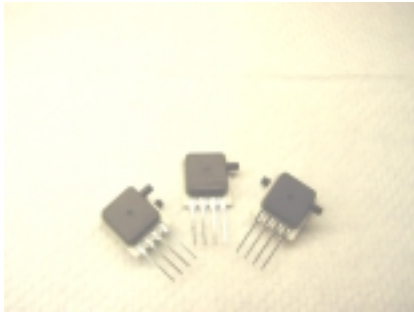


# MINIATURE AMPLIFIED PRESSURE SENSORS

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

**Preliminary**



## Features

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

## Applications

- Medical Instrumentation
- Respiratory Breathing

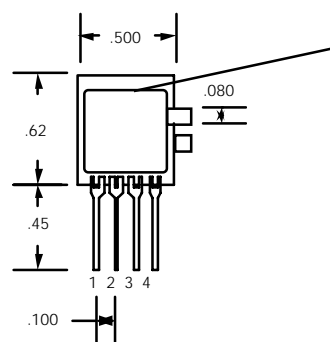
## General Description

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 up to +7 V is acceptable.

## Physical Dimensions



**Marking Color Code:**

**5 cmH<sub>2</sub>O: yellow**

**10 cmH<sub>2</sub>O: pink**

**120 cmH<sub>2</sub>O: orange**



## Pressure Sensor Characteristics Maximum Ratings

Supply Voltage $V_S$	+3 to +7 Vdc
Common-mode pressure	10 psig
Lead Temperature (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.

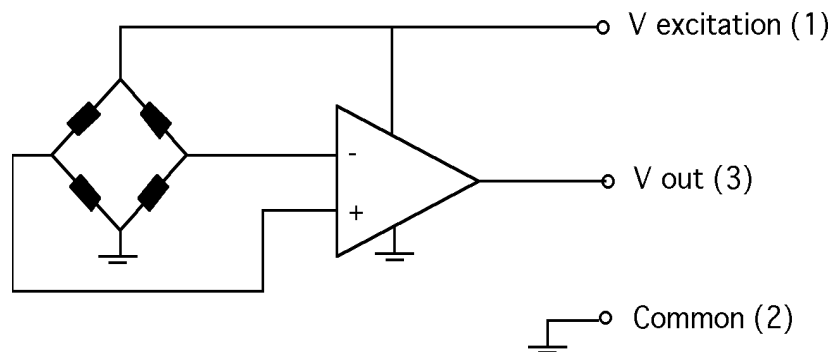
NOTE 3: SHIFT IS WITHIN THE FIRST HOUR OF EXCITATION APPLIED TO THE DEVICE.

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.

All Sensors reserves the right to make changes to any products herein. All Sensors does not assume any liability arising out of the application or use of any product or circuit described herein, neither does it convey any license under its patent rights nor the rights of others.

## 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 (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-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 (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

MINIATURE AMPLIFIED MEDICAL RANGE PRESSURE SENSORS