

# MINIATURE PRESSURE SENSORS

C-Grade  
Pressure Sensors



## Features

- 0 to 4" H<sub>2</sub>O to 0 to 100 PSI Pressure Ranges
- 1 % linearity version
- Temperature Compensated
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

## General Description

The Miniature series pressure sensors are based upon a proprietary technology to reduce the size of the sensor and yet maintain a high level of performance. This model provides a calibrated millivolt output with superior output offset characteristics. Output offset errors due to change in temperature, stability to warm-up, stability to long time period, and position sensitivity are all significantly reduced when compared to conventional compensation methods. In addition the sensor utilizes a silicon, micromachined, stress concentration enhanced structure to provide a very linear output to measured pressure.

These calibrated and temperature compensated sensors give an accurate and stable output over a wide temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like. The C-GRADE is a lowest cost version of the millivolt output pressure sensors.

The output of the device is ratiometric to the supply voltage and operation from any D.C. supply voltage.

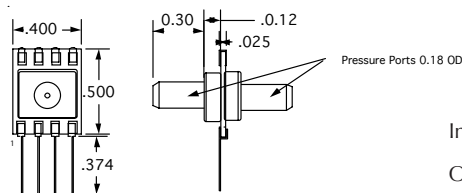
## Physical Dimensions

all dimensions in inches



No Pressure Port

- Marking:  
 right dot: Silver C-Grade  
 left dot:  
 L04: white  
 L10: yellow  
 0.3: pink  
 1.0: green  
 05: blue  
 15: purple  
 30: orange  
 100: brown



Dual Pressure Port



Single Pressure Port



Input Resistance 5.0 k ohm  
 Output Resistance 3.0 k ohm

Equivalent Circuit



## Pressure Sensor Characteristics Maximum Ratings

|  |         |
|--|---------|
| Supply Voltage VS                        | 16 Vdc  |
| Common-mode pressure                     | 50 psig |
| Lead Temperature<br>(soldering 2-4 sec.) | 250°C   |

## Environmental Specifications

|                           |                                 |
|---------------------------|---------------------------------|
| <b>Temperature Ranges</b> |                                 |
| <b>Compensated</b>        | 0 to 70° C                      |
| <b>Operating</b>          | -25 to 85° C                    |
| <b>Storage</b>            | -40 to 125° C                   |
| <b>Humidity Limits</b>    | 0 to 95% RH<br>(non condensing) |

## Standard Pressure Ranges

| No Pressure Port      |                    | Single Pressure Port   |                       | Dual Pressure Port | Proof Pressure |
|-----------------------|--------------------|------------------------|-----------------------|--------------------|----------------|
| Part Number           | Operating Pressure | Part Number            | Part Number           | Part Number        |                |
| 4 INCH-G-CGRADE-MINI  | 0-4 "H2O           | 4 INCH-GF-CGRADE-MINI  | 4 INCH-D-CGRADE-MINI  |                    | 3 PSI          |
| 0.3 PSI-G-CGRADE-MINI | 0-0.3 PSI          | 0.3 PSI-GF-CGRADE-MINI | 0.3 PSI-D-CGRADE-MINI |                    | 3 PSI          |
| 10 INCH-G-CGRADE-MINI | 0-10 "H2O          | 10 INCH-GF-CGRADE-MINI | 10 INCH-D-CGRADE-MINI |                    | 5 PSI          |
| 1 PSI-G-CGRADE-MINI   | 0-1 PSI            | 1 PSI-GF-CGRADE-MINI   | 1 PSI-D-CGRADE-MINI   |                    | 10 PSI         |
| 5 PSI-G-CGRADE-MINI   | 0-5 PSI            | 5 PSI-GF-CGRADE-MINI   | 5 PSI-D-CGRADE-MINI   |                    | 20 PSI         |
| 15 PSI-A-CGRADE-MINI  | 0-15 PSIA          | 15 PSI-AF-CGRADE-MINI  |                       |                    | 60 PSI         |
| 15 PSI-G-CGRADE-MINI  | 0-15 PSIG          | 15 PSI-GF-CGRADE-MINI  | 15 PSI-D-CGRADE-MINI  |                    | 60 PSI         |
| 30 PSI-G-CGRADE-MINI  | 0-30 PSIG          | 30 PSI-GF-CGRADE-MINI  | 30 PSI-D-CGRADE-MINI  |                    | 60 PSI         |
| 100 PSI-G-CGRADE-MINI | 0-100 PSIG         | 100-GF-CGRADE-MINI     |                       |                    | 150 PSI        |

## Performance Characteristics for 4 INCH-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | 4.0     |         | "H2O  |
| Output Span, note 5                         | 23      | 25      | 27      | mV    |
| Offset Voltage @ zero differential pressure |         |         | ±1.5    | mV    |
| Offset Temperature Shift (0°C-50°C), note 2 |         |         | ±1.5    | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-50°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 10 INCH-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | 10.0    |         | "H2O  |
| Output Span, note 5                         | 18      | 20      | 22      | mV    |
| Offset Voltage @ zero differential pressure |         |         | ±1.5    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1.5    | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 0.3 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | 0.3     |         | PSI   |
| Output Span, note 5                         | 18      | 20.0    | 22      | mV    |
| Offset Voltage @ zero differential pressure |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1       | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 1 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | 1.0     |         | PSI   |
| Output Span, note 5                         | 16      | 18      | 20      | mV    |
| Offset Voltage @ zero differential pressure |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 5 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | 5.0     |         | PSI   |
| Output Span, note 5                         | 57      | 60      | 63      | mV    |
| Offset Voltage @ zero differential pressure |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 15 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 15.0    |         | PSIG  |
| Output Span, note 5                         | 85      | 90.0    | 95      | mV    |
| Offset Voltage @ zero gage pressure         |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |



## Performance Characteristics for 15 PSI-A-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units   |
|---|---------|---------|---------|---------|
| Operating Range, absolute pressure          |         | 15.0    |         | PSIA5mV |
| Output Span, note 5                         | 85      | 90.0    | 94      | mV      |
| Offset Voltage @ zero absolute pressure     |         |         | ±1      | mV      |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | %fs     |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs     |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      |         |

## Performance Characteristics for 30 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 30.0    |         | PSI   |
| Output Span, note 5                         | 85      | 90.0    | 95      | mV    |
| Offset Voltage @ zero pressure              |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

## Performance Characteristics for 100 PSI-G-CGRADE-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 100.0   |         | PSI   |
| Output Span, note 5                         | 95      | 100.0   | 105     | mV    |
| Offset Voltage @ zero pressure              |         |         | ±1      | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 |         |         | ±1      | mV    |
| Linearity, hysteresis error, note 4         |         | 0.5     | 1.0     | %fs   |
| Span Shift (0°C-70°C), note 2               |         |         | ±2      | %fs   |

### Specification Notes

NOTE 1: ALL PARAMETERS ARE MEASURED AT 12.0 VOLT EXCITATION, FOR THE NOMINAL FULL SCALE PRESSURE AND ROOM TEMPERATURE UNLESS OTHERWISE SPECIFIED. PRESSURE MEASUREMENTS ARE WITH POSITIVE PRESSURE APPLIED TO PORT B.

NOTE 2: SHIFT IS RELATIVE TO 25°C.

NOTE 3: SHIFT IS WITHIN THE FIRST HOUR OF EXCITATION APPLIED TO THE DEVICE.

NOTE 4: MEASURED AT ONE-HALF FULL SCALE RATED PRESSURE USING BEST STRAIGHT LINE CURVE FIT.

NOTE 5: THE VOLTAGE ADDED TO THE OFFSET VOLTAGE AT FULL SCALE PRESSURE.

**Pressure Response: for any pressure applied the response time to get to 90% of pressure applied is typically less than 100 useconds.**