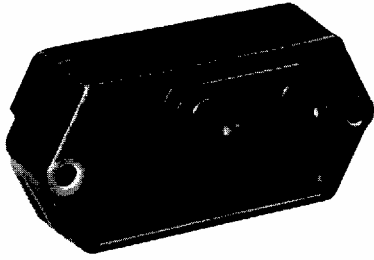


# Pressure Sensors

140PC Series

## Absolute, Differential, Gage, Vacuum Gage/Amplified



### FEATURES

- PCB terminals on opposite side from the ports
- Fully signal conditioned

### 140PC SERIES PERFORMANCE CHARACTERISTICS at 8.0 ±0.01 VDC Excitation, 25°C

|                          | Min.   | Typ.  | Max. | Units |
|--------------------------|--|-------|------|-------|
| Excitation*              | 7.00   | 8.00  | 16.0 | VDC   |
| Supply Current           | ---  | 8.00  | 20.0 | mA    |
| Current Sourcing Output  | ---  | ---   | 10   | mA    |
| Null Offset (141/142PC)  | 0.95   | 1.00  | 1.05 | V     |
| Null Offset (143PC)**    | 3.45   | 3.50  | 3.55 | V     |
| Null Offset              |  |       |      |       |
| 142PC15A @ 2 psia        | 1.62   | 1.67  | 1.72 | V     |
| 142PC30A @ 2 psia        | 1.28   | 1.33  | 1.38 | V     |
| Output at Full Pressure  | 5.90   | 6.00  | 6.10 | V     |
| Span† (141/142PC)        | 4.95   | 5.00  | 5.05 | V     |
| Span† (143PC)**          | ---  | 5.00  | ---  | V     |
| Span                     |  |       |      |       |
| 142PC15A                 | 4.28   | 4.33  | 4.48 | V     |
| 142PC30A                 | 4.62   | 4.67  | 4.72 | V     |
| Ratiometricity Error     |  |       |      |       |
| 7 to 8 V or 8 to 9 V     | ---  | ±0.50 | ---  | %Span |
| 9 to 12 V                | ---  | ±2.00 | ---  |       |
| Stability over One Year  | ---  | ±0.50 | ---  | %Span |
| Response Time            | ---  | ---   | 1.00 | msec  |
| Common Mode Pressure***  | ---  | ---   | 40   | psi   |
| Weight                   | ---  | 5     | ---  | grams |
| Short Circuit Protection | Output may be shorted indefinitely to ground |       |      |       |
| Output Ripple            | None, DC device                              |       |      |       |
| Ground Reference         | Supply and output are common                 |       |      |       |

\*8.0 VDC excitation is recommended with 1 psi unit.

\*\*Positive and negative pressure measurement.

\*\*\*Higher common mode pressures possible if sensor is not used over entire operating temperature range.

†Span is defined as the algebraic difference between end points. Please note: actual output is 1 V to 6 V (at 8.00 ±0.01 VDC). Span is then 5V.

### ENVIRONMENTAL SPECIFICATIONS

|                         |  |
|-------------------------|--|
| Operating Temperature   | -40° to +85°C (-40° to +185°F)   |
| Storage Temperature     | -55° to +125°C (-67° to +257°F)  |
| Compensated Temperature | -18° to +63°C (0° to +145°F)   |
| Shock                   | MIL-STD-202, Method 213 (50 g, half sine, 11 msec)   |
| Vibration               | MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)  |
| Media                   | P2 port Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass, and silicon-to-glass bond* |
|                         | P1 port Dry gases only   |

\*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

# Pressure Sensors

140PC Series

## Absolute, Differential, Gage, Vacuum Gage/Amplified

### 140PC SERIES ORDER GUIDE, VACUUM GAGE TYPE

| Catalog Listing | Pressure Range psi | Combined Null & Sensitivity Shift (% Span) |       |                           |                          | Sensitivity V/psi | Overpressure psi Max. | Linearity, B.F.S.L. |         | Repeatability & Hysteresis %Span Typ. |  |  |
|-----------------|--------------------|--|-------|---------------------------|--------------------------|-------------------|-----------------------|---------------------|---------|---------------------------------------|--|--|
|                 |                    | 25 to 5°<br>25 to 45°C                     |       | 25 to -18°<br>25 to +63°C | 25 to -40°<br>25 to 85°C |                   |                       | P2 > P1             | P2 < P1 |                                       |  |  |
|                 |                    | %Span                                      |       |                           |                          |                   |                       | Max.                | Max.    |                                       |  |  |
|                 |                    | Typ.                                       | Max.  | Max.                      | Max.                     |                   |                       | Max.                | Max.    |                                       |  |  |
| 141PC01G        | 0-1                | ---  | ±1.50 | ---                       | ---                      | 5.000             | 20                    | ---                 | ±0.75   | ±0.30                                 |  |  |
| 141PC05G        | 0-5                | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 1.000             | 20                    | ---                 | ±0.75   | ±0.25                                 |  |  |
| 141PC15G        | 0-15               | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 0.333             | 45                    | ---                 | ±0.40   | ±0.15                                 |  |  |

### 140PC SERIES ORDER GUIDE, GAGE TYPE

| Catalog Listing | Pressure Range psi | Combined Null & Sensitivity Shift (% Span) |       |                           |                          | Sensitivity V/psi | Overpressure psi Max. | Linearity, B.F.S.L. |         | Repeatability & Hysteresis %Span Typ. |  |  |
|-----------------|--------------------|--|-------|---------------------------|--------------------------|-------------------|-----------------------|---------------------|---------|---------------------------------------|--|--|
|                 |                    | 25 to 5°<br>25 to 45°C                     |       | 25 to -18°<br>25 to +63°C | 25 to -40°<br>25 to 85°C |                   |                       | P2 > P1             | P2 < P1 |                                       |  |  |
|                 |                    | %Span                                      |       |                           |                          |                   |                       | Max.                | Max.    |                                       |  |  |
|                 |                    | Typ.                                       | Max.  | Max.                      | Max.                     |                   |                       | Max.                | Max.    |                                       |  |  |
| 142PC01G        | 0-1                | ---  | ±1.50 | ---                       | ---                      | 5.000             | 20                    | ±0.75               | ---     | ±0.30                                 |  |  |
| 142PC02G        | 0-2                | ---  | ±1.50 | ---                       | ---                      | 2.500             | 20                    | ±0.75               | ---     | ±0.30                                 |  |  |
| 142PC05G        | 0-5                | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 1.000             | 20                    | ±1.50               | ---     | ±0.25                                 |  |  |
| 142PC15G        | 0-15               | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 0.333             | 45                    | ±0.75               | ---     | ±0.15                                 |  |  |
| 142PC30G        | 0-30               | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 0.167             | 60                    | ±0.75               | ---     | ±0.15                                 |  |  |
| 143PC03G        | ±2.5               | ---  | ---   | ±1.00                     | ±1.50                    | 1.000             | 20                    | ±0.75               | ---     | ±0.25                                 |  |  |
| 143PC05G        | ±5                 | ---  | ---   | ±1.00                     | ±1.50                    | 0.500             | 30                    | ±0.75               | ---     | ±0.15                                 |  |  |
| 143PC15G        | ±15                | ---  | ---   | ±1.00                     | ±1.50                    | 0.177             | 50                    | ±0.75               | ---     | ±0.15                                 |  |  |

### 140PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE

| Catalog Listing | Pressure Range psi | Combined Null & Sensitivity Shift (% Span) |       |                           |                          | Sensitivity V/psi | Overpressure psi Max. | Linearity, B.F.S.L. |         | Repeatability & Hysteresis %Span Typ. |  |  |
|-----------------|--------------------|--|-------|---------------------------|--------------------------|-------------------|-----------------------|---------------------|---------|---------------------------------------|--|--|
|                 |                    | 25 to 5°<br>25 to 45°C                     |       | 25 to -18°<br>25 to +63°C | 25 to -40°<br>25 to 85°C |                   |                       | P2 > P1             | P2 < P1 |                                       |  |  |
|                 |                    | %Span                                      |       |                           |                          |                   |                       | Max.                | Max.    |                                       |  |  |
|                 |                    | Typ.                                       | Max.  | Max.                      | Max.                     |                   |                       | Max.                | Max.    |                                       |  |  |
| 142PC01D        | 0-1                | ---  | ±1.50 | ---                       | ---                      | 5.000             | 20                    | ±0.75               | ±0.40   | ±0.30                                 |  |  |
| 142PC02D        | 0-2                | ---  | ±1.50 | ---                       | ---                      | 2.500             | 20                    | ±0.75               | ±0.40   | ±0.30                                 |  |  |
| 142PC05D        | 0-5                | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 1.000             | 20                    | ±1.50               | ±0.75   | ±0.25                                 |  |  |
| 142PC15D        | 0-15               | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 0.333             | 45                    | ±0.75               | ±0.40   | ±0.15                                 |  |  |
| 142PC30D        | 0-30               | ±0.50                                      | ---   | ±1.00                     | ±2.00                    | 0.167             | 60                    | ±0.75               | ±0.40   | ±0.15                                 |  |  |
| 143PC03D        | ±2.5               | ---  | ---   | ±1.00                     | ±1.50                    | 1.000             | 20                    | ±0.75               | ±0.40   | ±0.25                                 |  |  |
| 143PC05D        | ±5                 | ---  | ---   | ±1.00                     | ±1.50                    | 0.500             | 30                    | ±0.75               | ±0.40   | ±0.15                                 |  |  |
| 143PC15D        | ±15                | ---  | ---   | ±1.00                     | ±1.50                    | 0.177             | 50                    | ±0.75               | ±0.40   | ±0.15                                 |  |  |

Amplified

### 140PC SERIES ORDER GUIDE, ABSOLUTE TYPE\*

| Catalog Listing | Pressure Range psia | Combined Null & Sensitivity Shift (% Span) |      |                           |                          | Sensitivity V/psi | Overpressure psi Max. | Linearity, B.F.S.L. |         | Repeatability & Hysteresis %Span Typ. |  |  |
|-----------------|---------------------|--|------|---------------------------|--------------------------|-------------------|-----------------------|---------------------|---------|---------------------------------------|--|--|
|                 |                     | 25 to 5°<br>25 to 45°C                     |      | 25 to -18°<br>25 to +63°C | 25 to -40°<br>25 to 85°C |                   |                       | P2 > P1             | P2 < P1 |                                       |  |  |
|                 |                     | %Span                                      |      |                           |                          |                   |                       | Max.                | Max.    |                                       |  |  |
|                 |                     | Typ.                                       | Max. | Max.                      | Max.                     |                   |                       | Max.                | Max.    |                                       |  |  |
| 142PC15A        | 0-15                | ±0.50                                      | ---  | ±1.00                     | ±2.00                    | 0.333             | 45                    | ---                 | ±0.40   | ±0.15                                 |  |  |
| 142PC30A        | 0-30                | ±0.50                                      | ---  | ±1.00                     | ±2.00                    | 0.167             | 60                    | ---                 | ±0.40   | ±0.15                                 |  |  |

\* Tested at 2 psia reference

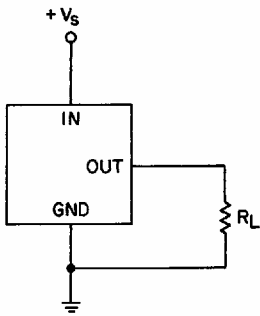
# Pressure Sensors

140PC Series

## Absolute, Differential, Gage, Vacuum Gage/Amplified

### ELECTRICAL CONNECTION

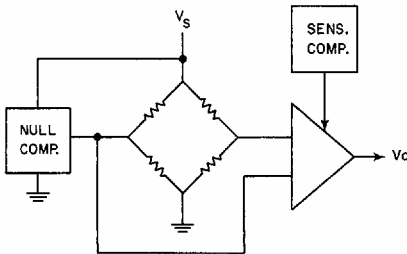
#### Voltage Excitation



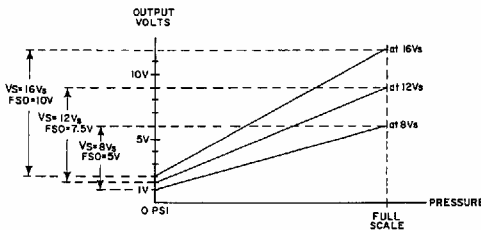
### NOTES

1. Terminals are labeled on the sensor.
2. Input and output share a common ground.
3.  $R_L$  must be greater than or equal to 3000 ohms.

### INTERNAL CIRCUITRY



### RATIOMETRICITY



Ratiometricity refers to the output voltage being directly proportional to the supply voltage. 140PC sensors in this catalog are calibrated at 8 VDC supply voltage to provide a 1-6 volt (5V Span) output swing. For example, if supply increases by 50% to 12 VDC, the output voltage increases by 50% to 1.5-9 volts (7.5 V Span).

### NOTE

The output is not perfectly ratiometric. See specifications for the degree of error.

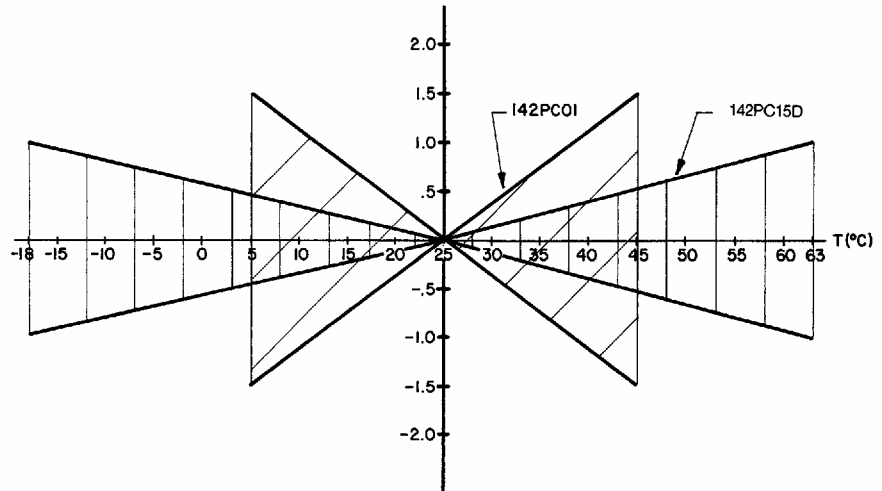
### NULL AND SENSITIVITY TEMPERATURE SHIFT

Amplified pressure sensors are 100% tested to insure that the maximum null and sensitivity temperature shift does not exceed the specification. The diagram below illustrates how null and sensitivity shift relates to temperature. Note that the maximum shift occurs at temperature extremes. Therefore, if a sensor is not ex-

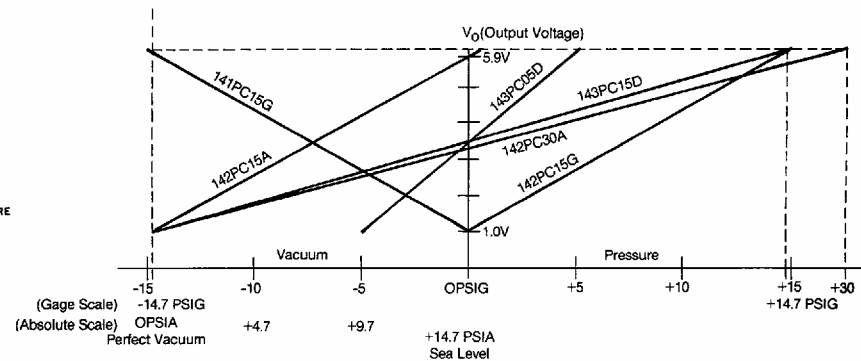
posed to the entire temperature range, the maximum null and sensitivity shift will actually be less than the value specified.

This diagram indicates the temperature shift pertaining to a few listings. Maximum null and sensitivity shift varies from listing to listing.

NULL AND SENSITIVITY SHIFT (% F.S.O.)



### SCALING OF 140PC SERIES SENSORS WITH 8V EXCITATION



|          |              |  |
|----------|--------------|--|
| 142PC15A | Absolute     | $V_O = 1 \text{ V at } 0 \text{ psia} \text{ \& } 6 \text{ V at } 15 \text{ psia}$   |
| 142PC30A | Absolute     | $V_O = 1 \text{ V at } 0 \text{ psia} \text{ \& } 6 \text{ V at } 30 \text{ psia}$   |
| 142PC15G | Gage         | $V_O = 1 \text{ V at } 0 \text{ psig} \text{ \& } 6 \text{ V at } 15 \text{ psig}$   |
| 141PC15G | Vacuum Gage  | $V_O = 1 \text{ V at } 0 \text{ psig} \text{ \& } 6 \text{ V at } -15 \text{ psig}$  |
| 143PC05D | Differential | $V_O = 1 \text{ V at } -5 \text{ psig} \text{ \& } 6 \text{ V at } 5 \text{ psig}$   |
| 143PC15D | Differential | $V_O = 1 \text{ V at } -15 \text{ psig} \text{ \& } 6 \text{ V at } 15 \text{ psig}$ |

NOTE: 141PC sensors are scaled for vacuum pressure on P2.

142PC sensors are scaled for greater pressure on the P2 side of the chip. Input pressures on absolute units are applied to the P1 port.

Other scalings available upon request.



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