

# Strain Sensors

## Model DT3757 Series

Columbia's strain sensors take the work out of strain sensing. They are complete and thermally compensated strain sensing solutions. Columbia's strain sensors are much easier to install compared to foil strain gages by themselves and provide additional accuracy given the thermal compensation. Columbia's strain sensors have been flight qualified, including requirements to FAA DO-160, and have been used on military and commercial aircraft for more than 30 years. Columbia's strain sensors have been used on various aircraft including large cargo airplanes, fighter aircraft, and helicopters.

The DT3757 series takes Columbia's strain sensors to the next level by integrating an amplified within the sensor body providing a higher signal to noise ratio. Columbia's DT3757 has a signal 10 times higher than standard strain gages. In addition, the DT3757 series is interchangeable with Columbia's DT2684 series. The simplicity of use and reliability make them ideal for other applications including structural monitoring, geophysical measurements, and laboratory use.

**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).**

- High Signal to Noise Ratio
- Ease of Installation
- Signal Gain of 10
- Thermally Compensated
- High Reliability

### SPECIFICATIONS

Operation<sup>1</sup>

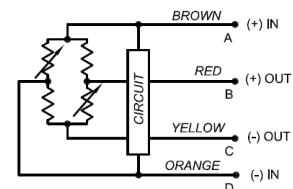
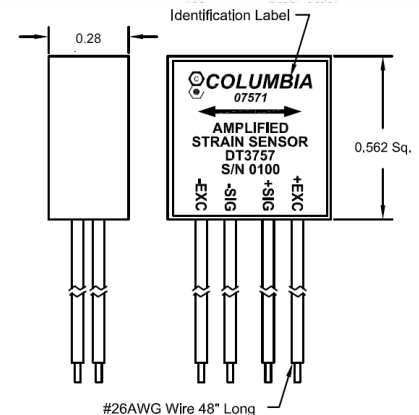
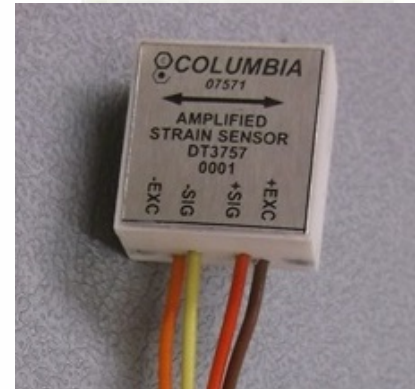
	Series DT3757
Input Resistance	1000Ω, ±2%
Sensitivity	10.25mV/V/1000μC <b>nominal</b>
Rated Excitation Voltage	7 to 10.0VDC
Internal Amplifier Current	120μA@10VDC <b>maximum</b>
Linearity	±1.0% <b>maximum</b>
Zero Offset	±0.5mV/V <b>typical</b>
Operating Range	+3000μC 100 cycles / +2000μC 10,000 cycles
Output Resistance	1000Ω, ±2%
Sensitivity Shift	±0.013%/° F <b>maximum</b>
Hysteresis, Repeatability	±0.5% <b>maximum</b>
Zero Shift	±0.00025mV/V/° F <b>typical</b>

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

Temperature Range	-40° to 200°F
Vibration	30g, 10Hz to 2KHz <sup>3</sup>
Humidity	MIL-STD-202 Method 103B <sup>3</sup>
Salt Spray	MIL-STD-202 Method 101D (168 Hours) <sup>3</sup>
Insulation Resistance	100 Meg. min @ 500VDC
Dielectric Strength	1050VRMS, 60Hz, 1 Min.
Altitude	Sea Level to 70,000 Ft. <sup>3</sup>
Flammability	MIL-STD-202 Method 111A <sup>3</sup>
Shock	100g, 11mSec <sup>3</sup>
Fluids	Resistance to short term exposure to fuel, lubricating oils and hydraulic fluids <sup>3</sup>

### Physical

Size	0.562" Square x 0.28" Thick
Encapsulation	Silicone Rubber per MIL-S-23586A Type I, Class 2, Grade A
Weight	Approx. 13gms (Depending on length of leads)
Matrix	0.001" Polyimide
Leads	#26AWG, Teflon Ins. SPC, 12" Min.

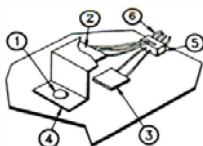


SCHEMATIC DIAGRAM

### Ordering Information\*

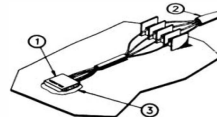
Model	Lead Length	Compensating Material
DT3757-1	48"	Aluminum 7075-T6 or 7050-T73651, IVD
DT3757-2	48"	Steel, AISI 4130 or HP9-4-,20
DT3757-3	48"	Titanium TI-6AL-4V Annealed
DT3757-4	48"	Carbon/Epoxy MMS 549 Type 1

<sup>1</sup> @25°C    <sup>2</sup> Installed Gage    <sup>3</sup> Preliminary/Qualified by Similarity/Pending Testing



**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
- 10X the output
- Less installation time
- No loss of structural integrity
- Optimum temperature compensation

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Subject to change without notice