

Amplified Low Pressure Sensors

1 mbar (0.4 In H₂O) to 30 In H₂O Pressure Sensors

Military Temperature Grade



Features

- 0 to 1 mbar to 0 to 30 In H₂O Pressure Ranges
- Ratiometric 4V Output
- Temperature Compensated (-40C to 125C)
- Calibrated Zero and Span

Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

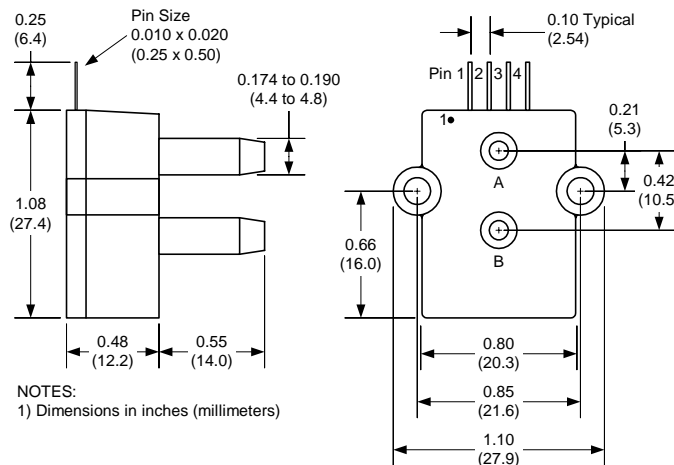
General Description

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



NOTES:
1) Dimensions in inches (millimeters)

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



Pressure Sensor Ratings

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

Environmental Specifications

| | |
|---------------------------|---------------------------------|
| Temperature Ranges | |
| Compensated | -40 to 125° C |
| Operating | -40 to 125° C |
| Storage | -40 to 125° C |
| Humidity Limits | 0 to 95% RH (non condensing) |

Standard Pressure Ranges

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

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

| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±4 | %span |

Amplified Low Pressure Sensors Military Grade

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

| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±2 | %span |

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

| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±2 | %span |

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

| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |



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

| Parameter, NOTE 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------|
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

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

| Parameter, NOTE 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------|
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

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

| Parameter, NOTE 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------|
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

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

| Parameter, note 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------------------|
| Operating Range, differential pressure | | ±20.0 | | "H ₂ O |
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

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

| Parameter, note 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------------------|
| Operating Range, gage pressure | | 20.0 | | "H ₂ O |
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

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

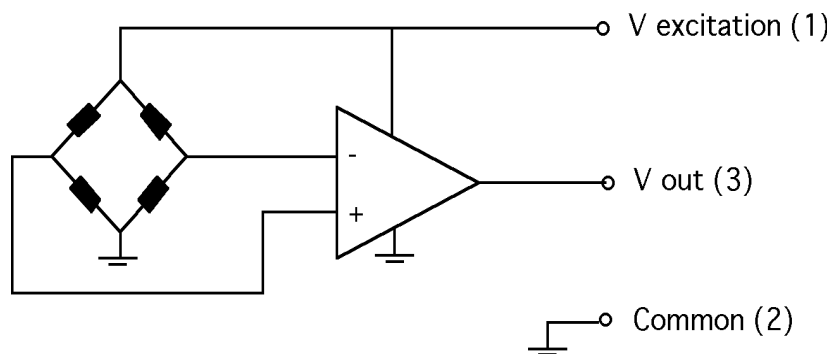
| Parameter, note 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------------------|
| Operating Range, differential pressure | | ±30.0 | | "H ₂ O |
| Output Span, note 5 | ±1.90 | ±2.0 | ±2.10 | volt |
| Offset Voltage @ zero differential pressure | 2.15 | 2.25 | 2.35 | volt |
| Offset Temperature Shift (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |



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

| Parameter, NOTE 1 | Minimum | Nominal | Maximum | Units |
|--|---------|---------|---------|-------------------|
| Operating Range, gage pressure | | 30.0 | | "H ₂ O |
| 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 (-40°C-125°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 (-40°C-125°C), NOTE 2 | | | ±1 | %span |

Equivalent Circuit



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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