

SPT Series

Low Cost, Stainless Steel Media Isolated Pressure Sensors



DESCRIPTION

Honeywell's SPT Series stainless steel pressure sensors are designed for media that will not adversely attack 316L stainless steel.

The back side metal tube is made from 304 stainless steel which provides effective protection against most harsh environments. The SPT Series is calibrated and compensated for three styles of output: 4.0 mA to 20.0 mA (mA version); 1.0 Vdc to 5.0 Vdc (4 V version); and 0 mV to 100 mV (mV version).

FEATURES

- Reliable semiconductor technology
- Calibrated and temperature compensated
- Rugged, stainless steel package
- NEMA 4 design
- Small size
- Absolute, gage, sealed gage, vacuum gage pressures
- 0 psi to 3 psi, 0 psi to 5000 psi

All versions feature a variety of pressure connections to allow use in a wide range of OEM (Original Equipment Manufacturer) equipment.

The SPT Series stainless steel devices are rugged and reliable transducers for use in a wide variety of pressure sensing applications where corrosive liquids and gases are monitored.

POTENTIAL APPLICATIONS

- Industrial automation and flow control
- Pressure instrumentation
- Hydraulic systems
- Process control

SPT Series

Table 1. Specifications

| Characteristic | Parameter |
|--|------------------------------------|
| Environmental specifications | |
| Compensated temperature range | -10 °C to 85 °C [14 °F to 185 °F] |
| Operating temperature range | -40 °C to 85 °C [-40 °F to 185 °F] |
| Storage temperature range | -40 °C to 85 °C [-40 °F to 185 °F] |
| Vibration | 10 G at 20 Hz to 2000 Hz |
| Shock | 100 G for 11 ms |
| Insulation resistance | 100 MΩ at 50 Vdc |
| Recommended supply range | |
| SPT mA supply voltage | +12.5 Vdc to +24 Vdc |
| SPT 4V | |
| Supply voltage V_s | +12.5 Vdc to +24 Vdc |
| Quiescent current I_{osc} | 5 mA |
| Short circuit current I_{sc} | 18 mA |
| SPT mV supply voltage V_s | +10 Vdc |
| Maximum supply ratings | |
| SPT mV supply voltage V_s | +15 Vdc |
| SPT mA and SPT 4V supply voltage V_s | +24 Vdc |

Table 2. Pressure Range Specifications

| Catalog Listing ¹ | Pressure Range | Proof Pressure ² | Burst Pressure ³ |
|--|-------------------|-----------------------------|-----------------------------|
| SPT (mA, mV, 4V) 0003P G (4,5,6,7,9) (B/WXX) | 0 psig to 3 psig | 9 psig | 15 psig |
| SPT (mA, mV, 4V) 0005P G (4,5,6,7,9) (B/WXX) | 0 psig to 5 psig | 15 psig | 25 psig |
| SPT (mA, mV, 4V) 0010P G (4,5,6,7,9) (B/WXX) | 0 psig to 10 psig | 30 psig | 50 psig |
| SPT (mA, mV, 4V) 0015P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 15 psi | 45 psi | 75 psi |
| SPT (mA, mV, 4V) 0030P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 30 psi | 90 psi | 150 psi |
| SPT (mA, mV, 4V) 0050P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 50 psi | 150 psi | 250 psi |
| SPT (mA, mV, 4V) 0100P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 100 psi | 300 psi | 500 psi |
| SPT (mA, mV, 4V) 0200P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 200 psi | 600 psi | 1000 psi |
| SPT (mA, mV, 4V) 0300P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 300 psi | 900 psi | 1500 psi |
| SPT (mA, mV, 4V) 0500P (A,G,V) (4,5,6,7,9) (B/WXX) | 0 psi to 500 psi | 1200 psi | 2400 psi |
| SPT (mA, mV, 4V) 1000P (A,S) (4,5,6,7) (B/WXX) | 0 psi to 1000 psi | 3000 psia | 5000 psia |
| SPT (mA, mV, 4V) 2000P (A,S) (4,5,6,7) (B/WXX) | 0 psi to 2000 psi | 6000 psia | 10000 psia |
| SPT (mA, mV, 4V) 3000P (A,S) (4,5,6,7) (B/WXX) | 0 psi to 3000 psi | 9000 psia | 10000 psia |
| SPT (mA, mV, 4V) 5000P (A,S) (4,5,6,7) (B/WXX) | 0 psi to 5000 psi | 10000 psia | 10000 psia |

Notes:

1. Vacuum gage units (V option) allow you to pull a hard vacuum on the gage units. Vacuum gage parts are only available on the mV version in 15 psig through 500 psig. As sold, this package design is not submersible. In order to make the package submersible, the package needs to be sealed.
2. The maximum pressure that can be applied without changing the transducer's performance or accuracy.
3. The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer case.

Low Cost, Stainless Steel Media Isolated Pressure Sensors

Table 3. Performance Specifications¹

| Characteristic | Minimum | Typical | Maximum | Unit |
|--|---------|---------|---------|------|
| SPT mV Version | | | | |
| Zero pressure offset | -2 | 0 | +2 | mV |
| Full-scale span (0 psig to 3 psig and 0 psig-5 psig only) ² | 48 | 50 | 52 | mV |
| Full-scale span (0 psi to 10 psi and 0 psi to 3000 psi only) ² | 98 | 100 | 102 | mV |
| Full-scale span (0 psi to 5000 psi only) ² | 148 | 150 | 152 | mV |
| Pressure non-linearity ³ | – | ±0.1 | ±0.25 | %FSS |
| Pressure hysteresis ³ | – | ±0.015 | ±0.030 | %FSS |
| Repeatability | – | ±0.010 | ±0.030 | %FSS |
| Temp. effect on span ⁴ | – | ±0.5 | ±1.0 | %FSS |
| Temp. effect on offset ⁴ | – | ±0.5 | ±1.0 | %FSS |
| Temp. effect on span (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1 | ±2.0 | %FSS |
| Temp. effect on offset (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1 | ±2.0 | %FSS |
| Thermal hysteresis (-10 °C to 85 °C [14 °F to 185 °F]) | – | ±0.1 | ±0.3 | %FSS |
| Long-term stability of offset and span ⁵ | – | ±0.1 | ±0.3 | %FSS |
| Response time ⁶ | – | 0.1 | – | ms |
| Common mode voltage (voltage version “K”) ⁷ | 0.5 | 1.25 | 2.0 | Vdc |
| Input resistance | 8.0 | 25 | 50 | kΩ |
| Output resistance | 3.0 | 4.5 | 6.0 | kΩ |
| SPT mA Version | | | | |
| Zero pressure offset | 3.84 | 4.0 | 4.16 | mA |
| Full-scale span ² | 15.84 | 16.0 | 16.16 | mA |
| Pressure non-linearity ³ | – | ±0.1 | ±0.25 | %FSS |
| Pressure hysteresis ³ | – | ±0.015 | ±0.03 | %FSS |
| Repeatability | – | ±0.010 | ±0.030 | %FSS |
| Temp. effect on span ⁴ | – | ±0.5 | ±1.5 | %FSS |
| Temp. effect on offset ⁴ | – | ±0.5 | ±1.5 | %FSS |
| Temp. effect on span (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1.5 | ±2.5 | %FSS |
| Temp. effect on offset (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1.5 | ±2.5 | %FSS |
| Thermal hysteresis -10 °C to 85 °C [14 °F to 185 °F] | – | ±0.1 | ±0.3 | %FSS |
| Long term stability of offset and span ⁵ | – | ±0.1 | ±0.3 | %FSS |
| Response time ⁶ | – | 5 | – | ms |
| SPT 4V Version | | | | |
| Zero pressure offset | 0.96 | 1.0 | 1.04 | V |
| Full-scale span ² | 3.96 | 4.0 | 4.04 | V |
| Pressure non-linearity ³ | – | ±0.1 | ±0.25 | %FSS |
| Pressure hysteresis ³ | – | ±0.015 | ±0.03 | %FSS |
| Repeatability | – | ±0.010 | ±0.030 | %FSS |
| Temp. effect on span ⁴ | – | ±0.5 | ±1.5 | %FSS |
| Temp. effect on offset ⁴ | – | ±0.5 | ±1.5 | %FSS |
| Temp. effect on span (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1.5 | ±2.5 | %FSS |
| Temp. effect on offset (0 psi to 3 psi and 0 psi to 5 psi only) ⁴ | – | ±1.5 | ±2.5 | %FSS |
| Thermal hysteresis -10 °C to 85 °C [14 °F to 185 °F] | – | ±0.1 | ±0.3 | %FSS |
| Long term stability of offset and span ⁵ | – | ±0.1 | ±0.3 | %FSS |
| Response time ⁶ | – | 5 | – | ms |

Notes:

- Reference conditions (unless otherwise noted): $T_A = 25\text{ °C}$ [77 °F]; For SPTmA and SPT4V, Supply $V_S = 23.5\text{ Vdc} \pm 0.01\text{ Vdc}$; for SPTmV: $V_S = 10\text{ Vdc}$.
- Full-scale span (FSS) is the algebraic difference between the output voltage at full-scale positive pressure and the output at zero pressure. FSS is ratiometric to the supply voltage.
- Pressure non-linearity is based on best-fit straight line from zero to the full-scale pressure. Pressure hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
- Maximum error band of the offset voltage or span over the compensated temperature range, relative to the 25 °C [77 °F] reading.
- Long-term stability over a six-month period.
- Response time for a 0 psi to FSS pressure step change, 10% to 90% rise time.
- Common mode voltage as measure from output to ground.

Figure 1. Equivalent Basic Circuits

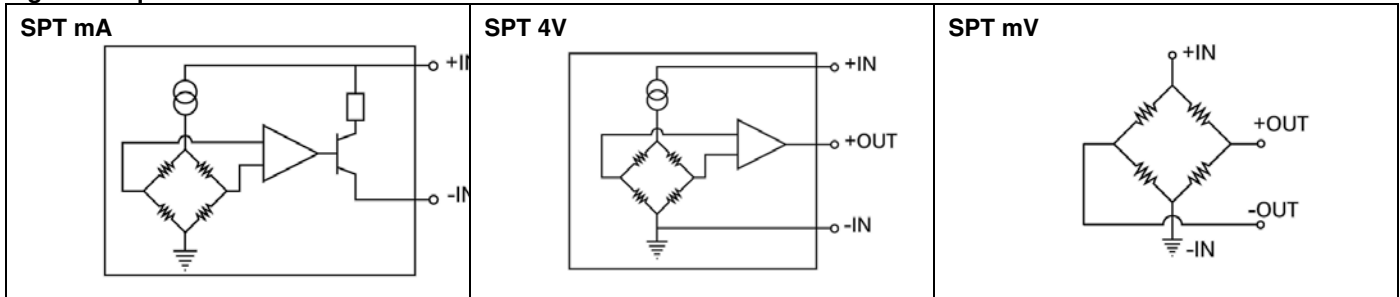


Figure 2. SPT mA Version External Load Line

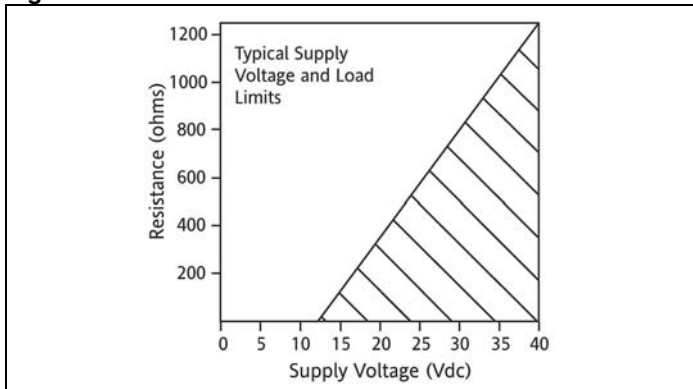


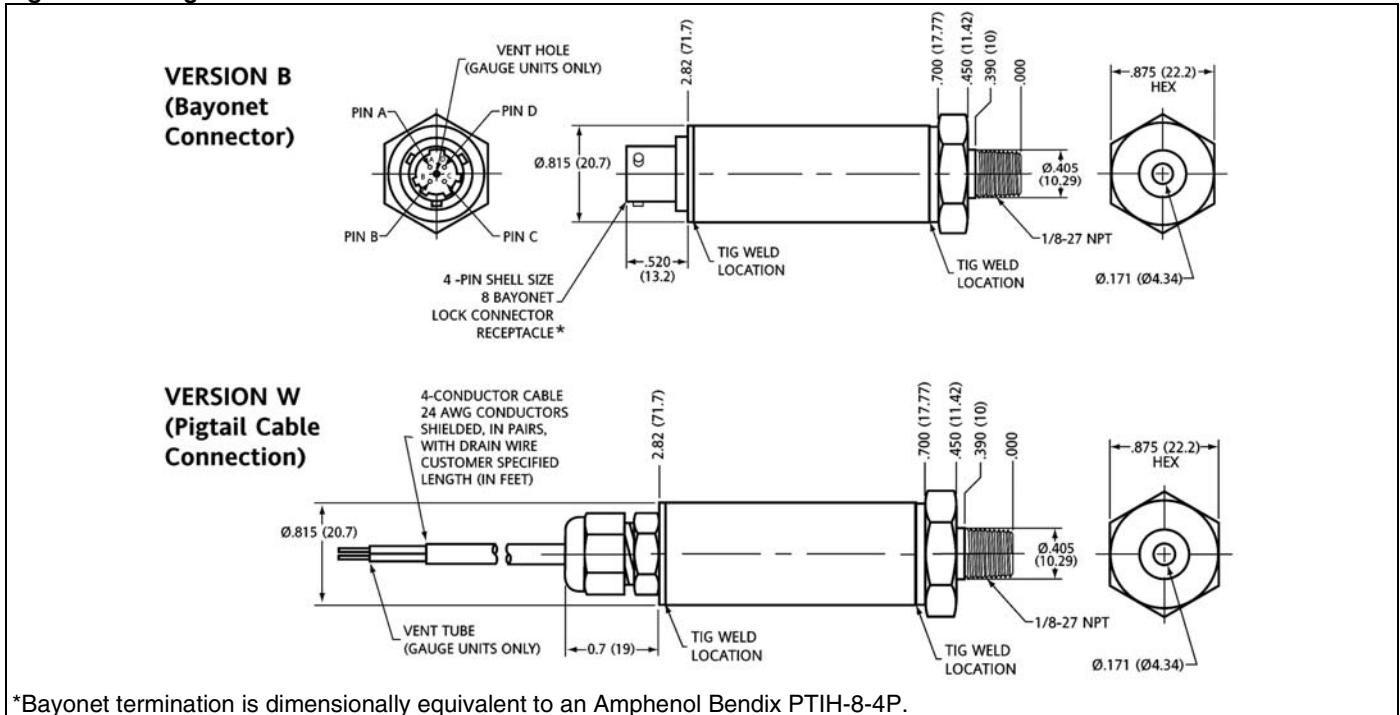
Figure 3. Pinout and Wire Code for all Package Styles

| PIN DESIGNATIONS | | | |
|------------------|-----|------|------|
| PIN LTR | mA | 4V | mV |
| A | +IN | +IN | +IN |
| B | N/C | +OUT | +OUT |
| C | N/C | N/C | -OUT |
| D | -IN | -IN | -IN |

| WIRE CODE | | | |
|-----------|--------|--------|--------|
| Color | mA | 4V | mV |
| RED | +IN | +IN | +IN |
| BLACK | -IN | -IN | -IN |
| GREEN | N/C | +OUT | +OUT |
| WHITE | N/C | N/C | -OUT |
| BARE | SHIELD | SHIELD | SHIELD |

MOUNTING DIMENSIONS (For reference only, in (mm).)

Figure 4: Package 4: 1/8-27 NPT Port



Low Cost, Stainless Steel Media Isolated Pressure Sensors

Figure 5. Package 5: 1/4-18 NPT Port

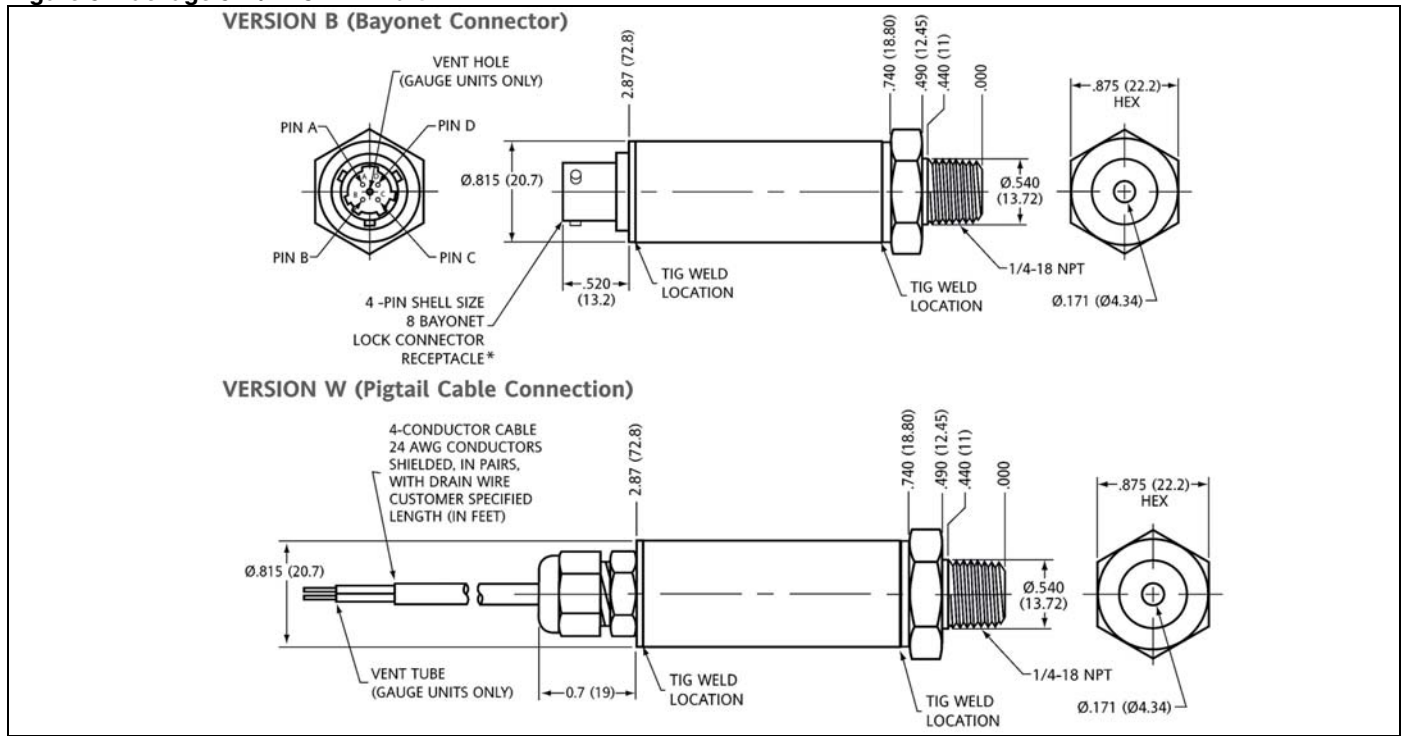
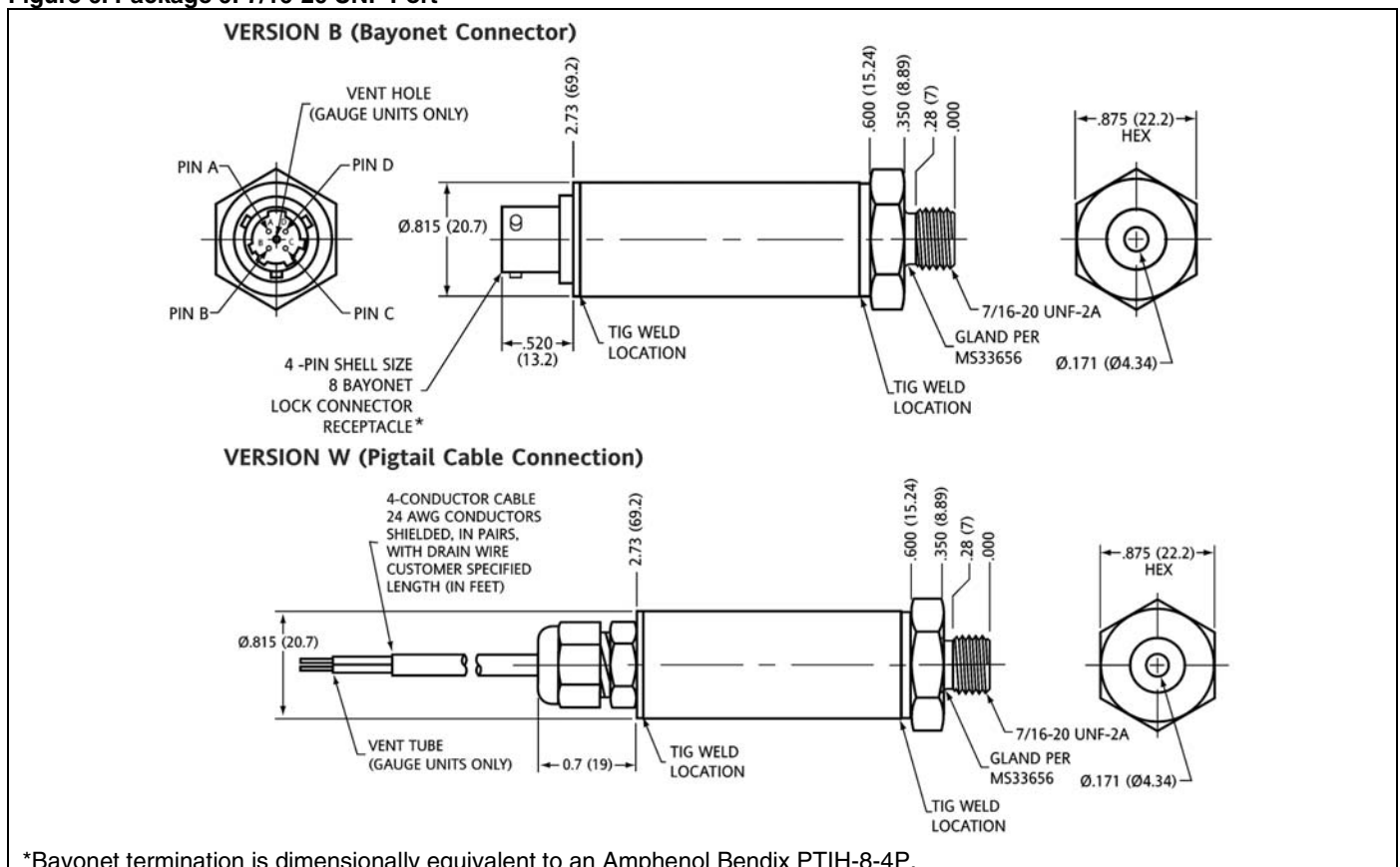


Figure 6. Package 6: 7/16-20 UNF Port



*Bayonet termination is dimensionally equivalent to an Amphenol Bendix PTIH-8-4P.

Figure 7. Package 7: 1/4-19 BSPP Port

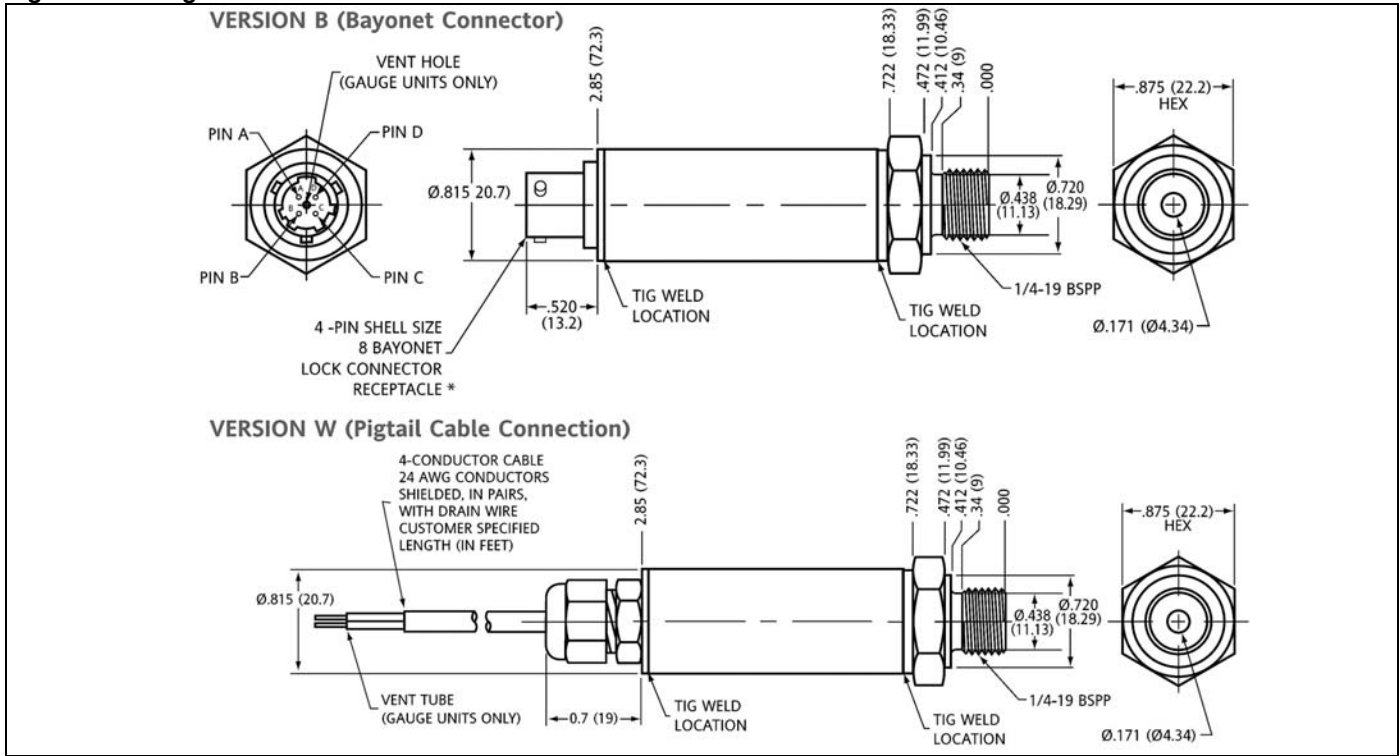
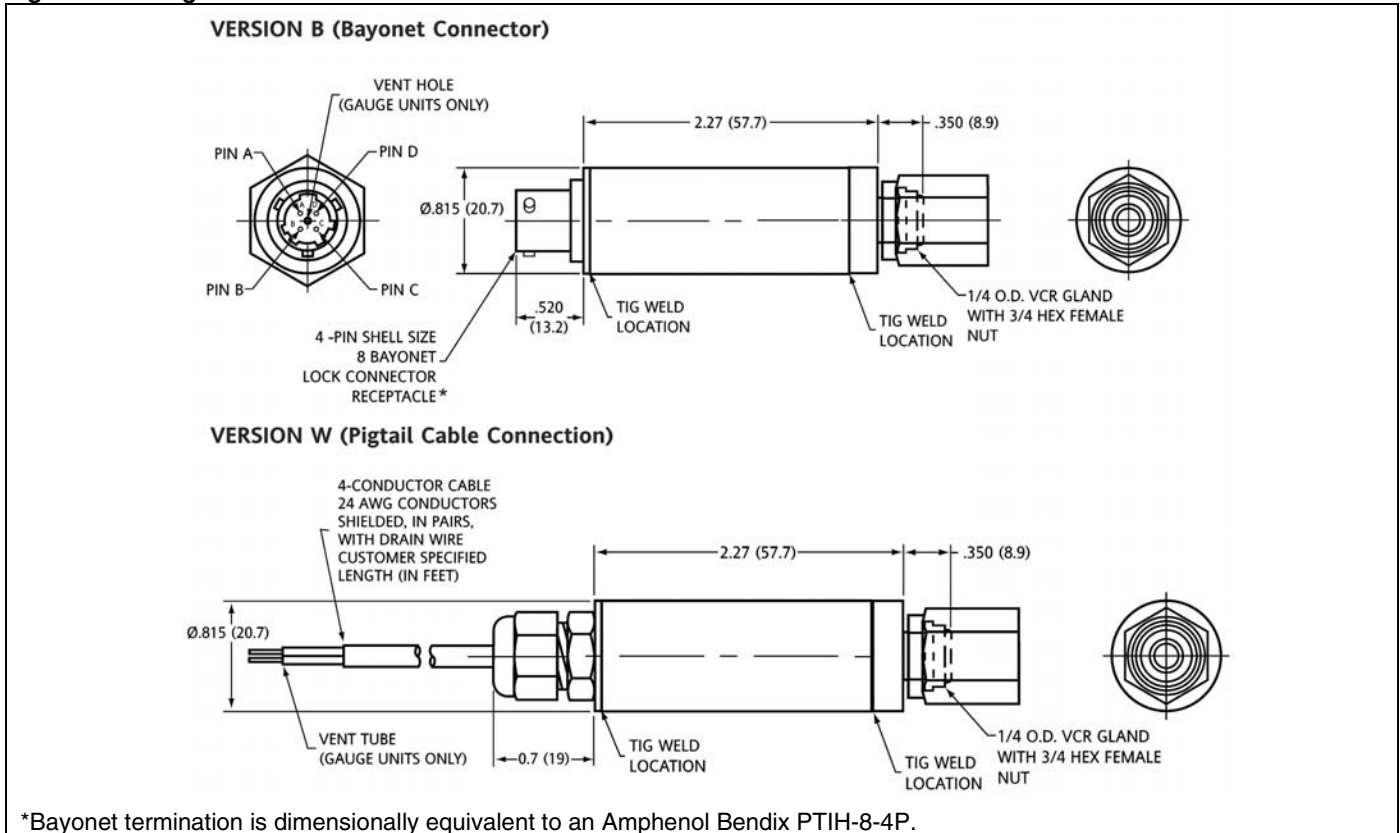


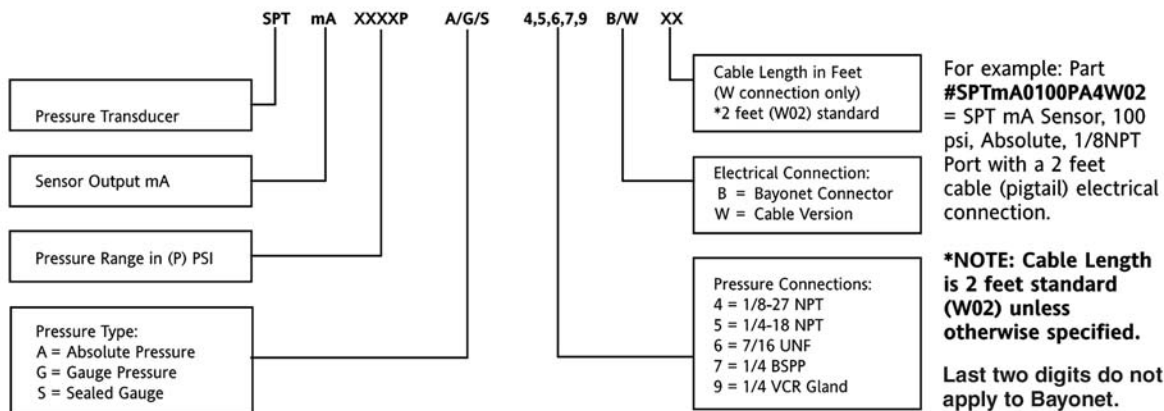
Figure 8. Package 9: VCR Port



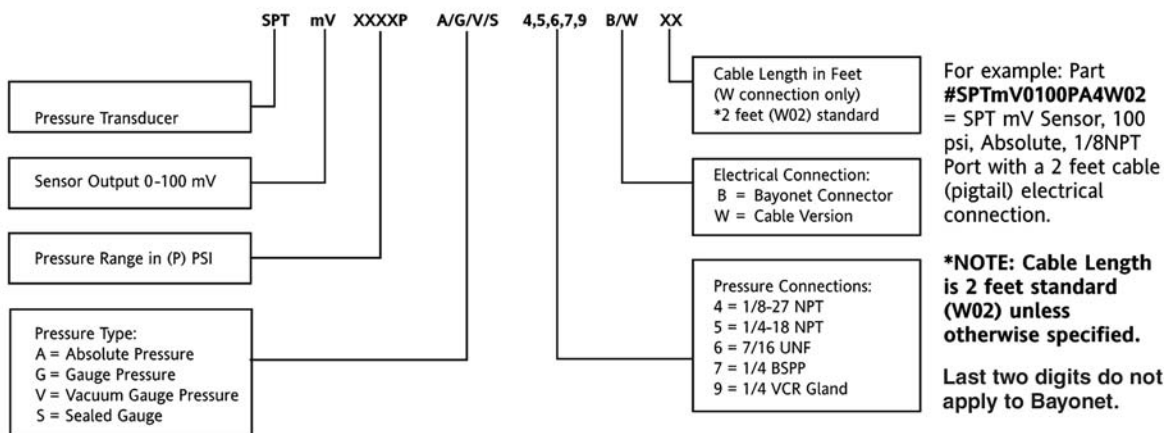
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Order Guide

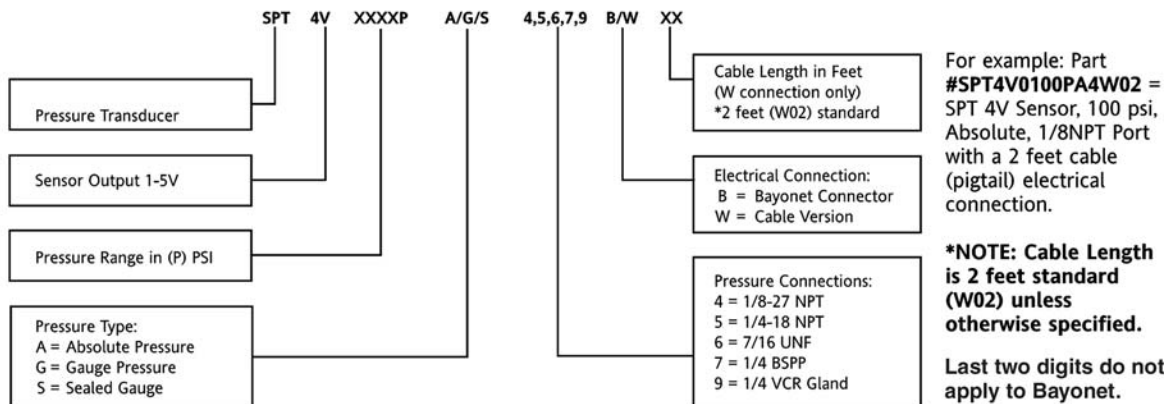
SPT mA



SPT mV



SPT 4V



WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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Honeywell

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