Piezoresistive Pressure Transducer

ENDEVCO MODEL 8507C

Model 8507C-2, -5, -15 and -50

- 2 to 50 psi
- 300 mV Full Scale
- Rugged, Miniature



Actual size

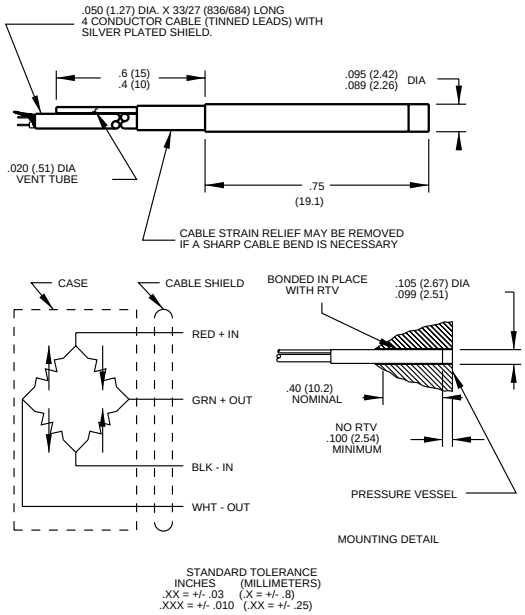
DESCRIPTION

The ENDEVCO® Model 8507C is a rugged, miniature, high sensitivity piezoresistive pressure transducer. It has a 0.092 inch (2.34 mm) cylindrical case and is available in ranges from 2 psi to 50 psi with full scale output of 300 mV. Its high sensitivity combined with high resonance makes it ideal for measuring dynamic pressure.

ENDEVCO pressure transducers feature an active four-arm strain gage bridge diffused into a sculptured silicon diaphragm for maximum sensitivity and wide-band frequency response. Self-contained hybrid temperature compensation provides stable performance over the wide temperature range of 0°F to 200°F (-18°C to +93°C). ENDEVCO transducers also feature excellent linearity (even to 3X range), high shock resistance, and excellent stability during temperature transients.

The Model 8507C is designed for installations which do not require threaded mounting and can be installed in locations which are difficult to reach. Its small size permits flush mounting on curved surfaces. ts high sensitivity combined with small size and high resonance frequency makes the Model 8507C ideal for use on small-scale models in wind tunnels.

ENDEVCO Model 136 Three-Channel System, Model 4430A Signal Conditioner, or Model 68207 BCAS™ Computer Controlled System are recommended as signal conditioner and power supply.



SPECIFICATIONS

CERTIFIED PERFORMANCE: All specifications assume +75°F (+24°C) and 10 Vdc excitation unless otherwise stated. The following parameters are 100% tested. Calibration data, traceable to the National Institute of Standards and Technology (NIST), is supplied.

	Units	8507C-2	-5	-15	-50
RANGE [1]	psig	0 - 2	0 - 5	0 - 15	0 - 50
POSITIVE SENSITIVITY [2]	mV/psi	150 ±50	60 ±20	20 ±6.7	6 ±2
COMBINED: NON-LINEARITY, NON-REPEATABILITY,					
PRESSURE HYSTERESIS [3]	% FSO RSS Max	1.5	0.75	0.50	0.50
Non-Linearity, Independent	% FSO Typ	1.0	0.50	0.20	0.20
Non-Repeatability	% FSO Typ	0.1	0.1	0.1	0.1
Pressure Hysteresis	% FSO Typ	0.1	0.1	0.05	0.03
ZERO MEASURAND OUTPUT [4]	mV Max	±10	±10	±10	±10
ZERO SHIFT AFTER 3X RANGE	±% 3X FSO Max	0.2	0.2	0.2	0.2
	(Typ)	(0.02)	(0.02)	(0.02)	(0.02)
THERMAL ZERO SHIFT					
From 0°F to 200°F (-18°C to +93°C)	±% FSO Max	3	3	3	3
THERMAL SENSITIVITY SHIFT					
From 0°F to 200°F (-18°C to +93°C)	±% Max	4	4	4	4

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SPECIFICATIONS—continued

TYPICAL PERFORMANCE CHARACTERISTICS: The following parameters are established from testing of sample units.

	Units	8507C-2	-5	-15	-50
RESONANCE FREQUENCY	Hz	70 000	85 000	130 000	270 000
NON-LINEARITY AT 3X RANGE	% 3 X FSO	2.5	2.0	1.0	1.0
THERMAL TRANSIENT RESPONSE PER	psi/°F	0.003	0.003	0.003	0.003
ISA-S37.10, PARA. 6.7, PROCEDURE I [5]	psi/°C	0.005	0.005	0.005	0.005
PHOTOFLASH RESPONSE [6]	Equiv. psi	0.01	0.03	0.1	0.3
WARM-UP TIME [7]	ms	1	1	1	1
ACCELERATION SENSITIVITY	Equiv. psi/g	0.0002	0.0002	0.0002	0.0002
BURST PRESSURE (Diaphragm/Reference Side)	psi Min	40/40	100/50	150/50	200/50

ELECTRICAL

FULL SCALE OUTPUT	300 ±100 mV at 10.0 Vdc
SUPPLY VOLTAGE [8]	10.0 Vdc recommended, 18 Vdc maximum
ELECTRICAL CONFIGURATION	Active four-arm piezoresistive bridge
POLARITY	Positive output for increasing pressure into (+) port (end with screen on it)
RESISTANCE	
Input	2000 ±800 ohms
Output	1600 ±500 ohms
Isolation	100 megohms minimum at 50 volts; leads to case, leads to shield, shield to case
NOISE	5 microvolts rms typical, dc to 50 000 Hz; 50 microvolts rms maximum, dc to 50 000 Hz

MECHANICAL

CASE, MATERIAL	Nickel - iron alloy
CABLE, INTEGRAL	Four conductor No. 36 AWG Teflon® insulated leads, braided shield, PVC jacket, 30 ±3 in (760 ±76 mm)
DEAD VOLUME (+) PORT	0.00005 cubic inches (0.0008 cc)
MOUNTING	Bond into #38 drill hole (2.6 mm) using an RTV such as DOW CORNING Silastic® 738; RTV not permitted within 0.10 inch (2.5 mm) of unit's face.
WEIGHT	0.3 gram (cable weighs 3.6 grams/meter)

ENVIRONMENTAL

MEDIA	Internal seals are epoxy and are compatible with clean dry gas media. Media in (+) measurand port is exposed to nickel-iron alloy, silicon, ceramic, Parylene C, and epoxy. Media in (-) measurand port is exposed to the above and RTV silicone coating. For use in water or corrosive media, contact the factory for modifications and installation precautions which may be taken to extend service life.
TEMPERATURE [9]	-65°F to +225°F (-54°C to +107°C)
VIBRATION	1000 g pk
ACCELERATION	1000 g
SHOCK	10 000g, 100 microsecond haversine pulse
HUMIDITY	Isolation resistance greater than 100 megohms at 50 volts when tested per MIL-STD-202E, Method 103B, Test Condition B.

CALIBRATION DATA

Data supplied for all parameters in Certified Performance section. Optional calibrations available for all parameters in Typical Performance section.

OPTIONAL ACCESSORY

25034 4 CONDUCTOR SHIELDED CABLE

NOTES

1. Pressure ranges can be considered bidirectional, e.g., an 8507C-5 can be used to measure +or - 5 psig. Sensitivity on the positive direction is typically within 1% of sensitivity in the negative direction. Sensitivity calibration provided with each unit is for the positive direction.
2. 1 psi = 6.895 kPa = 0.069 bar.
3. FSO (Full Scale Output) is defined as transducer output from 0 to + full scale pressure.
4. Zero Measurand Output (ZMO) is the transducer output with 0 psig applied.
5. Significantly higher thermal transient errors occur if the excitation voltage exceeds 10 Vdc. For sensitive phase change studies, many users reduce the excitation to 5 Vdc or even 1 Vdc.
6. Equiv. PSI Per ISA-37.10, Para. 6.7, Proc. 1. The metal screen partially shields the silicon diaphragm from incident radiation. Accordingly, light incident at acute angles to the screen generally increases the error by a factor of 2 or 3.
7. Warm-up time is defined as elapsed time from excitation voltage “turn on” until the transducer output is within ±1% of reading accuracy.
8. Use of excitation voltages other than 10.0 Vdc requires manufacture and calibration at that voltage since thermal errors increase with high excitation voltages.
9. Units can be compensated over any 200°F (93°C) span from -65°F to +225°F (-54°C to +107°C) on special order.

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.

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