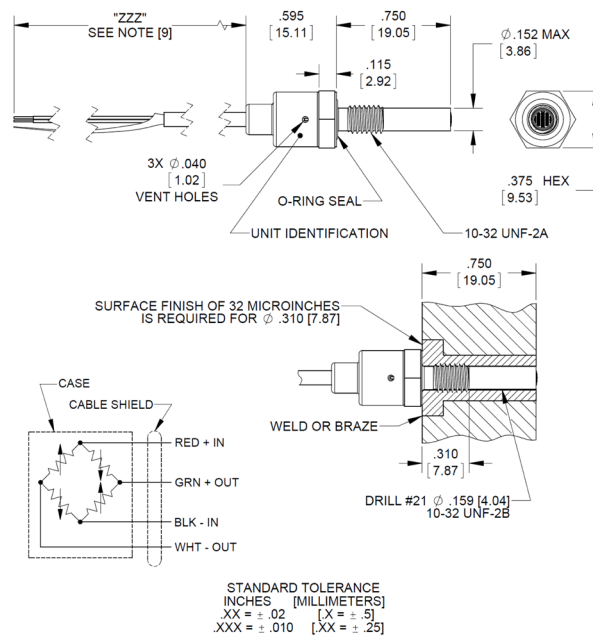


## Piezoresistive pressure transducer

### Model 8523

#### Key features

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



Model 8523 is a rugged, miniature, high sensitivity piezoresistive pressure transducer. It has a 0.152 inch (3.86 mm) face diameter and is available in ranges from 15 to 500 psig. Model 8523 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.

Model 8523 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. Three holes in the back of the unit vent to atmospheric pressure.

Recommended electronics for signal conditioning and power supply are model 126 and 136 general purpose three channel conditioners, or the 4990A-X (Oasis) multi-channel rack mount system.

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#### Specifications

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C) and 100 Hz, unless otherwise noted. Calibration data, traceable to National Institute of Standards and Technology (NIST), is supplied.

| Dynamic characteristics   | Units              | -15         | -50       | -100        | -200           | -500          |
|---|--------------------|-------------|-----------|-------------|----------------|---------------|
| Range [1]   | psig               | 0-15        | 0-50      | 0-100       | 0-200          | 0-500         |
| Sensitivity [1]   | 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 [2]   | % 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 [3]   | mV max             | ±10         | ±10       | ±10         | ±10            | ±10           |
| 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) ref. to 75°F (24°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) ref. to 75°F (24°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 [4] | psi / °F (typ)     | 0.002       | 0.004     | 0.005       | 0.006          | 0.006         |
| Photoflash response [5]   | equiv psi          | 0.1         | 0.2       | 0.3         | 0.5            | 1.0           |
| Warm-up time [6]  | ms                 | 1           | 1         | 1           | 1              | 1             |
| Acceleration sensitivity  | equiv. psi/g       | 0.0004      | 0.0003    | 0.0003      | 0.0007         | 0.0010        |
| Burst pressure (diaphragm)  | psig min           | 44.7        | 114.7     | 214.7       | 414.7          | 1014.7        |

#### Electrical

|                          |   |
|--------------------------|---|
| Full scale output        | 300 +150/-100 mV at 10.0 Vdc  |
| Supply voltage [7]       | 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 |

#### Mechanical

|                                 |  |
|---------------------------------|--|
| 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)  |

#### Environmental

|                          |   |
|--------------------------|---|
| Media                    | Media in (+) port is exposed to stainless steel case, silicon diaphragm, ceramic, epoxy, RTV and fluorosilicone O-ring. |
| Temperature [8]          | -65°F to +500°F (-54°C to +260°C)   |
| Vibration / acceleration | 300 g   |
| Shock                    | 10 000 g, 100 microsecond half-sine   |

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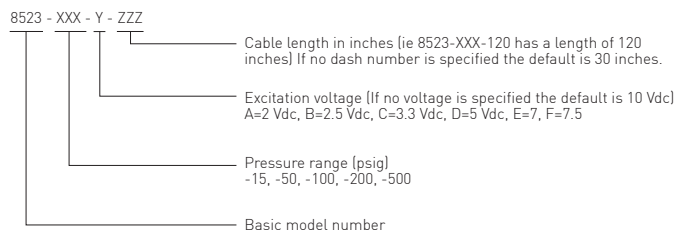
#### Accessories

| Product | Description            | 8530B    |
|---------|------------------------|----------|
| EHR97   | O-ring, fluorosilicone | Included |
| 25045   | Cable, 4 conductor     | Optional |

#### Notes

- 1 psi = 6.895 kPa = 0.069 bar.
- FSO (Full Scale Output) is defined as transducer output change from 0 psia to + full scale pressure.
- Zero Measurand Output (ZMO) is the transducer output with 0 psia applied.
- 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.
- 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.
- Warm-up time is defined as elapsed time from excitation voltage "turn on" until the transducer output is within  $\pm 1\%$  of reading accuracy.
- Use of excitation voltages other than 10.0 Vdc requires manufacture and calibration at that voltage since thermal errors increase with high excitation voltages.
- 8523 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.
- 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.

#### Model definition



#### Contact

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