

# Variable Capacitance Accelerometer

**ENDEVCO  
MODEL  
7596A**

## Model 7596A

- Economical and Rugged
- 2 to 100 g Full Scale
- DC Response
- Gas Damped Sensor
- Mechanical Over-range Stops



Actual size

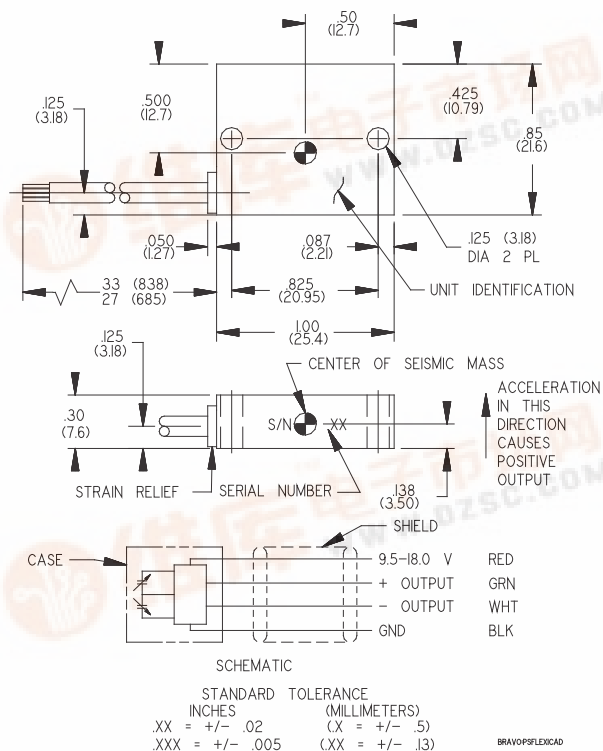
### DESCRIPTION

The ENDEVCO® Model 7596A VALULINE™ accelerometer family is a low cost solution to low-level, low frequency measurements. Applications include laboratory measurements, ground transportation studies and measurements where the accelerometer will be subjected to high shock levels (up to 10 000 gs, see specifications). The 7596A is ideal for modal studies on large structures.

Gas damping and internal overrange stops enable the anisotropically etched silicon microsensors to withstand high shocks and acceleration loads. The use of gas damping, in the sensor, results in very small-induced changes of frequency response. The patented sensor design ensures immediate stability making the unit ready to take accurate DC or dynamic data within one millisecond!

The 7596A can operate from 8.5Vdc to 30Vdc and provide a high level, low impedance output. The output is high enough to drive most laboratory instruments, tape recorders and data acquisition systems without amplification or signal conditioning. The output can be fed into either a differential or single-ended amplifier or standard bridge electronics with 10Vdc excitation.

ENDEVCO Model 136 Three-Channel System, Model 4430A or OASIS Computer-Controlled System are recommended signal conditioners.



### SPECIFICATIONS

**PERFORMANCE CHARACTERISTICS:** All values are typical at +75°F (+24°C) and 15 Vdc excitation unless otherwise stated. Calibration data, traceable to the National Institute of Standards, (NIST), is supplied.

	Units	7596-2	-10	-30	-50	-100
RANGE	g pk	±2	±10	±30	±50	±100
SENSITIVITY (at 100 Hz) [1] [2]	mV/g	1000 ±100	200 ±20	66 ±8	40 ±4	20 ±2
FREQUENCY RESPONSE (± 5%)	Hz	0 to 15	0 to 500	0 to 800	0 to 1000	0 to 1000
MOUNTED RESONANCE FREQUENCY	Hz	1300	3000	5500	5500	6000
NON-LINEARITY AND HYSTERESIS [3]	% FSO Typ	±0.20	±0.20	±0.20	±0.2	±1
	% FSO (Max)	±0.50	±0.50	±0.50	±0.5	±2
TRANSVERSE SENSITIVITY [4]	% Typ	1	1	1	1	1
ZERO MEASURAND OUTPUT [2]	mV Max	±200	±200	±200	±200	±200
DAMPING RATIO		3.0	0.7	0.7	0.6	0.6
DAMPING RATIO CHANGE	%°F	+0.04	+0.04	+0.04	+0.04	+0.04
	From -65°F to +250°F (-55°C to +121°C)	%°C	+0.08	+0.08	+0.08	+0.08



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## Variable Capacitance Accelerometer

### SPECIFICATIONS—continued

#### PERFORMANCE CHARACTERISTICS—continued

	Units	7596-2	-10	-30	-50	-100
<b>THERMAL ZERO SHIFT</b>						
From 32°F to 122°F (0°C to 50°C)	% FSO Max	±2.0	±2.0	±2.0	±2.0	±2.0
From -13°F to +167°F (-25°C to +75°C)	% FSO Max	±4.0	±4.0	±4.0	±4.0	±4.0
From -65°F to +250°F (-54°C to +121°C)	% FSO Max	±6.0	±6.0	±6.0	±6.0	±6.0
<b>THERMAL SENSITIVITY SHIFT</b>						
From 32°F to 122°F (0°C to +50°C)	% Max	±2.0	±2.0	±2.0	±2.0	±2.0
From -13°F to +167°F (-25°C to +75°C)	% Max	±4.0	±4.0	±4.0	±4.0	±6.0
From -65°F to +250°F (-54°C to +121°C)	% Max	±6.0	±6.0	±6.0	±6.0	±6.0
<b>THERMAL TRANSIENT ERROR</b>						
PER ISA RP 37.2	Equiv. g/°F	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
	Equiv. g/°C	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
<b>OVERRRANGE (Determined by Electrical clipping or Mechanical stops, whichever is smaller.)</b>						
Electrical clipping	g	-3.5/+3.8	-18/+19	-53/+57	-87/+95	-175/+190
Mechanical stops, typical	g	±4	±30	±90	±200	±200
Recovery Time	µs	< 10	< 10	< 10	< 10	< 10
<b>THRESHOLD (RESOLUTION) [5]</b>	Equiv. g's	0.0005	0.0025	0.008	0.0012	0.025
<b>BASE STRAIN SENSITIVITY, MAX [6]</b>	Equiv. g's	0.01	0.01	0.01	0.01	0.01
<b>MAGNETIC SUSCEPTIBILITY [7]</b>	Equiv. g's	< 1	< 1	< 1	< 1	< 0.1
<b>WARM-UP TIME (to within 1%)</b>	ms	10	10	10	10	10

#### ELECTRICAL

<b>EXCITATION [2]</b>	8.5 to 30 Vdc, 32 Vdc maximum without damage; excitation voltage can be applied to any lead without damage
<b>CURRENT DRAIN [8]</b>	4.5 mA Typ, 8 mA Max
<b>OUTPUT IMPEDANCE/LOAD</b>	50 ohms max/10K ohms resistance minimum, 0.1 µF capacitance maximum
<b>RESIDUAL NOISE</b>	100 µV rms typ, 0.5 to 100 Hz. 500 µV rms typ, 0.5 Hz to 10 KHz
<b>ISOLATION</b>	100 MΩ

#### PHYSICAL

<b>CASE, MATERIAL/BASE</b>	Anodized Aluminum Alloy
<b>ELECTRICAL, CONNECTIONS</b>	28 AWG silver plated alloy 135, PFA340 Teflon® insulated conductors, spiral shield (SPC), HyperFLEX™ jacket with TFE non-fray, end grip 30 ± 3 inches (760 ± 76mm) long.
<b>MOUNTING/TORQUE</b>	Two 4-40 x 3/8 6 lbf-in (0.7 Nm)
<b>WEIGHT</b>	10 grams (cable weighs 9 grams/meter)

#### ENVIRONMENTAL

<b>ACCELERATION LIMITS (in any direction)</b>	
Static	20 000 g
Sinusoidal/Random Vibration	100 g pk, 20 - 2000 Hz/40 g rms, 20 - 2000 Hz
Shock (half-sine pulse)	5000 g, 150 µsec or longer for the -2 and -10; 10 000 g, 80 µsec or longer for the -30 and -100
Zero Shift	0.1% FSO typical at 5000 g
<b>TEMPERATURE</b>	
Operating	-65°F to +250°F (-55°C to +121°C)
Storage	-100°F to +300°F (-73°C to +150°C)
<b>HUMIDITY/ALTITUDE</b>	Unaffected. Unit is epoxy sealed. Hybrid and sensor are hermetically sealed/unaffected.
<b>ESD SENSITIVITY</b>	Unit meets Class 3 requirements of MIL-STD-883

#### CALIBRATION DATA SUPPLIED (noted on shipping box)

<b>SENSITIVITY</b>	
(at 5 Hz and 1 g pk, for 2 g range)	
(at 100 Hz and 10 g pk, all other ranges)	mV/g with 15 Vdc excitation
<b>FREQUENCY RESPONSE</b>	1 to 100 Hz for 7596A-2, 20 to 10000 Hz for all other ranges
<b>ZERO MEASURAND OUTPUT</b>	mV
<b>MAXIMUM TRANSVERSE SENSITIVITY</b>	% of sensitivity

#### ACCESSORIES (included)

EHW265	(2) SIZE 4, FLAT WASHERS
EH409	(2) 4-40 X 3/8 INCH CAP SCREWS
EHM464	(1) HEX WRENCH

#### OPTIONAL ACCESSORIES

24328	4 CONDUCTOR SHIELDED CABLE
7990	TRIAXIAL MOUNTING BLOCK

#### NOTES

- Reference frequency is 20 Hz on the 2 g range.
- Over the excitation range 8.5 to 30 Vdc. Sensitivity changes +0.1%/V typical and zero measurand output changes -0.5 mV/V typical.

- Full scale output (FSO) is nominally 4 volts.
- 1% is typical. 1% maximum available on special order.
- THRESHOLD = MAX. RESIDUAL NOISE: 0.5 TO 100 Hz SENSITIVITY
- Per ISA 37.2 at 250 Microstrain.
- At 100 Gauss, 60 Hz.
- Current drain increases slightly with increasing excitation; typical change is +.06 mA per volt from 8.5 to 30 Vdc.
- Maintain high levels of precision and accuracy using Endevco's factory calibration services. Call Endevco's inside sales force at 800-982-6732 for recommended intervals, pricing and turn-around time for these services as well as for quotations on our standard products.

Continued product improvement necessitates that Endevco reserve the right to modify these specifications without notice. Endevco maintains a program of constant surveillance over all products to ensure a high level of reliability. This program includes attention to reliability factors during product design, the support of stringent Quality Control requirements, and compulsory corrective action procedures. These measures, together with conservative specifications have made the name Endevco synonymous with reliability.