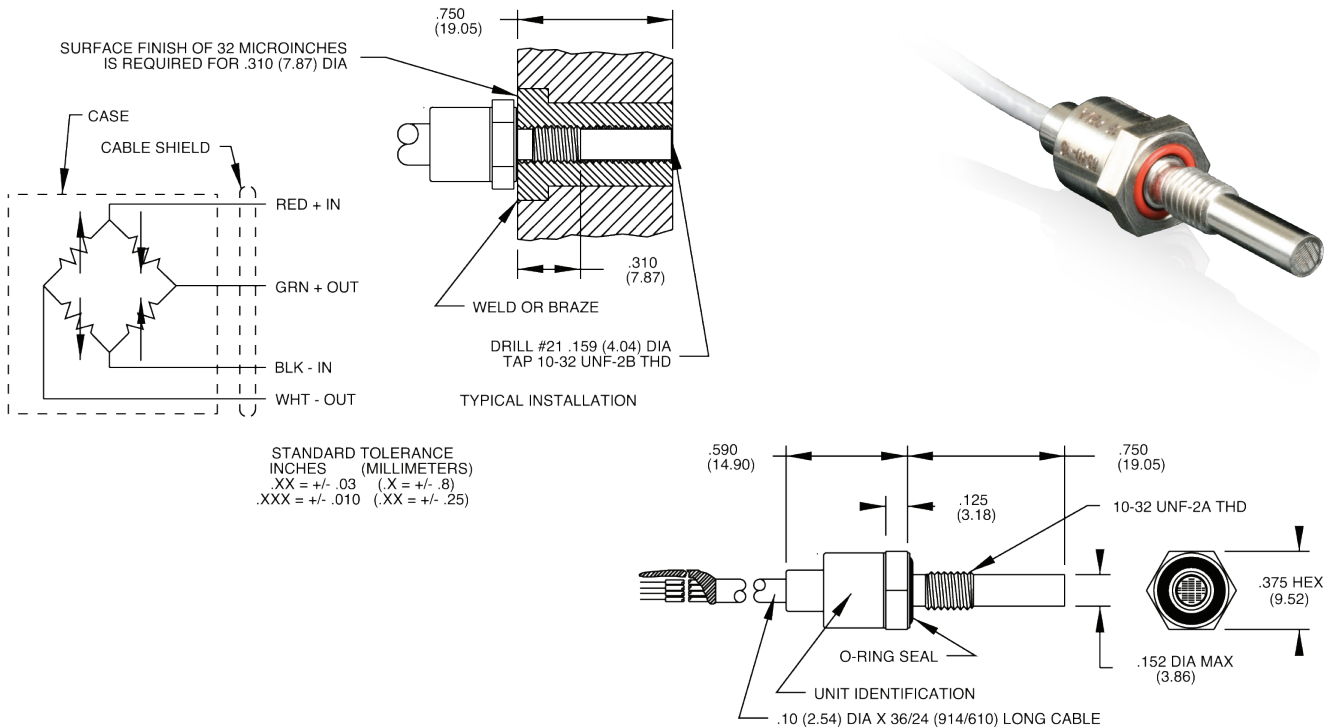


# Piezoresistive pressure transducer

## Model 8540



### Key features

- 15, 50, 100, 200 and 500 psia ranges
- 300 mV full scale
- High temperature, +500°F (+260°C)
- Absolute reference

### Description

Model 8540 is a rugged, miniature, high sensitivity piezoresistive absolute pressure transducer. The transducer has a 0.15 inch (3.8 mm) face diameter and is available in ranges from 15 to 500 psia. 8540 features high temperature performance to +500°F (+260°C) and can operate with diminished lifetime to +600°F (+316°C). Its excellent linearity 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 photo-flash sensitivity and high stability during temperature transients.

8540 is designed to measure 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 transmission pressures in automobiles. The transducer's high frequency response permits use on small scale models in wind tunnels.

## Piezoresistive pressure transducer | Model 8540

All specifications assume +75°F(24°C) and 10 volts excitation unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

Specifications						
Dynamic characteristics	Units	-15	-50	-100	-200	-500
Range	psia	0-15	0-50	0-100	0-200	0-500
Sensitivity	mV/psi	20 +10/-6.7	6 +3/-2	3 +1.5/-1.0	1.5 +0.75/-0.5	0.6 +0.3/-0.2
Combined: non-linearity, non repeatability, pressure hysteresis	% FSO RSS max	0.50	0.50	0.50	0.75	0.75
Non-linearity, independent	% FSO typ	0.25	0.25	0.25	0.4	0.4
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	mV max	±20	±20	±20	±20	±20
Zero shift after 2X range	% 2X FSO max (typ)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)
Thermal zero shift						
From -30°F to 500°F (-34°C to +260°C)	% FSO max	3.0	3.0	3.0	3.0	3.0
Thermal sensitivity shift						
From -30°F to 500°F (-34°C to +260°C)	% max	4.0	4.0	4.0	4.0	4.0
Diaphragm resonance frequency	Hz (typ)	140,000	240,000	350,000	450,000	900,000
Non-linearity at 2X range	% 2X FSO (typ)	0.5	1.0	1.0	1.0	1.0
Zero shift with mounting torque						
15 lbf-in.	% FSO (typ)	0.25	0.25	0.25	0.25	0.25
Thermal transient response per ISA-S37.10, PARA. 6.7, procedure I [2]	psi / °F (typ)	0.002	0.004	0.005	0.006	0.006
Photoflash response [3]	equiv psi	0.1	0.2	0.3	0.5	1.0
Warm-up time [4]	ms	1	1	1	1	1
Acceleration sensitivity	equiv. psi/g	0.0004	0.0003	0.0003	0.0007	0.0010
Burst pressure (diaphragm)	psia min	30	100	200	400	1000
<b>Electrical characteristics</b>						
Full scale output	300 +150/-100 mV at 10.0 Vdc					
Supply voltage [5]	10.0 Vdc recommended, 18 Vdc maximum					
Electrical configuration	Active four-arm piezoresistive bridge					
Polarity	Positive output for increasing pressure into (+) port					
Resistance						
Input	1600 ±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					
<b>Mechanical characteristics</b>						
Case, material	Stainless steel (17-4 PH CRES)					
Cable, integral	Four conductor No. 30 AWG Teflon insulated conductors, braided shield, Teflon jacket					
Dead volume, measurand (+) port	0.0003 cubic inches (0.005 cc)					
Mounting/torque	10-32 UNF-2A threaded case 0.75 inch (19.05 mm) long / 15 ±5 lbf-in (1.7 ±0.6 Nm)					
Weight	8.5 grams (cable weighs 14 grams/meter)					
<b>Environmental characteristics</b>						
Media	Media in (+) port is exposed to stainless steel case, silicon diaphragm, ceramic, epoxy, RTV and fluorosilicone O-ring.					
Temperature [6]	-65°F to +500°F (-54°C to +260°C)					
Vibration / acceleration	300 g					
Shock	10,000 g, 100 microsecond half-sine					

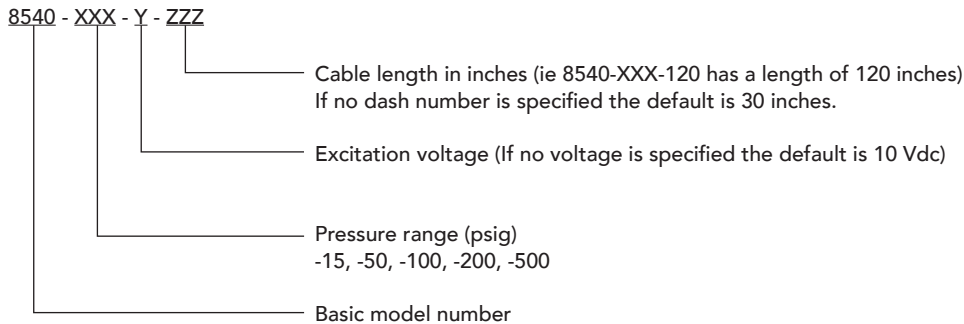
# Piezoresistive pressure transducer | Model 8540

Accessories		
Product	Description	8540
EHR97	O-ring, fluorosilicone	Included

## Notes

1. Maintain high levels of precision and accuracy using Endevco's factory calibration services. Call Endevco's inside sales force at 866-ENDEVCO for recommended intervals, pricing and turn-around time for these services as well as for quotations on our standard products.
2. 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.
3. 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.
4. Warm-up time is defined as elapsed time from excitation voltage "turn on" until the transducer output is within  $\pm 1\%$  of reading accuracy.
5. Use of excitation voltages other than 10.0 Vdc requires manufacture and calibration at that voltage since thermal errors increase with high excitation voltages.
6. 8540 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.

Model number definition:



## Other options

- M4 Gel
- M8 "A" screen, black grease



[www.endevco.com](http://www.endevco.com) | Tel: +1 (866) ENDEVCO [+1 (866) 363-3826] | 10869 NC-903, Halifax, NC 27839 USA

© 2020 PCB Piezotronics of North Carolina, Inc. (doing business as Endevco). In the interest of constant product improvement, specifications are subject to change without notice. PCB®, ICP®, Swiveler®, Modally Tuned®, and IMI® with associated logo are registered trademarks of PCB Piezotronics, Inc. in the United States. ICP® is a registered trademark of PCB Piezotronics Europe GmbH in Germany and other countries. UHT-12TM is a trademark of PCB Piezotronics, Inc. SensorLine<sup>SM</sup> is a servicemark of PCB Piezotronics, Inc. MTS®, MTS Sensors logo, Temposonics®, SWIFT®, R Series V®, TempoLink®, and RefineMe® are registered trademarks of MTS Systems Corporation in the United States. These marks may be registered or otherwise protected in other countries. Endevco® is a registered trademark of PCB Piezotronics of North Carolina, Inc. d/b/a Endevco in the United States.

042420



Endevco is an assumed name of PCB Piezotronics of North Carolina, Inc. and is a designer and manufacturer of sensors, instrumentation, and cables for vibration, shock and pressure measurements, known for innovation of sensor technology for the automotive, aerospace and military markets. Visit [www.endevco.com](http://www.endevco.com) for more information. PCB Piezotronics of North Carolina, Inc. (doing business as Endevco) is a wholly owned subsidiary of PCB Piezotronics, Inc. PCB Piezotronics, Inc. is a designer and manufacturer of microphones, and vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology used by design engineers and predictive maintenance professionals worldwide for test, measurement, monitoring, and control requirements in automotive, aerospace, industrial, R&D, military, educational, commercial, and OEM applications. PCB also manufactures the Endevco product line of sensors, instrumentation and cables for vibration, shock and pressure measurements. With a worldwide customer support team, 24-hour SensorLine<sup>SM</sup>, and a global distribution network, PCB® is committed to Total Customer Satisfaction. Visit [www.pcb.com](http://www.pcb.com) for more information. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corporation. Additional information on MTS can be found at [www.mts.com](http://www.mts.com).