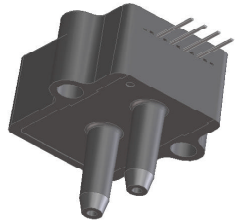


# Amplified Low Pressure Sensors

1 mbar (0.4 In H<sub>2</sub>O) to 30 In H<sub>2</sub>O Pressure Sensors



## Features

- 0 to 1 mbar to 0 to 30 In H<sub>2</sub>O Pressure Ranges
- Ratiometric 4V Output
- Temperature Compensated
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

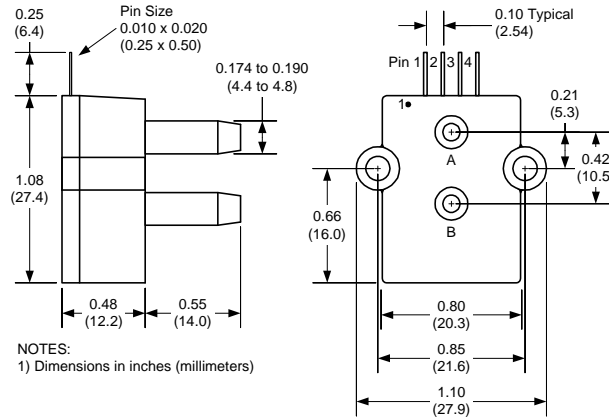
## General Description

The Amplified line of low pressure sensors is based upon a proprietary technology to reduce all output offset or common mode errors. This model provides a ratiometric 4-volt 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.

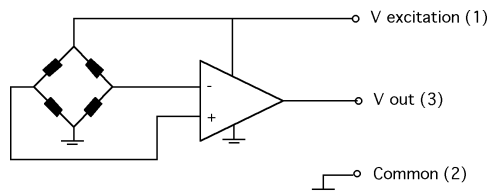
The output of the device is ratiometric to the supply voltage over a supply voltage range of 4.5 to 5.5 volts.

## Physical Dimensions



**pin 1: Vsupply**  
**pin 2: Common**  
**pin 3: Voutput**  
**pin 4: do not connect**

## Equivalent Circuit



**Pressure Sensor Ratings**

|   |                  |
|---|------------------|
| <b>Supply Voltage VS</b>                          | +4.5 to +5.5 Vdc |
| <b>Common-mode pressure</b>                       | -10 to +10 psig  |
| <b>Lead Temperature, max (soldering 2-4 sec.)</b> | 250°C            |

**Environmental Specifications**

|                           |                                 |
|---------------------------|---------------------------------|
| <b>Temperature Ranges</b> |                                 |
| <b>Compensated</b>        | 5 to 50° 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**

| Part Number   | Operating Pressure | Nominal Span | Proof Pressure | Burst Pressure |
|---------------|--------------------|--------------|----------------|----------------|
| 1 MBAR-D-4V   | ±1 mbar            | 4 V          | 100 In H2O     | 200 In H2O     |
| 1 INCH-D-4V   | ±1 In H2O          | 4 V          | 100 In H2O     | 200 In H2O     |
| 1 INCH-G-4V   | 0 - 1 In H2O       | 4 V          | 100 In H2O     | 200 In H2O     |
| 2.5 INCH-D-4V | ±2.5 In H2O        | 4 V          | 200 In H2O     | 300 In H2O     |
| 5 INCH-D-4V   | ± 5 In H2O         | 4 V          | 200 In H2O     | 300 In H2O     |
| 5 INCH-G-4V   | 0 - 5 In H2O       | 4 V          | 200 In H2O     | 300 In H2O     |
| 10 INCH-D-4V  | ±10 In H2O         | 4 V          | 200 In H2O     | 300 In H2O     |
| 10 INCH-G-4V  | 0 - 10 In H2O      | 4 V          | 200 In H2O     | 300 In H2O     |
| 20 INCH-D-4V  | ±20 In H2O         | 4 V          | 300 In H2O     | 500 In H2O     |
| 20 INCH-G-4V  | 0 - 20 In H2O      | 4 V          | 300 In H2O     | 500 In H2O     |
| 30 INCH-D-4V  | ±30 In H2O         | 4V           | 500 In H2O     | 800 In H2O     |
| 30 INCH-G-4V  | 0 - 30 In H2O      | 4V           | 500 In H2O     | 800 In H2O     |

**Performance Characteristics for: 1 MBAR-D-4V**

| Parameter, NOTE 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±1.0    |         | mbar  |
| Output Span, NOTE 5                         | ±1.80   | ±2.0    | ±2.20   | volt  |
| Offset Voltage @ zero differential pressure | 2.00    | 2.25    | 2.50    | volt  |
| Offset Temperature Shift (5°C-50°C), NOTE 2 |         |         | ±120    | mvolt |
| Offset Warm-up Shift, NOTE 3                |         | ±20     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±40     |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±20     |         | mvolt |
| Linearity, hysteresis error, NOTE 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), NOTE 2               |         |         | ±4      | %span |

### Performance Characteristics for 1 INCH-D-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±1.0    |         | "H2O  |
| Output Span, note 5                         | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±60     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±10     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±10     |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±2      | %span |

### Performance Characteristics for 1 INCH-G-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 1.0     |         | "H2O  |
| Output Span, note 5                         | 3.90    | 4.0     | 4.10    | volt  |
| Offset Voltage @ zero pressure              | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±60     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±10     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±15     |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±10     |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±2      | %span |

### Performance Characteristics for 5 INCH-D-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±5.0    |         | "H2O  |
| Output Span, note 5                         | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±40     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±1      | %span |

**Performance Characteristics for: 5 INCH-G-4V**

| <b>Parameter, NOTE 1</b>                    | <b>Minimum</b> | <b>Nominal</b> | <b>Maximum</b> | <b>Units</b> |
|---|----------------|----------------|----------------|--------------|
| Operating Range, gage pressure              |                | 5.0            |                | "H2O         |
| Output Span, NOTE 5                         | 3.90           | 4.0            | 4.10           | volt         |
| Offset Voltage @ zero pressure              | 0.15           | 0.25           | 0.35           | volt         |
| Offset Temperature Shift (5°C-50°C), NOTE 2 |                |                | ±40            | mvolt        |
| Offset Warm-up Shift, NOTE 3                |                | ±5             |                | mvolt        |
| Offset Position Sensitivity (±1g)           |                | ±5             |                | mvolt        |
| Offset Long Term Drift (one year)           |                | ±5             |                | mvolt        |
| Linearity, hysteresis error, NOTE 4         |                | 0.05           | 0.25           | %fs          |
| Span Shift (5°C-50°C), NOTE 2               |                |                | ±1             | %span        |

**Performance Characteristics for: 10 INCH-D-4V**

| <b>Parameter, NOTE 1</b>                    | <b>Minimum</b> | <b>Nominal</b> | <b>Maximum</b> | <b>Units</b> |
|---|----------------|----------------|----------------|--------------|
| Operating Range, differential pressure      |                | ±10.0          |                | "H2O         |
| Output Span, NOTE 5                         | ±1.90          | ±2.0           | ±2.10          | volt         |
| Offset Voltage @ zero differential pressure | 2.15           | 2.25           | 2.35           | volt         |
| Offset Temperature Shift (5°C-50°C), NOTE 2 |                |                | ±20            | mvolt        |
| Offset Warm-up Shift, NOTE 3                |                | ±5             |                | mvolt        |
| Offset Position Sensitivity (±1g)           |                | ±5             |                | mvolt        |
| Offset Long Term Drift (one year)           |                | ±5             |                | mvolt        |
| Linearity, hysteresis error, NOTE 4         |                | 0.05           | 0.25           | %fs          |
| Span Shift (5°C-50°C), NOTE 2               |                |                | ±1             | %span        |

**Performance Characteristics for: 10 INCH-G-4V**

| <b>Parameter, NOTE 1</b>                    | <b>Minimum</b> | <b>Nominal</b> | <b>Maximum</b> | <b>Units</b> |
|---|----------------|----------------|----------------|--------------|
| Operating Range, gage pressure              |                | 10.0           |                | "H2O         |
| Output Span, NOTE 5                         | 3.90           | 4.0            | 4.10           | volt         |
| Offset Voltage @ zero pressure              | 0.15           | 0.25           | 0.35           | volt         |
| Offset Temperature Shift (5°C-50°C), NOTE 2 |                |                | ±20            | mvolt        |
| Offset Warm-up Shift, NOTE 3                |                | ±5             |                | mvolt        |
| Offset Position Sensitivity (±1g)           |                | ±5             |                | mvolt        |
| Offset Long Term Drift (one year)           |                | ±5             |                | mvolt        |
| Linearity, hysteresis error, NOTE 4         |                | 0.05           | 0.25           | %fs          |
| Span Shift (5°C-50°C), NOTE 2               |                |                | ±1             | %span        |

### Performance Characteristics for 20 INCH-D-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±20.0   |         | "H2O  |
| Output Span, note 5                         | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±20     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±1      | %span |

### Performance Characteristics for 20 INCH-G-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 20.0    |         | "H2O  |
| Output Span, note 5                         | 3.90    | 4.0     | 4.1     | volt  |
| Offset Voltage @ zero pressure              | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±20     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±1      | %span |

### Performance Characteristics for 30 INCH-D-4V

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±30.0   |         | "H2O  |
| Output Span, note 5                         | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±20     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±1      | %span |

**Performance Characteristics for 30 INCH-G-4V**

| Parameter, NOTE 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 30.0    |         | "H2O  |
| Output Span, NOTE 5                         | 3.9     | 4.0     | 4.1     | volt  |
| Offset Voltage @ zero pressure              | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C-50°C), NOTE 2 |         |         | ±20     | mvolt |
| Offset Warm-up Shift, NOTE 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, NOTE 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), NOTE 2               |         |         | ±1      | %span |

**Performance Characteristics for 2.5 INCH-D-4V**

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±2.5    |         | "H2O  |
| Output Span, note 5                         | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±40     | mvolt |
| Offset Warm-up Shift, note 3                |         | ±5      |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±5      |         | mvolt |
| Offset Long Term Drift (one year)           |         | ±5      |         | mvolt |
| Linearity, hysteresis error, note 4         |         | 0.05    | 0.25    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±1      | %span |

**Pressure Response: for any pressure applied the response time to get to 90% of pressure applied is typically less than 500 useconds.**

**Specification Notes**

NOTE 1: ALL PARAMETERS ARE MEASURED AT 5.0 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. NOMINALLY THE OUTPUT VOLTAGE RANGE IS 0.25 TO 4.25 VOLTS FOR MINUS TO PLUS FULL SCALE PRESSURE.

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