



## MSP100

### Pressure Transducer

#### SPECIFICATIONS

- ◆ Analog and 14-Bit Digital Output
- ◆ Small Size
- ◆ Low Cost
- ◆ 316L Stainless Steel or 17-4PH

#### FEATURES

- ◆ Single Piece Construction; No Welds, No Oil
- ◆ 100% Stainless Steel Isolation for Harsh Chemical Measurement
- ◆ Low Cost
- ◆ 14-Bit Digital Output or Analog

The MSP100 pressure transducer provides stainless steel media compatibility in a low cost, small profile solution. This sensor has no silicone gel or polymeric media isolation methods to fail in contact with water or other harsh chemicals. Pressure connections are provided via an O-ring seal. The device is available in both analog and 14-bit digital output with a port material of either 316L SS or 17-4PH. Additional custom port options available to meet your application needs. The small size vs. performance and media compatibility are provided through solid-state technology.

#### APPLICATIONS

- ◆ Beverage Dispensing Systems
- ◆ Water Pressure or Flow Monitor
- ◆ Medical Equipment
- ◆ Industrial Equipment/Hydraulics
- ◆ Tank Level Measurement
- ◆ Manifold Pressure

**STANDARD RANGES**

| Range    | psig |
|----------|------|
| 0 to 100 | +    |
| 0 to 150 | +    |
| 0 to 250 | +    |
| 0 to 500 | +    |

**PERFORMANCE SPECIFICATIONS (ANALOG, OUTPUT SIGNAL “2”)**

Ambient Temperature: 25°C (unless otherwise specified)

| PARAMETERS                                     | MIN  | TYP  | MAX  | UNITS           | NOTES   |
|--|--|------|------|-----------------|---|
| Supply Voltage                                 | 4.75   | 5.00 | 5.25 | V <sub>DC</sub> |   |
| Zero Offset                                    | -2   |      | 2    | mV              | Ratiometric                                       |
| Span   | 98   | 100  | 102  | mV              | Ratiometric                                       |
| Current Consumption                            |  |      | 2    | mA              |   |
| Proof Pressure                                 | 1.5X   |      |      | Rated           |   |
| Burst Pressure                                 | 3X   |      |      | Rated           |   |
| Endurance                                      | 1E+6   |      |      | 0~FS Cycles     |   |
| Accuracy                                       | -0.5   | ±0.2 | 0.5  | %Span           | RSS of BFSL: Linearity, Hysteresis, Repeatability |
| Long Term Stability                            |  | 0.25 |      | %Span           |   |
| Minimum Resistance between Transducer and Body | 50   |      |      | MΩ              | @25V <sub>DC</sub>                                |
| Thermal Zero Shift                             | -2.0   |      | 2.0  | %Span           | Reference to 25°C over Compensated Temperature    |
| Thermal Span Shift                             | -2.0   |      | 2.0  | %Span           | Reference to 25°C over Compensated Temperature    |
| Compensation Temperature                       | 0  |      | 45   | °C              |   |
| Operating Temperature                          | 0  |      | 55   | °C              |   |
| Response Time (10% to 90%)                     |  | 0.1  |      | ms              |   |
| Vibration                                      | ±20g MIL-STD-810C, Procedure 514.2, Figure 514.2-2, Curve L                  |      |      |                 |   |
| Shock  | 50g, 11 msec half sine shock per mil standard 202F. Method 213B, Condition A |      |      |                 |   |

**PERFORMANCE SPECIFICATIONS (DIGITAL, OUTPUT SIGNAL “J” OR “S”)**

Ambient Temperature: 25°C (unless otherwise specified)

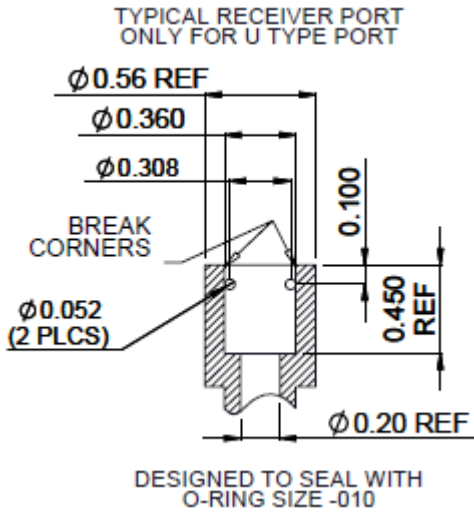
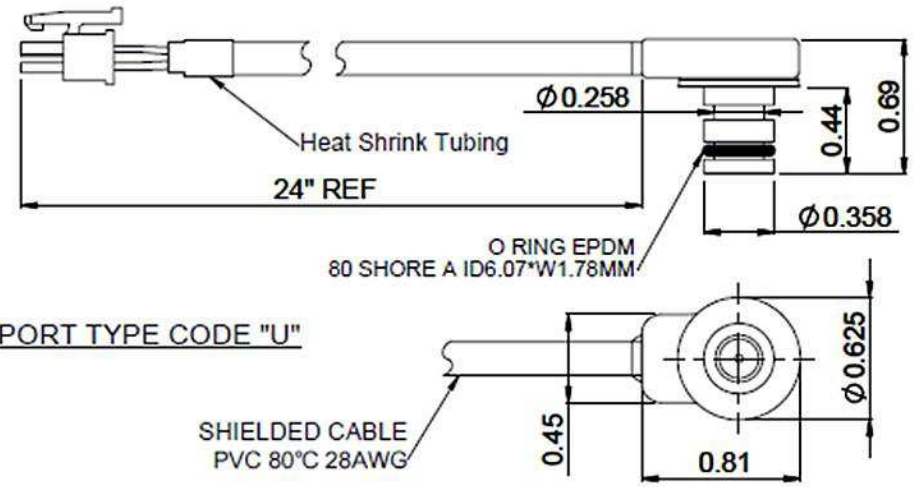
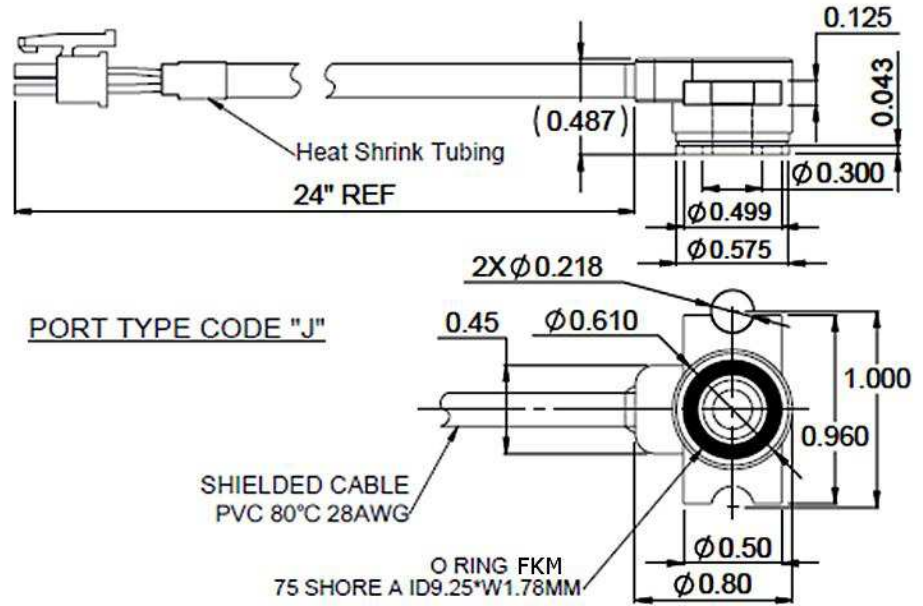
| PARAMETERS                 | MIN  | TYP    | MAX    | UNITS           | NOTES   |
|----------------------------|--|--------|--------|-----------------|---|
| Supply Voltage             | 2.7  | 3.0    | 5.0    | V <sub>DC</sub> |   |
| Output at Zero Pressure    | 720  | 1000   | 1280   | Count           |   |
| Output at FS Pressure      | 14,720   | 15,000 | 15,280 | Count           |   |
| Current Consumption        |  |        | 3      | mA              |   |
| Proof Pressure             | 1.5X   |        |        | Rated           |   |
| Burst Pressure             | 3X   |        |        | Rated           |   |
| Endurance                  | 1E+6   |        |        | 0~FS Cycles     |   |
| Accuracy                   | -0.5   |        | 0.5    | %Span           | RSS of BFSL: Linearity, Hysteresis, Repeatability |
| A/D Resolution             |  | 14     |        | Bit             |   |
| Operating Temperature      | 0  |        | 55     | °C              |   |
| Temperature Accuracy       | -3   |        | 3      | °C              | 1*  |
| Thermal Zero Shift         | -2.0   |        | 2.0    | %F.S.           | Reference to 25°C over Compensated Temperature    |
| Thermal Span Shift         | -2.0   |        | 2.0    | %F.S.           | Reference to 25°C over Compensated Temperature    |
| Compensated Temperature    | 0  |        | 45     | °C              |   |
| Response Time (10% to 90%) |  |        | 3      | ms @ 4MHz       | Without Sleep Mode                                |
| Response Time (10% to 90%) |  |        | 8.4    | ms @ 4MHz       | With Sleep Mode                                   |
| Vibration                  | ±20g MIL-STD-810C, Procedure 514.2, Figure 514.2-2, Curve L                  |        |        |                 |   |
| Shock                      | 50g, 11 msec half sine shock per mil standard 202F. Method 213B, Condition A |        |        |                 |   |

**Notes:**

1\* Reflect pressure port diaphragm temperature over the compensated temperature range

2\* Response time is from power on to reading measurement data.

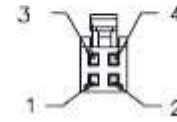
**DIMENSIONS**



**WIRING****Analog mV Output Wiring**

| Connection                        | PIN 1   | PIN 2   | PIN 3   | PIN 4   |
|-----------------------------------|---------|---------|---------|---------|
| Molex 4pin Connector<br>PCB Mount | +SUPPLY | +OUTPUT | -OUTPUT | -SUPPLY |

4 PINS MOLEX CONNECTOR  
HOUSING:MOLEX 430-25-040  
PIN:MOLEX 430-30-004

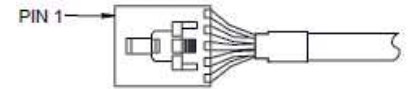
**Digital I<sup>2</sup>C Output Wiring**

| Connection                        | PIN 1 | PIN 2 | PIN 3 | PIN 4 |
|-----------------------------------|-------|-------|-------|-------|
| Molex 4pin Connector<br>PCB Mount | VDD   | GND   | SDA   | SCL   |

**Digital SPI Output Wiring**

| Connection                        | PIN 1 | PIN 2 | PIN 3 | PIN 4 | PIN5 |
|-----------------------------------|-------|-------|-------|-------|------|
| Molex 5pin Connector<br>PCB Mount | VDD   | GND   | MISO  | SCLK  | SS   |

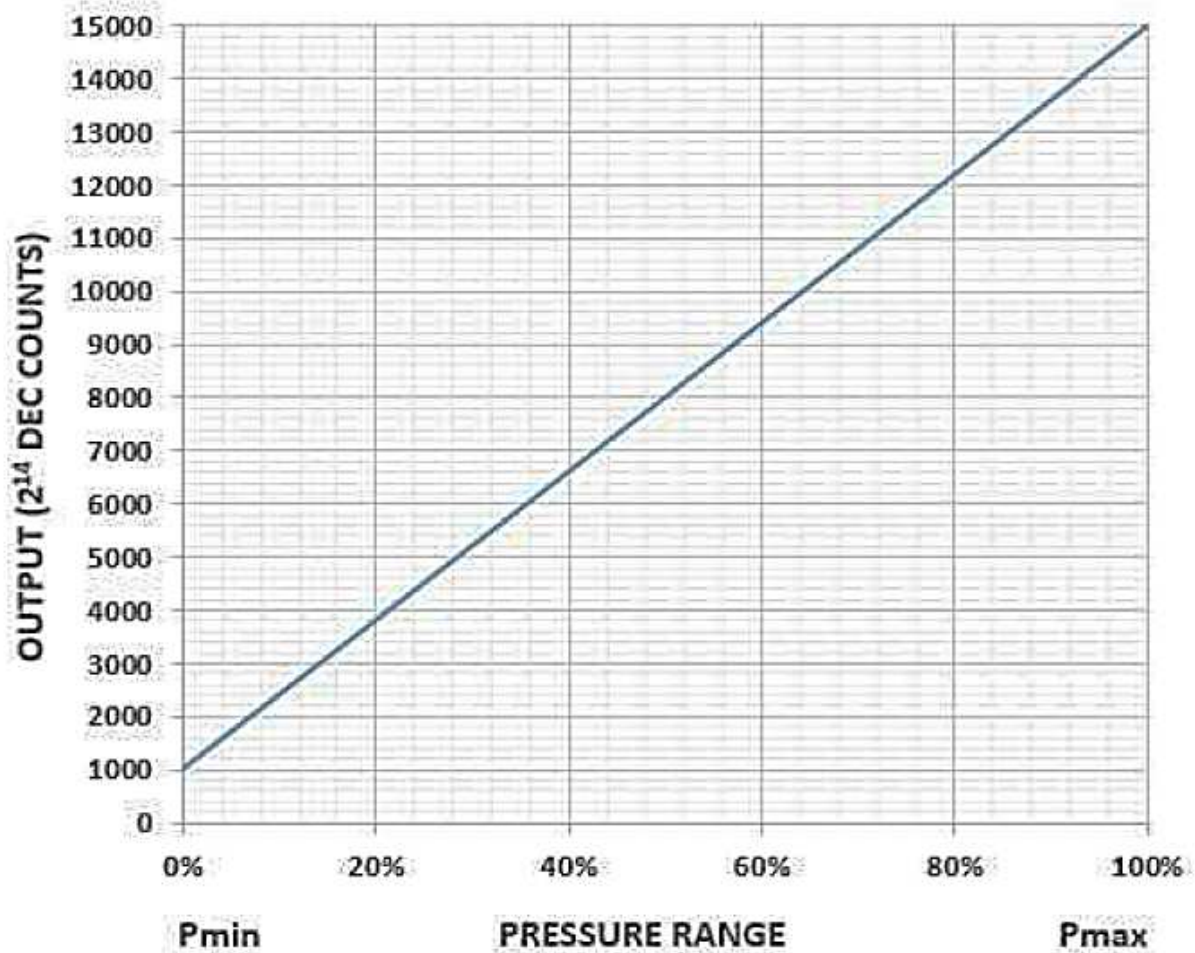
5 PINS MOLEX CONNECTOR  
HOUSING:MOLEX 50-57-9405  
PIN:MOLEX 16-02-0082



**SENSOR OUTPUT**

**SENSOR OUTPUT AT SIGNIFICANT PERCENTAGES**

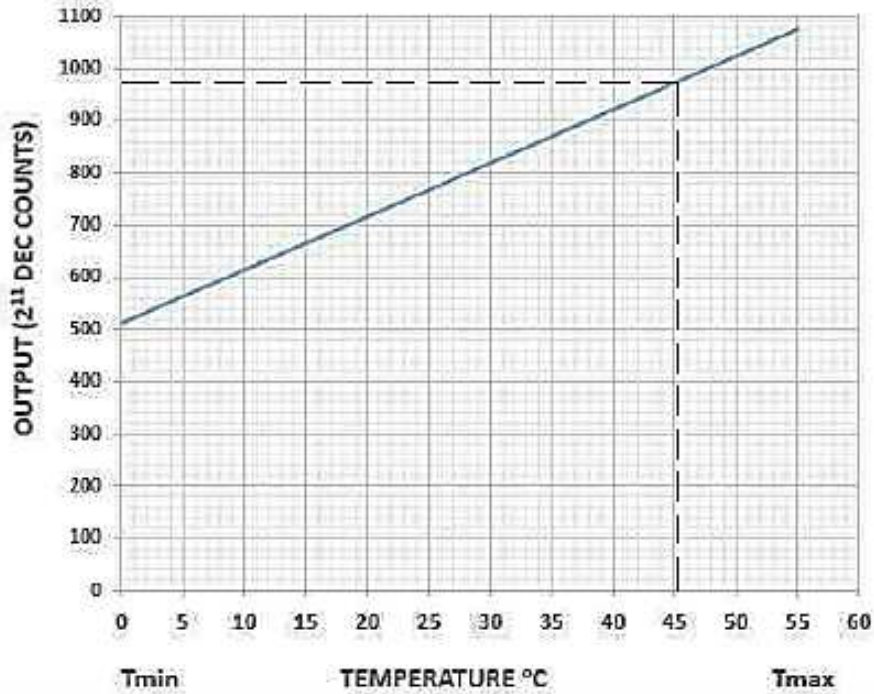
| % OUTPUT | DIGITAL COUNTS (DECIMAL) | DIGITAL COUNTS (HEX) |
|----------|--------------------------|----------------------|
| 0%       | 1000                     | 0 × 3E8              |
| 5%       | 1700                     | 0 × 6A4              |
| 10%      | 2400                     | 0 × 960              |
| 50%      | 8000                     | 0 × 1F40             |
| 90%      | 13600                    | 0 × 3520             |
| 95%      | 14300                    | 0 × 37DC             |
| 100%     | 15000                    | 0 × 3A98             |



$$\text{OUTPUT (DECIMAL COUNTS)} = \frac{15000-1000}{P_{\text{max}} - P_{\text{min}}} \times (P_{\text{applied}} - P_{\text{min}}) + 1000$$

## TEMPERATURE OUTPUT

| TEMPERATURE OUTPUT |                          |                      |
|--------------------|--------------------------|----------------------|
| OUTPUT °C          | DIGITAL COUNTS (DECIMAL) | DIGITAL COUNTS (HEX) |
| 0                  | 512                      | 0 × 200              |
| 10                 | 614                      | 0 × 266              |
| 25                 | 767                      | 0 × 2FF              |
| 40                 | 921                      | 0 × 399              |
| 55                 | 1075                     | 0 × 433              |



$$\text{OUTPUT (DECIMAL COUNTS)} = \frac{(\text{OUTPUT}^\circ\text{C} + 50^\circ\text{C}) \times 2048}{150^\circ\text{C} - (-50^\circ\text{C})}$$

## OUTPUT SIGNAL

| Code | Output Signal    | Supply Voltage (V) |
|------|------------------|--------------------|
| 2    | 0 – 100mV        | 5 ± 0.25           |
| J    | I <sup>2</sup> C | 2.7 – 5.0          |
| S    | SPI              | 2.7 – 5.0          |

# MSP100

Pressure Transducer

## ORDERING INFORMATION

MS1 S 1 - 1 0 0 0 0 J- 100P G

| Output |                  |                |
|--------|------------------|----------------|
| Code   | Type             | Supply Voltage |
| 2      | 0 - 100mV        | 5±0.25V        |
| J*     | I <sup>2</sup> C | 2.7 - 5.0V     |
| S*     | SPI              | 2.7 - 5.0V     |

\*Digital Output

| Cable/Connector |                                    |
|-----------------|------------------------------------|
| Code            | Connection Type                    |
| 1               | Cable, 2 feet with Molex Connector |

| Port Material |                        |
|---------------|------------------------|
| Code          | Material               |
| 0             | 316L Stainless Steel   |
| 1             | 17-4PH Stainless Steel |

| Cleaning |                             |
|----------|-----------------------------|
| Code     | Cleaning Method             |
| 0        | No Selection                |
| 1        | Oxygen Clean B40.1 Level IV |

| Sleep (Digital Only) |                |
|----------------------|----------------|
| Code                 | Mode           |
| 0                    | Non-Sleep Mode |
| 1                    | Sleep mode     |

| Pressure Type |       |
|---------------|-------|
| Code          | Type  |
| G             | Gauge |

| Pressure Ranges |     |
|-----------------|-----|
| Code            | psi |
| 100P            | 100 |
| 150P            | 150 |
| 250P            | 250 |
| 500P            | 500 |

| Port Type Selection |                    |
|---------------------|--------------------|
| Code                | Port Type          |
| J                   | O-ring Face Seal   |
| U                   | O-ring Radial Seal |

| I <sup>2</sup> C Address (Digital Only) |         |
|---|---------|
| Code                                    | Address |
| 0                                       | 0x28H   |
| 1                                       | 0x36H   |
| 2                                       | 0x46H   |
| 3                                       | 0x48H   |
| 4                                       | 0x51H   |

SPI Default Code "0"

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