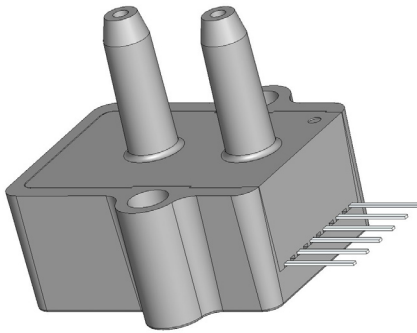


# MILLIVOLT OUTPUT PRESSURE SENSORS

H-Grade  
Pressure Sensors



## Features

- 0 to 4" H<sub>2</sub>O to 0 to 100 PSI Pressure Ranges
- 0.5 % linearity...high accuracy version
- Temperature Compensated
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

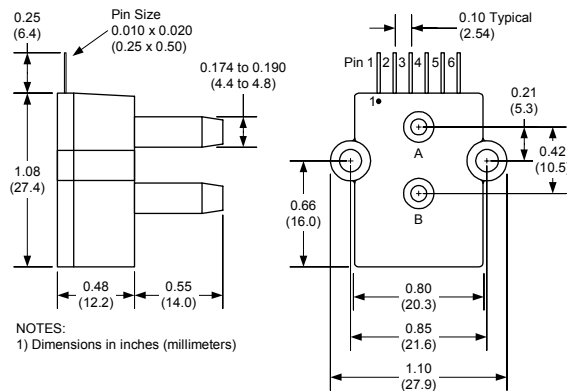
## General Description

The Millivolt Output pressure sensors is based upon a proprietary packaging technology to reduce output offset or common mode errors. This model provides a calibrated millivolt output with excellent output offset characteristics. 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 H-GRADE is a high accuracy version of the millivolt output pressure sensors.

The output of the device is ratiometric to the supply voltage and operation from any D.C. supply voltage up to +16 V is acceptable.

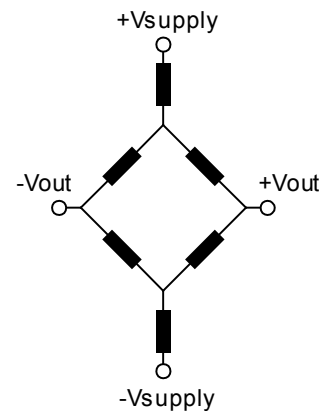
## Physical Dimensions



## Equivalent Circuit

### Pinout (note 1)

- pin 1: N/C
- pin 2: +V supply
- pin 3: +Voutput
- pin 4: -Vsupply
- pin 5: -Voutput
- pin 6: N/C



Input Resistance 20 k ohm  
Output Resistance 3.0 k ohm

## Approvals

| MKT                                                                 | DATE | MFG                                                                 | DATE | ENG                                                                 | DATE | QA                                                                  | DATE |
|---------------------------------------------------------------------|------|---------------------------------------------------------------------|------|---------------------------------------------------------------------|------|---------------------------------------------------------------------|------|
| <input type="checkbox"/> As Is <input type="checkbox"/> With Change |      | <input type="checkbox"/> As Is <input type="checkbox"/> With Change |      | <input type="checkbox"/> As Is <input type="checkbox"/> With Change |      | <input type="checkbox"/> As Is <input type="checkbox"/> With Change |      |



## Pressure Sensor Characteristics Maximum Ratings

|                                              |         |
|----------------------------------------------|---------|
| <b>Supply Voltage, V<sub>s</sub></b>         | 16 Vdc  |
| <b>Common-mode pressure</b>                  | 50 psig |
| <b>Lead Temperature (soldering 2-4 sec.)</b> | 250°C   |

## Environmental Specifications

|                           |                                 |
|---------------------------|---------------------------------|
| <b>Temperature Ranges</b> |                                 |
| <b>Compensated</b>        | 0 to 70° 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 |
|---------------------|-------------------------|--------------|----------------|----------------|
| 4 INCH-D-HGRADE-MV  | 0 - 4" H <sub>2</sub> O | 40 mV        | 3 PSI          | 15 PSI         |
| 0.3 PSI-D-HGRADE-MV | 0 - 0.3 PSI             | 20 mV        | 5 PSI          | 15 PSI         |
| 1 PSI-D-HGRADE-MV   | 0 - 1 PSI               | 18 mV        | 5 PSI          | 15 PSI         |
| 5 PSI-D-HGRADE-MV   | 0 - 5 PSI               | 60 mV        | 10 PSI         | 30 PSI         |
| 15 PSI-D-HGRADE-MV  | 0 - 15 PSI              | 90 mV        | 60 PSI         | 120 PSI        |
| 30 PSI-D-HGRADE-MV  | 0 - 30 PSI              | 90 mV        | 90 PSI         | 150 PSI        |
| 100 PSI-D-HGRADE-MV | 0 - 100 PSI             | 100 mV       | 200 PSI        | 250 PSI        |
| 150 PSI-D-HGRADE-MV | 0 - 150 PSI             | 90 mV        | 200 PSI        | 250 PSI        |
| 15 PSI-A-HGRADE-MV  | 0 - 15 PSIA             | 90 mV        | 60 PSIA        | 120 PSIA       |
| 30 PSI-A-HGRADE-MV  | 0 - 30 PSIA             | 90 mV        | 90 PSIA        | 150 PSIA       |
| 100 PSI-A-HGRADE-MV | 0 - 100 PSIA            | 100 mV       | 200 PSIA       | 250 PSIA       |

## Performance Characteristics for 4 INCH-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units             |
|---------------------------------------------|---------|---------|---------|-------------------|
| Operating Range, differential pressure      | --      | 4       | --      | "H <sub>2</sub> O |
| Output Span, note 5                         | 39.5    | 40.0    | 40.5    | mV                |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.5    | mV                |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | µV                |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs               |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs               |

## Performance Characteristics for 0.3 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 0.3     | --      | PSI   |
| Output Span, note 5                         | 19.8    | 20.0    | 20.2    | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | µV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

## Performance Characteristics for 1 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 1.0     | --      | PSI   |
| Output Span, note 5                         | 17.82   | 18.0    | 18.18   | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

## Performance Characteristics for 5 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 5.0     | --      | PSI   |
| Output Span, note 5                         | 59.4    | 60.0    | 60.6    | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

## Performance Characteristics for 15 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 15.0    | --      | PSI   |
| Output Span, note 5                         | 89.1    | 90.0    | 90.9    | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

## Performance Characteristics for 30 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 30.0    | --      | PSI   |
| Output Span, note 5                         | 89.1    | 90.0    | 90.9    | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |



### Performance Characteristics for 100 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 100.0   | --      | PSI   |
| Output Span, note 5                         | 99      | 100     | 101     | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

### Performance Characteristics for 150 PSI-D-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      | --      | 150.0   | --      | PSI   |
| Output Span, note 5                         | 89      | 90      | 91      | mV    |
| Offset Voltage @ zero differential pressure | --      | --      | ±0.3    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

### Performance Characteristics for 15 PSI-A-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure          | --      | 15.0    | --      | PSIA  |
| Output Span, note 5                         | 89.1    | 90.0    | 90.9    | mV    |
| Offset Voltage @ zero absolute pressure     | --      | --      | ±0.5    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

### Performance Characteristics for 30 PSI-A-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure          | --      | 30.0    | --      | PSIA  |
| Output Span, note 5                         | 89.1    | 90.0    | 90.9    | mV    |
| Offset Voltage @ zero absolute pressure     | --      | --      | ±0.5    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

## Performance Characteristics for 100 PSI-A-HGRADE-MV

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure          | --      | 100.0   | --      | PSIA  |
| Output Span, note 5                         | 99.0    | 100.0   | 101.0   | mV    |
| Offset Voltage @ zero absolute pressure     | --      | --      | ±0.5    | mV    |
| Offset Temperature Shift (0°C-70°C), note 2 | --      | --      | ±500    | uV    |
| Linearity, hysteresis error, note 4         | --      | 0.25    | 0.5     | %fs   |
| Span Shift (0°C-70°C), note 2               | --      | --      | ±1      | %fs   |

### Specification Notes

NOTE 1: ALL PARAMETERS ARE MEASURED AT 12.0 VOLT EXCITATION, FOR THE NOMINAL FULL SCALE PRESSURE AND ROOM TEMPERATURE UNLESS OTHERWISE SPECIFIED. PRESSURE MEASUREMENTS ARE WITH POSITIVE PRESSURE APPLIED TO PORT B. FOR ABSOLUTE DEVICES PRESSURE IS APPLIED TO PORT A, AND THE OUTPUT POLARITY IS REVERSED.

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.

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