

Model 7596A Variable capacitance accelerometer

Features

- Economical and rugged
- 2 to 100 g full scale
- DC response
- Gas damped sensor
- Mechanical over-range stops



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.

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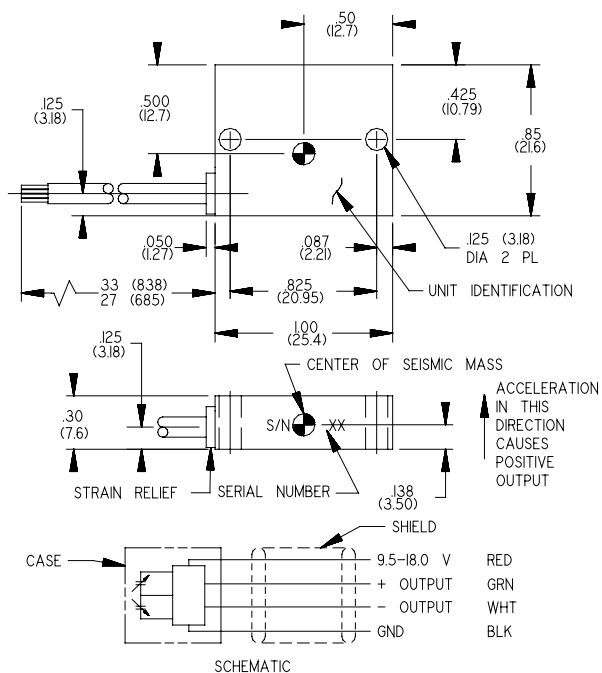
电话：+ 86 010 5601 8989

+ 86 010 5601 7979

传真：+ 86 010 5885 7266

邮箱：sales@aq315.com

<http://www.aq315.com>



STANDARD TOLERANCE
INCHES (MILLIMETERS)
.XX = +/- .02 (X = +/- .5)
.XXX = +/- .005 (XX = +/- .13)

BRAYOFFSLEICAD

Model 7596A Variable capacitance accelerometer

Endevco

Specifications

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.

Dynamic characteristics	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 (max)	±0.20 (±0.50)	±0.20 (±0.50)	±0.20 (±0.50)	±0.20 (±0.50)	±1 (±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	+0.08
Thermal zero shift						
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
Thermal sensitivity shift						
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
Thermal transient error	Equiv. g/°F	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
per ISA RP 37.2	Equiv. g/°C	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Overrange (determined by electrical clipping or mechanical stops, whichever is smaller.)						
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
Threshold (resolution) [5]	Equiv. g's	0.0005	0.0025	0.008	0.0012	0.025
Base strain sensitivity, max [6]	Equiv. g's	0.01	0.01	0.01	0.01	0.01
Magnetic susceptibility [7]	Equiv. g's	< 1	< 1	< 1	< 1	< 0.1
Warm-up time (to within 1%)	ms	10	10	10	10	10

Electrical characteristics

Excitation [2]	8.5-30 Vdc, 32 Vdc max without damage; excitation voltage can be applied to any lead without damage
Current drain [8]	4.5 mA typ, 8 mA max
Output impedance/load	50 ohms max/10K ohms resistance minimum, 0.1 µF capacitance maximum
Residual noise	100 µV rms typ, 0.5 to 100 Hz 500 µV rms typ, 0.5 Hz to 10 kHz
Isolation	100 MΩ

Physical characteristics

Case, material/base	Anodized aluminum alloy
Electrical, connections	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.
Mounting/torque	Two 4-40 x 3/8 6 lbf-in (0.7 Nm)
Weight	10 grams (cable weighs 9 grams/meter)

Environmental characteristics

Acceleration limits (in any direction)	
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
Temperature	
Operating	-65°F to +250°F (-55°C to +121°C)
Storage	-100°F to +300°F (-73°C to +150°C)
Humidity/altitude	Unaffected. Unit is epoxy sealed. Hybrid and sensor are hermetically sealed/unaffected.
ESD sensitivity	Unit meets Class 3 requirements of MIL-STD-883

北京汇润科贸有限公司

电话：+ 86 010 6478 7697

直线：133 8128 1890

传真：+ 86 010 5894 9029

邮箱：sales@aq315.com

http://www.aq315.com



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smart engineering for
extreme environments
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Calibration

Sensitivity

(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

Frequency response

1 to 100 Hz for 7596A-2, 20 to 10000 Hz for all other ranges

Zero measurand output

mV

Maximum transverse sensitivity

% of sensitivity

Accessories

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:

1. Reference frequency is 20 Hz on the 2 g range.
2. 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.
3. Full scale output (FSO) is nominally 4 volts.
4. 1% is typical. 1% maximum available on special order.
5. Threshold = max. residual noise; 0.5 to 100 Hz sensitivity
6. Per ISA 37.2 at 250 microstrain.
7. At 100 Gauss, 60 Hz.
8. Current drain increases slightly with increasing excitation; typical change is +.06 mA per volt from 8.5 to 30 Vdc.
9. 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.



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(800) 982-6732 • (949) 493-8181 fax (949) 661-7231 • www.endevco.com • Email: applications@endevco.com

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