

# MINIATURE AMPLIFIED LOW PRESSURE SENSORS

Low Pressure (1" H<sub>2</sub>O to 30 " H<sub>2</sub>O) Sensors  
PRIME GRADE



## Features

- 0 to 1" H<sub>2</sub>O to 0 to 30" H<sub>2</sub>O Pressure Ranges
- Matched pressure port volumes
- Temperature Compensated (-25 to 85° C)
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

## 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.

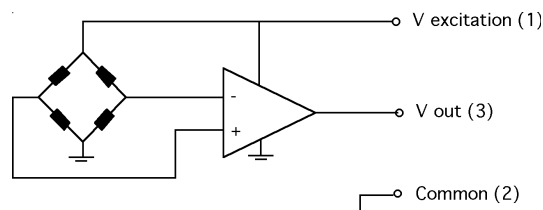
These calibrated and temperature compensated sensors give an accurate and stable output over a wide temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like.

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



## Equivalent Circuit



## Pressure Sensor Characteristics Maximum Ratings

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

## Environmental Specifications

Temperature Ranges	
Compensated	-25 to 85° 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 INCH-Dx-P4V-MINI	±1 ln H2O	4 V	100 ln H2O	200 ln H2O
1 INCH-G-P4V-MINI	0 - 1 ln H2O	4 V	300 ln H2O	200 ln H2O
5 INCH-Dx-P4V-MINI	±5 ln H2O	4 V	200 ln H2O	300 ln H2O
5 INCH-G-P4V-MINI	0 - 5 ln H2O	4 V	200 ln H2O	300 ln H2O
10 INCH-Dx-P4V-MINI	±10 ln H2O	4 V	200 ln H2O	300 ln H2O
10 INCH-G-P4V-MINI	0 - 10 ln H2O	4 V	200 ln H2O	300 ln H2O
20 INCH-Dx-P4V-MINI	±20 ln H2O	4 V	300 ln H2O	500 ln H2O
20 INCH-G-P4V-MINI	0 - 20 ln H2O	4 V	300 ln H2O	500 ln H2O
30 INCH-Dx-P4V-MINI	±30 ln H2O	4 V	500 ln H2O	800 ln H2O
30 INCH-G-P4V-MINI	0 - 30 ln H2O	4 V	500 ln H2O	800 ln H2O
60 INCH-Dx-P4V-MINI	±60 ln H2O	4V	500 ln H2O	800 ln H2O

For differential pressure D1 is the package with two pressure ports the same side, D2 has two ports the opposite sides.

## Equivalent Circuit



## Performance Characteristics for 1 INCH-Dx-P4V-MINI

Parameter, note 1	Minimum	Nominal	Maximum	Units
Operating Range, differential pressure		±1.0		"H <sub>2</sub> 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 (-25°C-85°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 (-25°C-85°C), note 2			±2	%span

## Performance Characteristics for 1 INCH-G-P4V-MINI

Parameter, note 1	Minimum	Nominal	Maximum	Units
Operating Range, gage pressure		1.0		"H <sub>2</sub> O
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 (-25°C-85°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-Dx-P4V-MINI

Parameter, note 1	Minimum	Nominal	Maximum	Units
Operating Range, differential pressure		±5.0		"H <sub>2</sub> 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 (-25°C-85°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 (-25°C-85°C), note 2			±1	%span



## Performance Characteristics for: 5 INCH-G-P4V-MINI

Parameter, NOTE 1	Minimum	Nominal	Maximum	Units
Operating Range, gage pressure		5.0		mbar
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 (-25°C-85°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 (-25°C-85°C), NOTE 2			±1	%span

## Performance Characteristics for: 10 INCH-Dx-P4V-MINI

Parameter, NOTE 1	Minimum	Nominal	Maximum	Units
Operating Range, differential pressure		±10.0		mbar
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 (-25°C-85°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 (-25°C-85°C), NOTE 2			±1	%span

## Performance Characteristics for: 10 INCH-G-P4V-MINI

Parameter, NOTE 1	Minimum	Nominal	Maximum	Units
Operating Range, gage pressure		10.0		mbar
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 (-25°C-85°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 (-25°C-85°C), NOTE 2			±1	%span

### Performance Characteristics for 20 INCH-Dx-P4V-MINI

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 (-25°C-85°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 (-25°C-85°C), note 2			±1	%span

### Performance Characteristics for 20 INCH-G-P4V-MINI

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 (-25°C-85°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 (-25°C-85°C), note 2			±1	%span

### Performance Characteristics for 30 INCH-Dx-P4V-MINI

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 (-25°C-85°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 (-25°C-85°C), note 2			±1	%span



## Performance Characteristics for 30 INCH-G-P4V-MINI

Parameter, NOTE 1	Minimum	Nominal	Maximum	Units
Operating Range, gage pressure		30.0		"H <sub>2</sub> 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 (-25°C-85°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 (-25°C-85°C), NOTE 2			±1	%span

## Performance Characteristics for 60 INCH-Dx-P4V-MINI

Parameter, note 1	Minimum	Nominal	Maximum	Units
Operating Range, differential pressure		±60.0		"H <sub>2</sub> 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 (-25°C-85°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 (-25°C-85°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 100 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 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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