HPT SERIES

008366
Issue 1

High Purity Pressure Sensors

DESCRIPTION

Honeywell HPT series pressure transducer is designed for measurement of gases in facility gas delivery systems. These systems are designed for delivery of gases from a central source to the point of use. They are often of high purity and corrosive.

The HPT pressure transducer uses Honeywell proven piezoresistive sensing technology with ASIC (Application Specific Integrated Circuit) and signal conditioning circuit in a stainless-steel housing with electrical connector.

Designed with 316L wetting material and VIM-VAR melting processes, this sensor exhibits exceptional corrosion resistance and is specifically designed to withstand the aggressive nature of halogenated gases commonly encountered in semiconductor manufacturing processes. Its robust construction and precise calibration are designed to protect against environmental factors while ensuring accurate pressure measurements,

Additionally, the HPT series transducer is designed to achieve superior long-term stability by minimizing offset drift under extended environmental conditions, allowing for longer intervals between recalibrations.

FEATURES

- Pressure range: -14.7 psi to 250 psi, -14.7 psi to 3000 psi (gage)
- Superior long-term stability
- High accuracy
- Ultra-high purity
- Fast response time
- Excellent Electromagnetic Compatibility (EMC) at Heavy Industrial Level
- Oil-free and grease-free and fully media isolated
- Full temperature range compensation and supports software zero adjustment

VALUE TO CUSTOMER

- **Long-Term Stability:** Total Error Band (TEB) as low as ±1.5 %FSS within -20°C to 85°C [-4°F to 185°F] temperature range and ±0.25 %FSS accuracy enables enhanced system performance promoting uptime and efficiency
- **Robust EMC Performance:** Operate reliably in the presence of electromagnetic fields
- **Excellent Corrosion Resistance:** The low-carbon 316L stainless steel offers excellent corrosion resistance for highly corrosive process gases, and the VIM-VAR dual refining process ensures superior cleanliness and ultra-high purity, essential for critical gas delivery applications

APPLICATIONS

- OEM specialty gas cabinets
- Valve manifold box/panel (VMB/VMP)
- Thin-layer deposition equipment
- Etch equipment

PORTFOLIO

The Honeywell HPT Series is one of the new offerings in package pressure sensing portfolio that includes 13 mm, 19 mm, GPT and MIP Series. To learn more about the product, or the many other Honeywell pressure sensors in this series, click here.

Honeywell

TABLE 1. PERFORMANCE SPECIFICATIONS (AT 25°C [77°F] UNLESS OTHERWISE NOTED)	
Characteristic	**Parameter**
Operating temperature range	-20°C to 85°C [-4°F to 185°F]
Storage temperature range	-20°C to 85°C [-4°F to 185°F]
Compensated temperature range	0°C to 60°C [32°F to 140°F]
Accuracy[1]	±0.25 %FSS
Total Error Band (TEB) (-20°C to 85°C)[4]	±1.5 %FSS
Mean temperature coefficient at 0°C to 60°C	Zero point: ≤0.1 %FS/10 K Span: ≤0.1 %FS/10 K
Response time[2]	2 ms typ. (10 % to 90 % step change in pressure)
Start-up time[3]	<7 ms
EMC rating	
Electrostatic discharge	±8 kV contact, ±15 kV air per IEC 61000-4-2
Radiated immunity	30 V/m (26 MHz to 1000 MHz) per IEC 61000-4-3 3 V/m (1.4 GHz to 2.7 GHz) per IEC 61000-4-3 100 V/m (200 MHz to 2500 MHz) per ISO 11452-2
Fast transient burst	±4 kV per IEC 61000-4-4
Surge immunity	±1 kV per IEC 61000-4-5
Immunity to conducted disturbances	10 V per IEC 61000-4-6
Radiated emissions	50 dB (30 MHz to 230 MHz), 57 dB (230 MHz to 1000 MHz) per CISPR 11:2009, A1:2010
Insulation resistance	>100 Mohm, 500 Vdc
Dielectric strength	<1 mA at 250 Vac (60 s)
Load resistance	Current output (Vs-8)*50 Ohm max.
Life	1 million cycles minimum to 90 % full scale pressure
Leakage (Helium leak rate)	< 1×10^{-9} mbar l/sec (atm STD cc/sec) per Semi F1

1 Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25 °C [77 °F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and pressure non-repeatability
2 Response time: The time taken by the transducer to change output from 10 % to 90 % of full scale in response to a 0 % to 100 % full scale step input pressure.
3 Start-up time: The time needed to receive valid output after power up.
4 Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, pressure non-repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis (see Figure 1).

TABLE 2. ELECTRICAL SPECIFICATIONS (AT 25°C [77°F] UNLESS OTHERWISE NOTED)	
Characteristic	**Parameter**
Output wiring	2-wire
Output	4 mA to 20 mA
Supply voltage (Vs)	10 Vdc to 30 Vdc
Over and reverse voltage	+36 V

TABLE 3. PRESSURE REFERENCE DEFINITIONS	
Pressure Reference	**Definition**
Gage	The output is calibrated to be proportional to the difference between applied pressure and the real-time atmospheric pressure.

TABLE 4. PRESSURE RATINGS		
Rated Pressure (psi)	**Over Pressure[1]**	**Burst Pressure[2]**
250	1.5XFS	3XFS
3000	1.5XFS	3XFS

[1]**Over Pressure:** The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product.

[2]**Burst Pressure:** The maximum pressure which may be applied without causing escape of pressure media. The product should not be expected to function after exposure to the burst pressure.

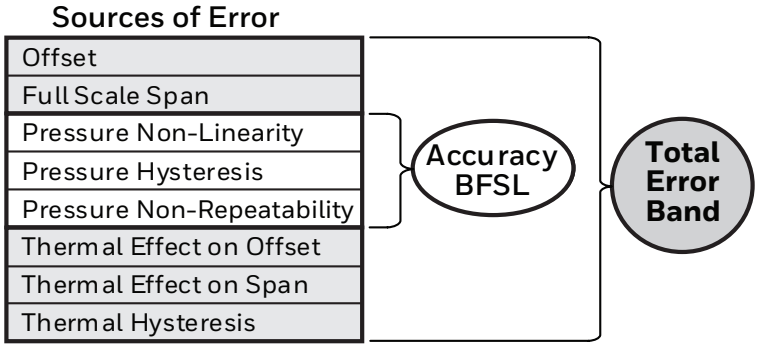
TABLE 5. ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS	
Characteristic	**Parameter**
Vibration	EN 60068-2-6: 20 G swept frequency, 10 Hz to 2000 Hz IEC 60068-2-6: 0,35 mm (10 Hz to 58 Hz)/5 g (1 Hz to 2000 Hz)
Shock	IEC 60068-2-27: 500 g (1.5 ms)
Humidity	0 %RH to 45 %RH, non-condensing
Ingress protection	IP67
Wetted materials	Port and diaphragm: 316L VIM-VAR
External materials (housing and electrical connector)	304 Stainless steel

Figure 1. TEB Components

Total Error Band (TEB) is a single specification that includes the major sources of sensor error. TEB is the worst error that the sensor could experience, and accuracy is a sub-component of this comprehensive measurement.

Honeywell uses the TEB specification in its datasheet because it is the most comprehensive measurement of a sensor's true accuracy. Honeywell also provides the accuracy specification in order to provide a common comparison with competitors' literature that does not use the TEB specification.

Many competitors do not use TEB—they simply specify the accuracy of their device. Their accuracy specification, however, may exclude certain parameters. On their datasheet, the errors are listed individually. When combined, the total error (or what would be TEB) could be significant.



HIGH PURITY SENSORS
HPT SERIES

Figure 2. HPT Series Product Nomenclature

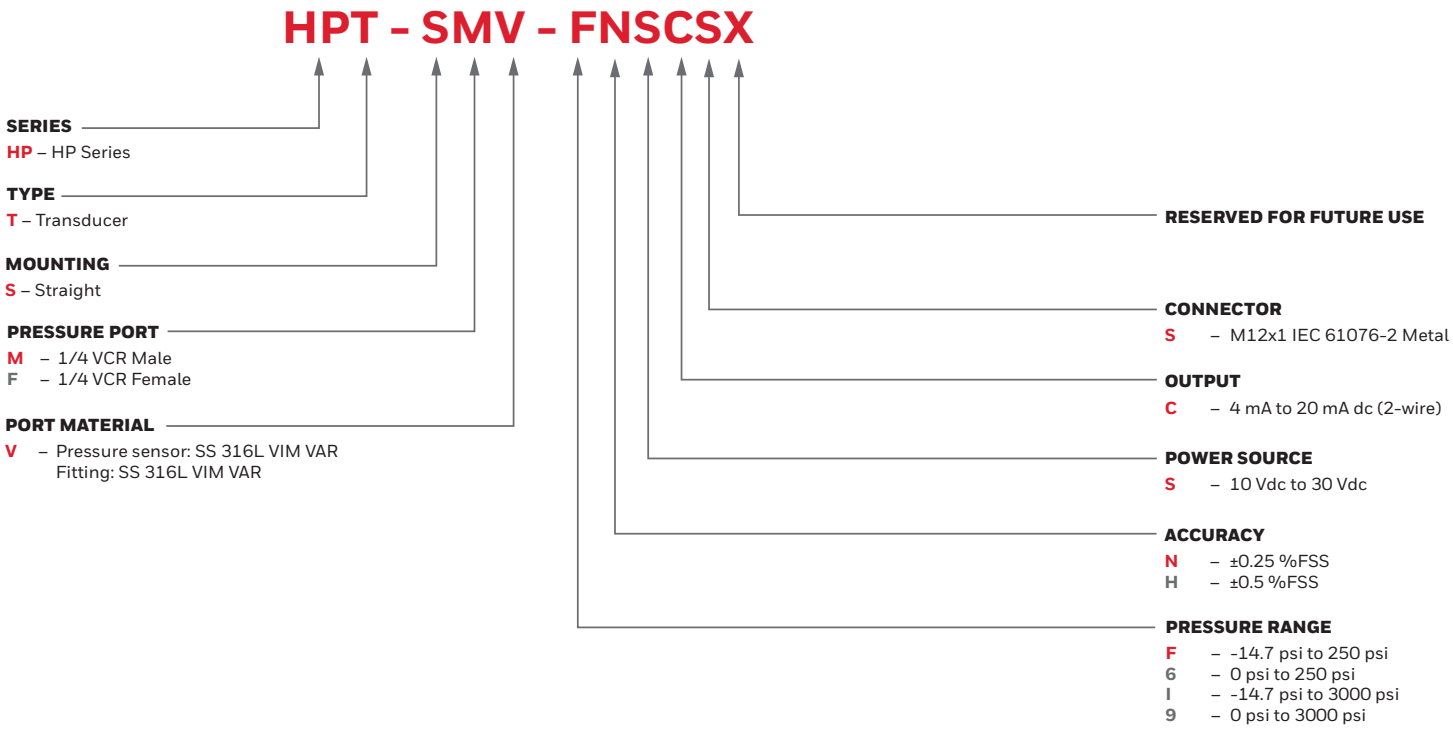
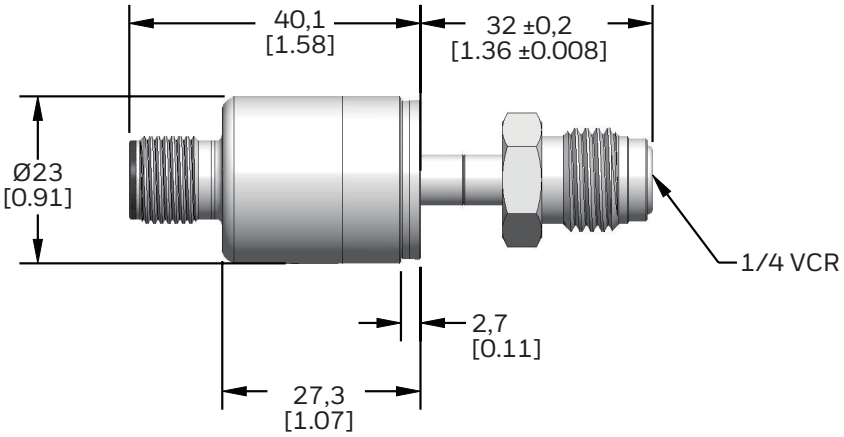


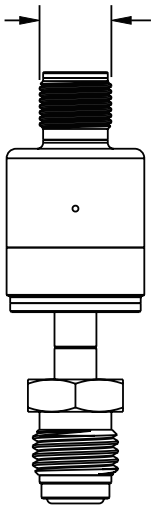
TABLE 6. GENERAL PART NUMBERS

Part Number	Description
HPT-SMV-FHSCSX	HPT Series pressure sensor, -14.7 psi to 250 psi, 1/4 VCR male port, SS316L VIM-VAR
HPT-SMV-6HSCSX	HPT Series pressure sensor, 0 psi to 250 psi, 1/4 VCR male port, SS316L VIM-VAR
HPT-SMV-IHSCSX	HPT Series pressure sensor, -14.7 psi to 3000 psi, 1/4 VCR male port, SS316L VIM-VAR
HPT-SMV-9HSCSX	HPT Series pressure sensor, 0 psi to 3000 psi, 1/4 VCR male port, SS316L VIM-VAR

[1]Continued development of configurations, including pressure range, pressure reference, pressure port, electrical terminal, and transfer function. For customization options, please consult your Honeywell representative.

Figure 3. Mounting Dimensions (For reference only) mm [in]





S=Metal Micro M12x1 IEC 61072-2, Mating Connector

¼" Pressure Screw Rotatable

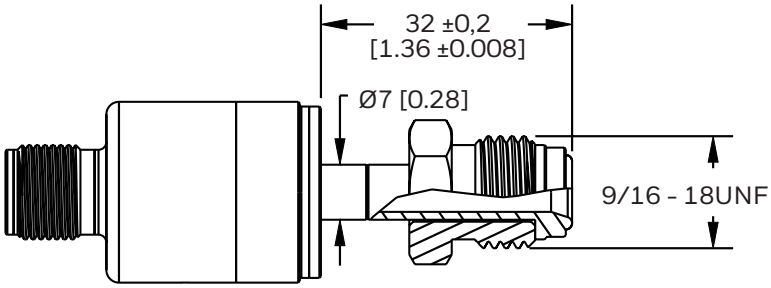


Figure 4. S=Metal Micro M12x1 IEC 61072-2, Mating Connector: 4 POS Type D Female

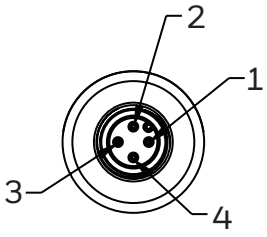


TABLE 7. CONNECTIONS

Pin	Current Output
1	U+ (Supply)
2	–
3	U- (Return)
4	–

CAUTION

- Ensure torque specifications are determined for the specific application
- When using mating parts made of stainless steel, use a thread sealant with anti-seize properties to prevent thread galling. Ensure the sealant is rated for the application
- Use appropriate tools (such as an open ended wrench or deep well socket) to install transducers
- Always hand-start transducers into the hole to prevent cross threading and damage
- Ensure that torque is not applied to the electrical connector
- Ensure that the proper mating electrical connector with a seal is used to connect the transducer. Improper or damaged seals can compromise ingress protection leading to short circuits

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

⚠ WARNING
IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine-control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

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

⚠ WARNING
MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

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

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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