Piezoresistive Pressure Transducer

ENDEVCO MODEL 8520A

Model 8520A-10, -20, -50, -100 and -500

- **10 to 500 psi, 300 mV Full Scale**
- **High Temperature, +500°F (+260°C)**



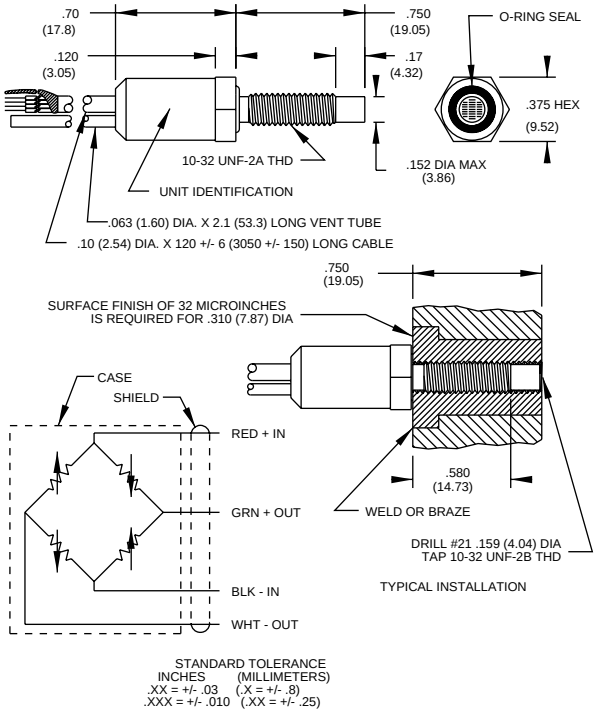
Actual size

DESCRIPTION

The ENDEVCO® Model 8520A is a rugged, miniature, high sensitivity piezoresistive pressure transducer. The transducer has a 0.15 inch (3.8 mm) face diameter and is available in ranges from 10 to 500 psi. The Model 8520A features high temperature performance to +500°F (+260°C) and can operate with diminished lifetime to +600°F (+316°C). Its excellent linearity (even to 2X range) combined with very high resonance makes it ideal for measuring dynamic pressure.

The transducer employs silicon strain gages bonded to a micro-machined silicon diaphragm for maximum sensitivity and wide frequency response. Internal sensitivity compensation and zero trim provides accuracy to +500°F (+260°C). This transducer exhibits low photoflash sensitivity and high stability during temperature transients.

The Model 8520A is designed to measure a wide range of static or dynamic pressures. Its small diameter suits it to flush mounting for measuring skin pressures on aircraft, inlet distortion pressures in turbine engines or small scale models in wind tunnels. The vent tube provides for venting to the atmosphere or to a standard reference manifold, or for differential pressure measurements.



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 Technology (NIST), is supplied.

	Units	8520A-10	-20	-50	-100	-500
RANGE [1]	psig	0 - 10	0 - 20	0 - 50	0 - 100	0 - 500
POSITIVE SENSITIVITY [2]	mV/psi	30 +15/-10	15 +7/-5	6 +3/-2	3 +1.5/-1.0	0.6 +0.3/-0.2
COMBINED: NON-LINEARITY, NON-REPEATABILITY, PRESSURE HYSTERESIS [3]	% FSO RSS Max	0.50	0.50	0.50	0.50	0.75
Non-Linearity, Independent	% FSO Typ	0.25	0.25	0.25	0.25	0.5
Non-Repeatability	% FSO Typ	0.1	0.1	0.1	0.1	0.1
Pressure Hysteresis	% FSO Typ	0.1	0.1	0.1	0.1	0.1
ZERO MEASURAND OUTPUT [4]	mV Max	±10	±10	±10	±10	±10
ZERO SHIFT AFTER 2X RANGE	±% 2X FSO Max	0.2	0.2	0.2	0.2	0.2
THERMAL ZERO SHIFT From -30°F to +500°F (-34°C to +260°C)	±% FSO Max	3	3	3	3	3
THERMAL SENSITIVITY SHIFT From -30°F to +500°F (-34°C to +260°C)	±% Max	3	3	3	3	3

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SPECIFICATIONS—continued

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

	Units	8520A-10	-20	-50	-100	-500
RESONANCE FREQUENCY	Hz	110 000	180 000	240 000	280 000	900 000
NON-LINEARITY AT 2X RANGE	% 2X FSO	0.5	0.5	1.0	1.0	1.0
ZERO SHIFT WITH MOUNTING TORQUE 15 lbf-in (1.7 Nm)	% FSO	0.1	0.1	0.1	0.1	0.1
THERMAL TRANSIENT RESPONSE PER ISA-S37.10, PARA. 6.7, PROCEDURE I	psi/°F	0.002	0.002	0.004	0.005	0.006
	psi/°C	0.004	0.004	0.007	0.009	0.011
PHOTOFLASH RESPONSE [6]	Equiv. psi	0.1	0.1	0.1	0.1	0.5
WARM-UP TIME [7]	ms	1	1	1	1	1
ACCELERATION SENSITIVITY	Equiv. psi/g	0.0004	0.0003	0.0003	0.0004	0.0010
BURST PRESSURE (Diaphragm/Reference Side)	psi Min	20/20	40/40	100/75	200/75	1000/75
Common Mode	psi	50	100	300	300	300

ELECTRICAL

FULL SCALE OUTPUT	300 +150/-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	1400 ±900 ohms
Output	800 ±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	Stainless Steel (17-4 PH CRES)
CABLE, INTEGRAL	Four conductor No. 30 AWG Teflon® insulated leads, braided shield, Teflon® jacket, 120 inches (3050 mm) length typical
DEAD VOLUME (+) PORT	0.0003 cubic inches (0.005 cc)
MOUNTING/TORQUE	10-32 UNF-2A threaded case 0.75 inch (19.05mm) long/15 ±5 lbf-in (1.7 ±0.6 Nm)
WEIGHT	8.5 grams (cable weighs 14 grams/meter)

ENVIRONMENTAL

MEDIA	Media in (+) port is exposed to stainless steel case, silicon diaphragm, ceramic, epoxy, RTV and fluorosilicone O-ring. The (+) port can be exposed to water for weeks without damage
TEMPERATURE [9]	-65°F to +500°F (-54°C to +260°C)
VIBRATION/ACCELERATION	100 g
SHOCK	10 000 g, 100 microsecond haversine pulse

CALIBRATION DATA

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

ACCESSORY

EHR97 O-RING, FLUOROSILICONE

OPTIONAL ACCESSORY

25045 4 CONDUCTOR SHIELDED CABLE

NOTES

1. 1 psi = 6.895 kPa = 0.069 bar.
2. Calibration provided is for positive pressure. Negative sensitivity is typically within 2% of positive sensitivity.
3. FSO (Full Scale Output) is defined as transducer output from 0 to +full scale pressure.
4. Zero Measurand Output (ZMO) is the transducer with 0 psig applied.
5. 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 to 3.
6. Per ISA-S37.10, Para. 6.7, Procedure II.
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. The 8520A can be operated at 500°F (260°C) continuously, at 550°F (288°C) for up to 24 hours and at 600°F (316°C) for up to 4 hours.

NOTE: Tighter specifications are available 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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