

## 1800/1805 Series

### TO-8, 0 psi to 3 psi, 0 psi to 150 psi Silicon Pressure Sensors



#### DESCRIPTION

The 1800/1805 Series sensors are high performance TO-8 pressure transducers specifically designed to address a variety of both low and medium pressure original equipment manufacture applications.

The transducers offer two performance grades and a variety of compensation options, including span and calibration to within  $\pm 2$  mV (normalized output). The 1800/1805 Series can operate with either constant current or voltage excitation.

#### FEATURES

- Standard pressure ranges from 0 psi to 3 psi, 0 psi to 150 psi
- Gauge, absolute or differential models
- Voltage or constant current excitation
- Choice of temperature compensation options
  - Laser trim, normalized output
  - Laser trim, standard output
  - Resistor compensation
- Uncompensated version available for microprocessor-based designs

The 1800/1805 Series contains a solid state piezoresistive pressure sensor mounted in a standard TO-8 package. They are printed circuit board and pin-for-pin compatible with other TO-8 pressure sensors.

#### POTENTIAL APPLICATIONS

- Instrumentation calibration
- Avionics/aerospace
- Medical equipment
- HVAC
- Pneumatic controls

# 1800/1805 Series

## TO-8, 0 psi to 3 psi, 0 psi to 150 psi

### ENVIRONMENTAL SPECIFICATIONS (All devices)

| Characteristic                | Parameter                           | Characteristic             | Parameter                          |
|-------------------------------|-------------------------------------|----------------------------|------------------------------------|
| Supply voltage, $V_s$         | 10 Vdc                              | Insulation resistance      | 100 MOhm at 50 Vdc                 |
| Compensated temperature range | -1 °C to 54 °C [34 °F to 129 °F]    | Humidity                   | 50 % $\pm$ 10 %                    |
| Operating temperature range   | -40 °C to 121 °C [-40 °F to 257 °F] | Common-mode pressure       | 150 psig                           |
| Vibration                     | 10 g rms at 20 Hz to 200 Hz         | Max. soldering temperature | 260 °C [500 °F] 10 s max.          |
| Shock                         | 100 g for 11 ms                     | Excitation voltage $V_s$   | Supply voltage $V_s = 15$ Vdc max. |
| Life                          | 100 million cycles                  | Excitation current         | Supply current $I_s = 2$ mA max.   |

### PERFORMANCE CHARACTERISTICS<sup>(1)</sup>

| Characteristic   | Min. | Typ.       | Max.         | Unit       |
|--|------|------------|--------------|------------|
| Zero pressure offset <sup>(1)</sup>                                | –    | –          | $\pm 0.5$    | mV         |
| Zero pressure offset (3 psi to 5 psi only) <sup>(1)</sup>          | –    | –          | $\pm 1$      | mV         |
| Full-scale span <sup>(2)</sup>                                     |      |            |              |            |
| Standard output–current excitation                                 | 75   | –          | 150          | mV         |
| Standard output–voltage excitation                                 | 40   | –          | 120          | mV         |
| Normalized output–current excitation                               | 98   | –          | 102          | mV         |
| Normalized output–current excitation (3 psi only)                  | 73   | –          | 77           | mV         |
| Normalized output–voltage excitation                               | 38   | –          | 42           | mV         |
| Pressure non-linearity <sup>(3)</sup>                              | –    | $\pm 0.15$ | $\pm 0.20$   | %FSS       |
| Pressure hysteresis <sup>(3)</sup>                                 | –    | –          | $\pm 0.0125$ | %FSS       |
| Repeatability  | –    | –          | $\pm 0.0125$ | %FSS       |
| Temperature effect on offset <sup>(4)</sup>                        | –    | –          | $\pm 0.5$    | mV         |
| Temperature effect on offset (3 psi and 5 psi only) <sup>(4)</sup> | –    | –          | $\pm 1$      | mV         |
| Temperature effect on span   | –    | –          | $\pm 0.5$    | mV         |
| Temperature effect on span (3 psi and 5 psi only) <sup>(4)</sup>   | –    | –          | $\pm 1$      | mV         |
| Thermal hysteresis   | –    | $\pm 0.1$  | –            | %FSS       |
| Response time <sup>(5)</sup>                                       | –    | –          | 1            | ms         |
| Long term stability of offset and span <sup>(6)</sup>              | –    | –          | $\pm 0.2$    | %FSS       |
| Common mode voltage <sup>(7)</sup>                                 |      |            |              |            |
| Standard output–current excitation                                 | –    | 50 %       | –            | input      |
| Standard output–voltage excitation                                 | –    | 50 %       | –            | input      |
| Normalized output–current excitation                               | –    | 35 %       | –            | input      |
| Normalized output–voltage excitation                               | –    | 25 %       | –            | input      |
| Input resistance   | –    | –          | –            | –          |
| Current excitation   | 2.0  | –          | 8.0          | k $\Omega$ |
| Voltage excitation   | 8.0  | –          | 40           | k $\Omega$ |
| Output resistance  | 3.5  | –          | 6.0          | k $\Omega$ |

### PRESSURE RANGE SPECIFICATIONS

| Catalog Listing                      | Pressure Range   | Top Side Overpressure <sup>(8)</sup> | Bottom Side Overpressure <sup>(9)</sup> |
|--------------------------------------|------------------|--------------------------------------|---|
| 1805-00 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 3 psi   | 15 psi                               | 9 psi                                   |
| 1805-01 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 5 psi   | 25 psi                               | 15 psi                                  |
| 1800-02 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 10 psi  | 50 psi                               | 30 psi                                  |
| 1800-03 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 15 psi  | 65 psi                               | 45 psi                                  |
| 1800-07 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 30 psi  | 250 psi                              | 50 psi                                  |
| 1800-08 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 50 psi  | 350 psi                              | 50 psi                                  |
| 1800-09 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 100 psi | 350 psi                              | 50 psi                                  |
| 1800-10 (G,D) - (K,L) (0..4) (M,L,N) | 0 psi to 150 psi | 350 psi                              | 50 psi                                  |

#### Notes:

- Reference conditions (unless otherwise noted);  $T_a = 25$  °C [77 °F], Supply  $V_s = 10$  Vdc  $\pm 0.01$  Vdc or  $I_s = 1.5$  mA  $\pm 0.0015$  mA.
- Full-scale span (FSS) is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. FFS is ratiometric to the supply voltage.
- Pressure non-linearity is based on best-fit straight line from the zero to the full-scale pressure. Pressure hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
- Maximum error band of the offset voltage or span over the compensated temperature range, relative to the 25 °C [77 °F] reading.
- Response time for a 0 psi to full-scale span pressure step change, 10 % to 90 % rise time.
- Long term stability over a six month period.
- Common mode voltage as measured from output to ground. For higher levels of common mode voltage, contact the factory.
- Pressure overrange: Top: 5 x full-scale pressure or  $\leq 350$  psi, whichever is less.
- Pressure overrange: Bottom: 3 x full-scale or  $\leq 50$  psi, whichever is less.

# Silicon Pressure Sensors

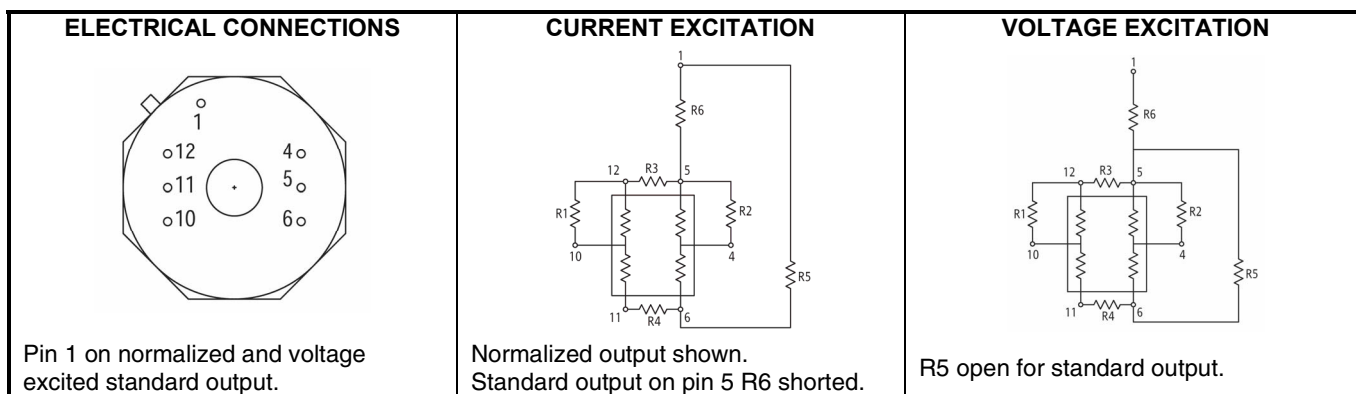
## STANDARD COMPENSATION AND TRIM CHOICES

For maximum convenience, the 1800/1805 Series is temperature compensated from -1 °C to 54 °C [34 °F to 129 °F]. Other temperature ranges are available upon request.

**Normalized Output Option:** For design convenience and sensor interchangeability, the 1800/1805 Series is available with normalized output (100 ±2 mV dc in current excited versions with pressure range >3 psi). Normalized output for current excited 3 psi devices is 75 ±2 mV dc.

**Laser Trim:** Compensation is accomplished by using an in-house laser trim facility that allows for tighter product performance control and improved flexibility in response to special customer performance requirements.

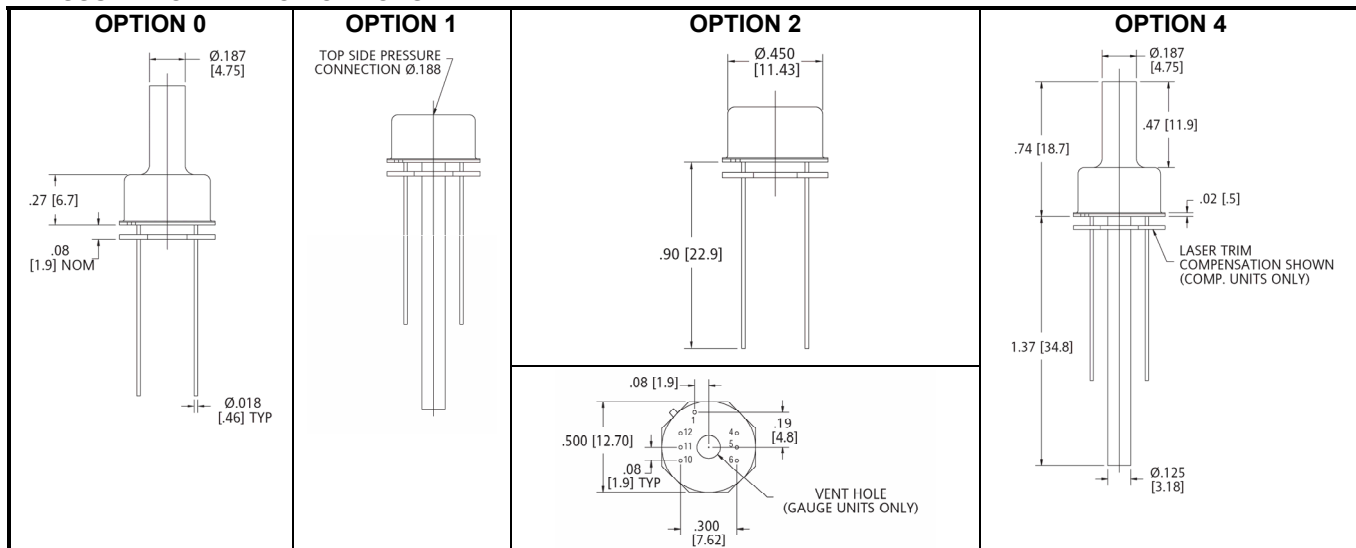
**Resistors:** This option includes a printout of suggested temperature compensation and zero offset resistor values for each individual sensor.



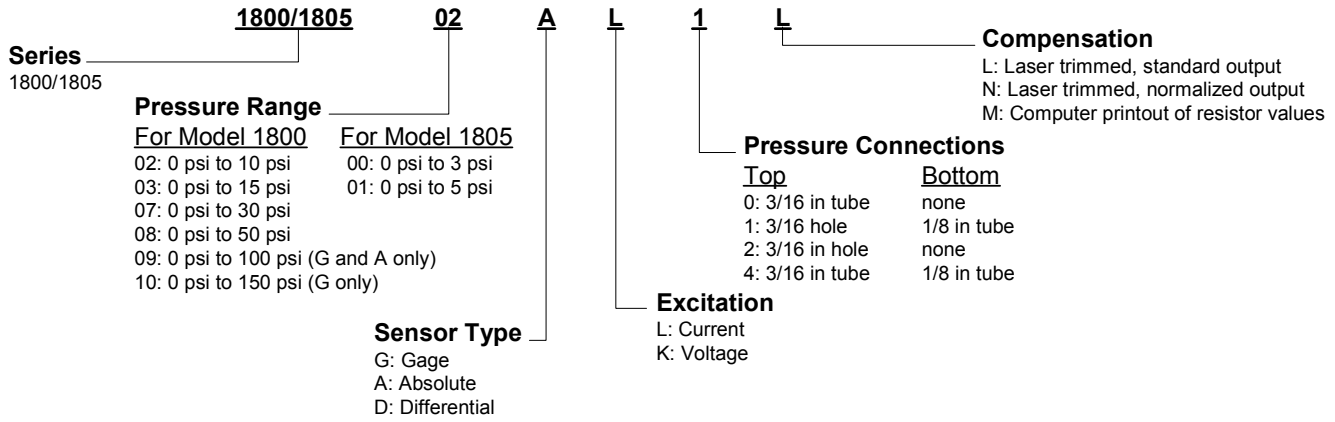
## EXTERNAL CONNECTIONS

| POSITIVE PRESSURE ON TOP AND BOTTOM SIDES |                  |                   |                  |                                      |                  |                   |                  | Current or Voltage Excitation – Normalized Output |            |
|---|------------------|-------------------|------------------|--------------------------------------|------------------|-------------------|------------------|---|------------|
| Current Excitation – Standard Output      |                  |                   |                  | Voltage Excitation – Standard Output |                  |                   |                  | Laser Trim Board                                  |            |
| Discrete Resistor                         | Laser Trim Board | Discrete Resistor | Laser Trim Board | Discrete Resistor                    | Laser Trim Board | Discrete Resistor | Laser Trim Board | Pin   | Connection |
| Pin                                       | Connection       | Pin               | Connection       | Pin                                  | Connection       | Pin               | Connection       | Pin   | Connection |
| 4   | + Output         | 4                 | + Output         | 4                                    | + Output         | 4                 | + Output         | 4   | + Output   |
| 5   | + Input          | 5                 | + Input          | 5                                    | + Input          | 5                 | NC               | 5   | NC         |
| 6   | - Input          | 6                 | - Input          | 6                                    | - Input          | 6                 | - Input          | 6   | - Input    |
| 10  | - Output         | 10                | - Output         | 10                                   | - Output         | 10                | - Output         | 10  | + Output   |
| 11  | NC               | 11                | NC               | 11                                   | NC               | 11                | NC               | 11  | NC         |
| 12  | NC               | 12                | NC               | 12                                   | NC               | 12                | NC               | 12  | NC         |
|   |                  |                   |                  |                                      |                  | 1                 | + Input          | 1   | + Input    |

## PRESSURE CONNECTION OPTIONS



## ORDER GUIDE



### Note:

Transducer recommended for use with non-corrosive, non-condensing gases.

### **WARNING**

#### **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **WARRANTY/REMEDY**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

### **WARNING**

#### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

### **SALES AND SERVICE**

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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Internet: [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

Phone and Fax:

|               |   |
|---------------|---|
| Asia Pacific  | +65 6355-2828<br>+65 6445-3033 Fax                        |
| Europe        | +44 (0) 1698 481481<br>+44 (0) 1698 481676 Fax            |
| Latin America | +1-305-805-8188<br>+1-305-883-8257 Fax                    |
| USA/Canada    | +1-800-537-6945<br>+1-815-235-6847<br>+1-815-235-6545 Fax |

### **Automation and Control Solutions**

Sensing and Control

Honeywell

11 West Spring Street

Freeport, Illinois 61032

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

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# Honeywell



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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.