

# Silicon Pressure Sensors

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

**1800/1805 Series**

## FEATURES

- Standard Pressure Ranges from 0 to 3 psi to 0 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 sensors are high performance TO-8 pressure transducers specifically designed to address 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 family can operate with either constant current or voltage excitation. Containing a solid state piezoresistive pressure sensor mounted in a standard TO-8 package, the Models 1800 and 1805 are printed circuit board compatible and pin-for-pin compatible with other TO-8 pressure sensors.

## TYPICAL APPLICATIONS

- Instrumentation Calibration
- Avionics/Aerospace
- Medical Equipment
- HVAC
- Pneumatic Controls

## **⚠ 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.**

## **⚠ 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.

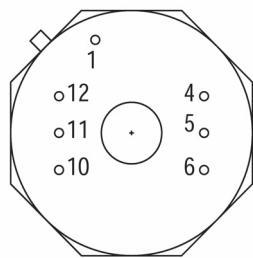
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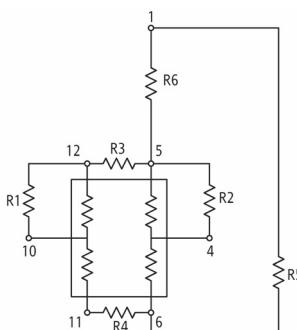
1800/1805 0 to 3 psi to 0 to 150 psi

TO-8 Series

## ELECTRICAL CONNECTIONS



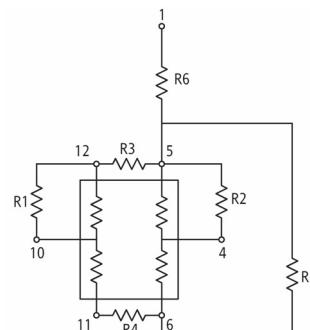
## CURRENT EXCITATION



Pin 1 on normalized and voltage excited standard output

Normalized output shown  
Standard output on pin 5 R6 shorted

## VOLTAGE EXCITATION



R5 open for standard output

## EXTERNAL CONNECTIONS

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

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

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## ENVIRONMENTAL SPECIFICATIONS (All Devices)

Supply Voltage, $V_s$	12 Vdc
Compensated Temperature Range	-1 °C to 54 °C [34 °F to 129 °F]
Operating Temperature Range	-40 °C to 121 °C [-40 °F to 257 °F]
Vibration	10 g rms at 20 Hz to 200 Hz
Shock	100 g for 11 ms
Life	100 million cycles
Insulation Resistance	100 Meg at 50 Vdc
Humidity	50 % ± 10 %
Common-mode Pressure	150 psig
Lead Soldering Temperature	250 °C [482 °F] 2 sec to 4 sec
<b>Maximum Ratings:</b>	
Excitation Voltage $V_s$	Supply Voltage $V_s = 15$ Vdc
Excitation Current	Supply Current $I_s = 2$ mA

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

Characteristic Description	Min.	Max.	Min.	Max.	Typ.	Unit
Zero Pressure Offset <sup>(1)</sup>	—	±0.5	—	±1	—	mV
Zero Pressure Offset (3 psi to 5 only) <sup>(1)</sup>	—	±1	—	±2	—	mV
Full-Scale Span <sup>(2)</sup>						
Standard Output-Current Excitation	75	150	75	150	—	mV
Standard Output-Voltage Excitation	40	120	40	120	—	mV
Normalized Output-Current Excitation	98	102	98	102	—	mV
Normalized Output-Current Excitation (3 psi Only)	73	77	73	77	—	mV
Normalized Output-Voltage Excitation	38	42	38	42	—	mV
Pressure Non-Linearity <sup>(3)</sup>	—	±0.1	—	±0.25	—	%FSS
Pressure Hysteresis <sup>(3)</sup>	—	±0.0125	—	±0.0125	—	%FSS
Repeatability	—	±0.0125	—	±0.0125	—	%FSS
Temperature effect on Offset <sup>(4)</sup>	—	±0.5	—	±1	—	mV
Temperature effect on Offset (3 psi and 5 psi Only) <sup>(4)</sup>	—	±1	—	±2	—	mV
Temperature effect on Span	—	±0.5	—	±1	—	mV
Temperature effect on Span (3 psi and 5 psi Only) <sup>(4)</sup>	—	±1	—	±2	—	mV
Thermal Hysteresis	—	—	—	—	±0.1	%FSS
Response Time <sup>(5)</sup>	—	1	—	—	—	ms
Long Term Stability of Offset and Span <sup>(6)</sup>	—	±0.2	—	±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	2.0	8.0	—	kΩ
Voltage Excitation	8.0	40	8.0	40	—	kΩ
Output Resistance	3.5	6.0	3.5	6.0	—	kΩ

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Series

## PRESSURE RANGE SPECIFICATIONS

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

### Specification Notes:

Note 1: Reference Conditions (unless otherwise noted);  $T_A = 25^\circ\text{C}$  [77 °F], Supply  $V_s = 10$  Vdc  $\pm 0.01$  Vdc or  $I_s = 1.5$  mA  $\pm 0.0015$  mA

Note 2: Full-scale span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-scale span (FFS) is ratio metric to the supply voltage.

Note 3: Pressure non-linearity is based on best-fit straight line from the zero to the full-scale pressure. Pressure Hysteresis the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.

Note 4: Maximum error band of the offset voltage or span over the compensated temperature range, relative to the 25 °C [77 °F] reading.

Note 5: Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.

Note 6: Long term stability over a six month period.

Note 7: Common Mode Voltage as measured from output to ground. For higher levels of Common Mode Voltage, contact factory.

Note 8: Pressure Overrange: Top: 5 x full-scale pressure or  $\leq 350$  psi whichever is less.

Note 9: Pressure Overrange: Bottom: 3 x full-scale or  $\leq 50$  psi, whichever is less.

## STANDARD COMPENSATION AND TRIM CHOICES

For maximum convenience, the 1800 series are 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 Model 1800 series are available with normalized output ( $100 \pm 2$  mV dc in current excited versions with pressure range  $> 3$  psi). Normalized output for current excited 3 psi devices is  $75 \pm 2$  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

Options include temperature compensation and zero offset resistors, plus a data readout for each individual sensor.

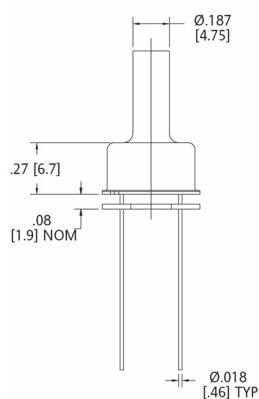
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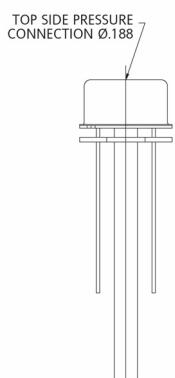
Series

## ORDERING INFORMATION

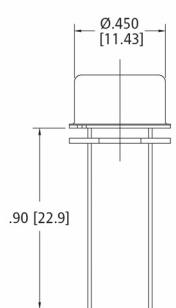
OPTION 0



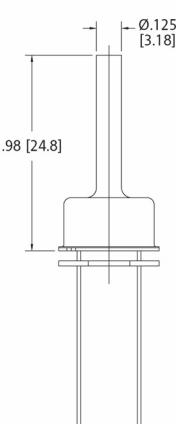
OPTION 1



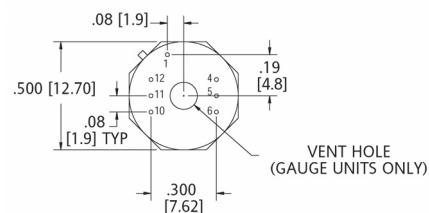
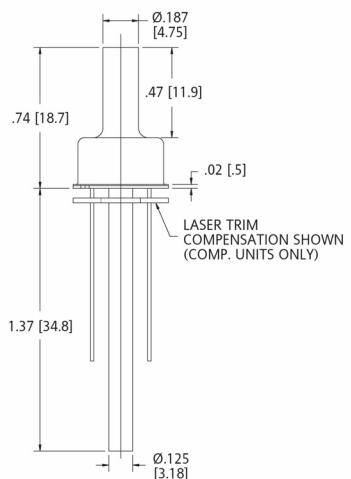
OPTION 2



OPTION 3



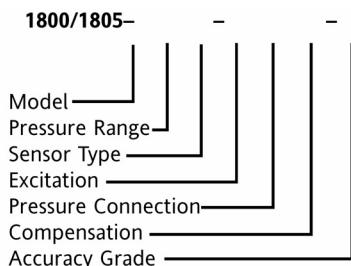
OPTION 4



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## Series

**MODEL PRESSURE RANGE**

1805	00 = 0 to 3 PSI
1805	01 = 0 to 5 PSI
1800	02 = 0 to 10 PSI
1800	03 = 0 to 15 PSI
1800	07 = 0 to 30 PSI
1800	08 = 0 to 50 PSI
1800	09 = 0 to 100 PSI (G and A only)
1800	10 = 0 to 150 PSI (G only)

**SENSOR TYPE**

G = Gauge Pressure  
A = Absolute Pressure  
D = Differential Pressure

**EXCITATION**

L = Current  
K = Voltage

**PRESSURE CONNECTIONS****TOP BOTTOM**

0 = 3/16" Tube	None
1 = 3/16" Hole	1/8" Tube
2 = 3/16" Hole	None
3 = 1/8" Tube	None
4 = 3/16" Tube	1/8" Tube

Note: Transducer recommended for use with non-corrosive, non-conductive fluids or gases.

**COMPENSATION**

M = Computer Printout of Resistor Value  
R = Computer Printout of Resistor Value and Resistors  
L = Laser Trimmed, Standard Output  
N = Laser Trimmed, Normalized Output

**ACCURACY GRADE**

B =  $\pm 0.100\%$  BSFL  
C =  $\pm 0.250\%$  BSFL

*Specifications subject to change without notice.*

**Note:** For other ranges and custom applications, please contact your Honeywell representative

**WARRANTY/REMEDY**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace 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.**

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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.

For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:

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