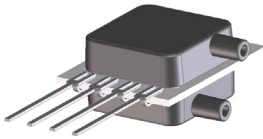


# MINIATURE AMPLIFIED PRESSURE SENSORS

cm H<sub>2</sub>O calibrated for Medical applications



## Features

- cm H<sub>2</sub>O Pressure Ranges
- Matched pressure port volumes
- Temperature Compensated
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Respiratory Breathing

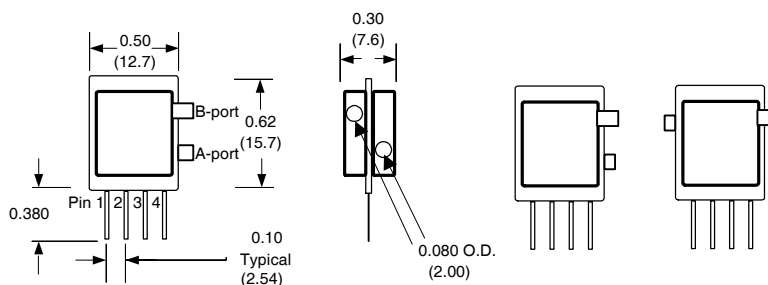
## General Description

The Miniature Amplified Output pressure sensors is based upon a proprietary technology to reduce all output offset or common mode errors. This model provides a calibrated amplified 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 and operation from any D.C. supply voltage between 4.5 and 5.5 volts.

## Physical Dimensions



Pressure Sensor Characteristics Maximum Ratings

|                      |          |
|----------------------|----------|
| Supply Voltage VS    | +4.5 to  |
| Common-mode pressure | +75.5Vdc |
| Lead Temperature     | 10 psig  |
| (soldering 2-4 sec.) | 250°C    |

Environmental Specifications

|                    |                   |
|--------------------|-------------------|
| Temperature Ranges |                   |
| Compensated        | see specification |
| Operating          | -25 to 85° C      |
| Storage            | -40 to 125° C     |
| Humidity Limits    | 0 to 95% RH       |
|                    | (non condensing)  |

Standard Pressure Ranges

| Part Number           | Operating Pressure | Compensated Range | Proof Pressure | Burst Pressure |
|-----------------------|--------------------|-------------------|----------------|----------------|
| 5 cmH2O-D1-4V-MINI    | -0.2 to 5 cmH2O    | 5 to 50° C        | 50 cmH2O       | 200 cmH2O      |
| 20 cmH2O-D1-4V-MINI   | -0.2 to 20 cmH2O   | 5 to 50° C        | 100 cmH2O      | 300 cmH2O      |
| 120 cmH2O-D1-4V-MINI  | -10 to 120 cm H2O  | 5 to 50° C        | 300 cmH2O      | 600 cmH2O      |
| 5 cmH2O-D1-P4V-MINI   | -0.2 to 5 cmH2O    | -25 to 85° C      | 50 cmH2O       | 200 cmH2O      |
| 20 cmH2O-D1-P4V-MINI  | -0.2 to 20 cmH2O   | -25 to 85° C      | 100 cmH2O      | 300 cmH2O      |
| 120 cmH2O-D1-P4V-MINI | -10 to 120 cm H2O  | -25 to 85° C      | 300 cmH2O      | 600 cmH2O      |

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 THE FRONT PORT.

NOTE 2: SHIFT IS RELATIVE TO 25°C.

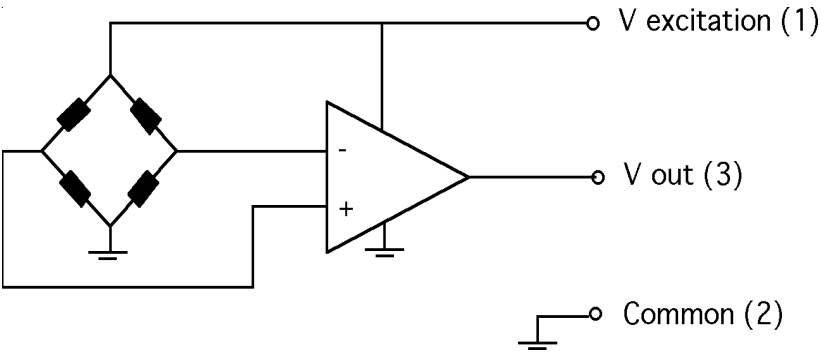
NOTE 3: SHIFT IS WITHIN THE FIRST HOUR OF EXCITATION APPLIED TO THE DEVICE.

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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Equivalent Circuit



## Performance Characteristics for 5 cmH2O-D1-4V-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                   | -0.2    |         | 5       | cmH2O |
| Output Voltage, @5 cmH2O                    | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure              | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-0.2 cmH2O                  | 0.13    | 0.18    | 0.23    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                |         | ±15     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±15     |         | 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               |         |         | ±1.0    | %span |

## Performance Characteristics for 20 cmH2O-D1-4V-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                   | -0.2    |         | 20      | cmH2O |
| Output Voltage, @20 cmH2O                   | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure              | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-0.2 cmH2O                  | 0.25    | 0.30    | 0.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                |         | ±10     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±10     |         | 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               |         |         | ±1.0    | %span |

## Performance Characteristics for 120 cmH2O-D1-4V-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                   | -10     |         | 120     | cmH2O |
| Output Voltage, @120 cmH2O                  | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure              | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-10 cmH2O                   | 0.23    | 0.28    | 0.33    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                |         | ±15     |         | mvolt |
| Offset Position Sensitivity (±1g)           |         | ±15     |         | 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               |         |         | ±1.0    | %span |



## Performance Characteristics for 5 cmH2O-D1-P4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                      | -0.2    |         | 5       | cmH2O |
| Output Voltage, @5 cmH2O                       | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure                 | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-0.2 cmH2O                     | 0.13    | 0.18    | 0.23    | volt  |
| Offset Temperature Shift (-25 to 85°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                   |         | ±15     |         | mvolt |
| Offset Position Sensitivity (±1g)              |         | ±15     |         | mvolt |
| Offset Long Term Drift (one year)              |         | ±20     |         | mvolt |
| Linearity, hysteresis error, note 4            |         | 0.05    | ±0.25   | %fs   |
| Span Shift (-25 to 85°C), note 2               |         |         | ±1.0    | %span |

## Performance Characteristics for 20 cmH2O-D1-P4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                      | -0.2    |         | 20      | cmH2O |
| Output Voltage, @20 cmH2O                      | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure                 | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-0.2 cmH2O                     | 0.25    | 0.30    | 0.35    | volt  |
| Offset Temperature Shift (-25 to 85°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                   |         | ±10     |         | mvolt |
| Offset Position Sensitivity (±1g)              |         | ±10     |         | mvolt |
| Offset Long Term Drift (one year)              |         | ±10     |         | mvolt |
| Linearity, hysteresis error, note 4            |         | 0.05    | ±0.25   | %fs   |
| Span Shift (-25 to 85°C), note 2               |         |         | ±1.0    | %span |

## Performance Characteristics for 120 cmH2O-D1-P4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, pressure                      | -10     |         | 120     | cmH2O |
| Output Voltage, @120 cmH2O                     | 4.40    | 4.5     | 4.6     | volt  |
| Output Voltage @ zero pressure                 | 0.30    | 0.35    | 0.40    | volt  |
| Output Voltage @-10 cmH2O                      | 0.23    | 0.28    | 0.33    | volt  |
| Offset Temperature Shift (-25 to 85°C), note 2 |         |         | ±1.0    | %span |
| Offset Warm-up Shift, note 3                   |         | ±15     |         | mvolt |
| Offset Position Sensitivity (±1g)              |         | ±15     |         | mvolt |
| Offset Long Term Drift (one year)              |         | ±20     |         | mvolt |
| Linearity, hysteresis error, note 4            |         | 0.05    | ±0.25   | %fs   |
| Span Shift (-25 to 85°C), note 2               |         |         | ±1.0    | %span |

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