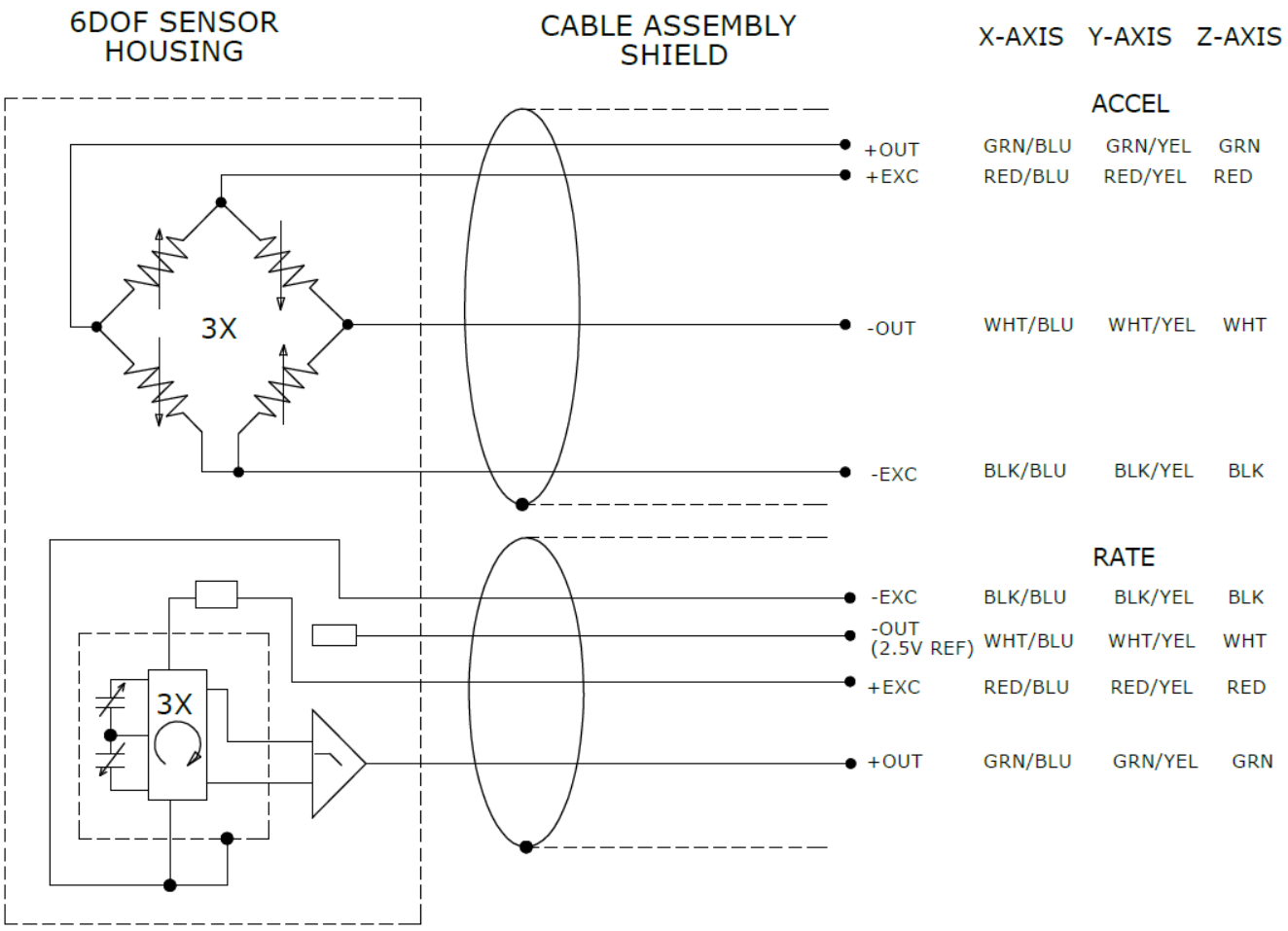
DIMENSIONS


[21.3]
.84
ZZZ
[3.05]
.120
[15.2]
.60
+ ACCELERATION, Y
[21.3]
.84
[15.2]
.60
[8.2]
.32
[3.05]
.120
[11.7]
.46
[2.26]
Ø.089, x2
[6.1]
.24
[13.2]
.52
ACCEL
RATE
[5.8]
.23
[10.7]
.42
+ ACCELERATION, X
Ø.150x.11DEEP
C'BORE, x2
RATE
[3.6]
Ø.14
+ ACCELERATION, Z
[15.2]
.60
[3.0]
.12
ACCEL AXIS DIRECTION
INDICATES POSITIVE
ROTATION DIRECTION
ACCEL
12x #30 AWG CONDUCTORS
PFA INSULATED, BRAIDED
SHIELD, PU JACKET, x2




Y
X
Z
(AXES
DIRECTIONS)

SCHEMATIC



ORDERING INFORMATION

633	GGG	RRR	ZZZ	XX

Range (Accelerometer)

050 = 50g
100 = 100g
200 = 200g
500 = 500g
2K = 2000g
6K = 6000g

Range (Rate Sensor)

500 = 500deg/sec
1K5 = 1500deg/sec
6K = 6000deg/sec
12K = 12,000deg/sec
18K = 18,000deg/sec
24K = 24,000deg/sec

Cable Length

120 = 120 inches, 10 feet
240 = 240 inches, 20 feet
360 = 360 inches, 30 feet
600 = 600 inches, 50 feet

197 = 197 inches, 5 meters
276 = 276 inches, 7 meters

Reserved for custom designs. Leave blank for standard options listed above.

Example; 633-500-6K-120
Model 633, 500g accel range, 6000deg/sec rate range, 120inch (10ft) cable length

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