



# Strain Sensors

## Series DT 3617

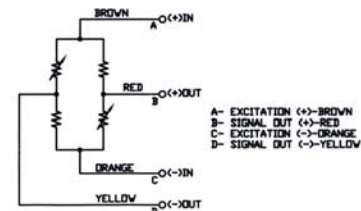
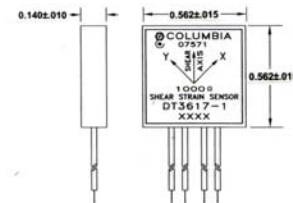
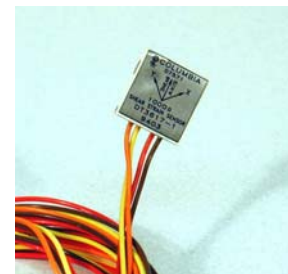
Columbia Series DT 3617 Strain Sensors are designed for the measurements of planar shear strain forces when the axis of principal strain is identified. Each sensor is a complete, compact, easily installed device utilizing the proven technology of the Columbia DTD 2684 Series Fatigue Monitoring Sensors.

The DT 3617 Shear Strain Sensor consists of two 1000 Ohm precision strain gage grids arranged orthogonally on a one mil polyimide substrate and a matching pair of 1000 Ohm bridge completion elements. The entire gage configuration is assembled in a rugged, molded silicone rubber package with four, M22759, 26-gage TFE insulated aircraft lead wires. The bottom surface of the sensor is polyimide substrate of active strain gage elements and is supplied pre-processed for bonding to the test structure. The top surface of the sensor contains the axis identification marking to assist in aligning the gage with the principal strain axis.

Individual models are available to compensate materials commonly used in aircraft structural fabrication. Columbia Model 5802 Strain Gage Amplifier is designed to amplify the sensor signals providing both strain and temperature outputs.

Note: Exports from the United States are subject to the licensing requirements of the Export Administration Regulations (EAR) and/or the International Traffic in Arms Regulations (ITAR).

- Planar Shear (2) 90 Deg. Gages
- Self Temperature Compensating
- Ease of Installation
- High Output – Two Active Arms



### Specifications<sup>1</sup>

Series DT 3617	
<b>Operational</b>	
Input Resistance	1000 ohms, ±2%
Gage Factor (GF)	2.05 ±1.5%
Rated Excitation	10.0 VDC
Strain Limits	1%
Working Range	±2000 µC
Fatigue Life	10 <sup>6</sup> Cycles
Null Offset <sup>2</sup> (Ez)	±2.5 mV
Linearity	0.5% BFS
Hysteresis / Repeatability	±0.5%
GF Temp. Coefficient	±0.02% / Deg.C
Ez Temp. Coefficient	0.0005 mV / V / Deg. C

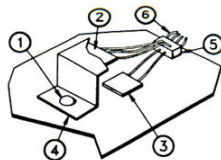
### Environmental<sup>2</sup>

Temperature Range	-55° to +125°C
Vibration	30g, 10Hz to 2KHz
Humidity	MIL-STD-202 Method 110A
Sand & Dust	MIL-STD-202, Method 101D (168 Hours)
Insulation Resistance	100 Meg. min. @ 500VDC
Dielectric Strength	1050 VRMS, 60Hz, 1 Min.
Altitude	Sea Level to 70,000 Ft.
Shock	100g, 11msec.
Flammability	MIL-Std-202 Method 111A
Fluids	Resistant to short term exposure to fuel, lubricating oils and hydraulic fluids.

### Physical

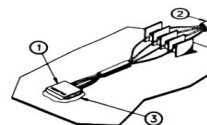
Size	0.56" x 0.56" x 0.14" thick
Encapsulant	Silicone rubber per MIL-S-23586A Type 1 Class 2, Grade A
Weight	Approx. 13 grams
Matrix	0.001" Polyimide
Leads	#26 AWG, Teflon ins, SPC

<sup>1</sup> at +25 Deg. C    <sup>2</sup> Installed Gage



**Fig. 1 Typical Installation of Old Style Strain Gages**

1. Bolt or rivet removed from assembly
2. Dummy gage(s) bonded to "Z Tab" of same material as structure.
3. Active gage bonded to structure under test.
4. "Z Tab" mounted to structure with bond or rivet.
5. Strain gage leads interwired and soldered to junction block.
6. Entire unit covered with protective material.



**Fig. 2 Installation of Columbia Strain Sensor**

1. Strain Sensor bonded to surface under test.
2. Leads connected to wire harness.
3. Coat sensor and wires with waterproofing material.

### ADVANTAGES

- Higher level accuracy
- Twice the output
- Less installation time
- No loss of structural integrity
- Optimum temperature compensation

Model	Compensating Material	Lead Length
DT 3617-1	Aluminum 7075-T6	24 Inches
DT 3617-2	Steel, AISI 4130	24 Inches
DT 3617-3	Titanium TI-6AL-4V Annealed	24 Inches
DT 3617-4	Graphite Epoxy AS4/3501-6	24 Inches

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