Psibar®

CVD Pressure Sensors

Chemical Vapor Deposition

Gems™ Sensors
The Fluid Sensor People™

The Strength of Gems Psibar® Pressure Transducers Starts with the Science of CVD

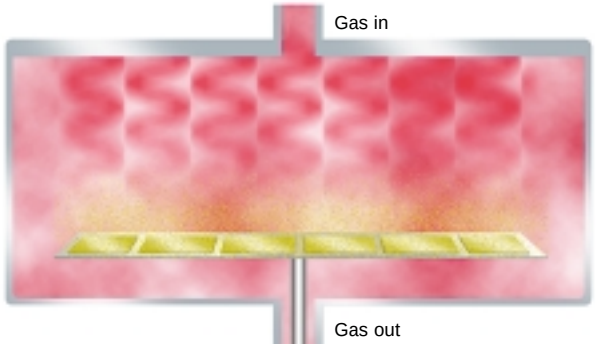
Gems Sensors provides the most stable pressure sensor on the market today by combining advanced sensing technology with highly automated and revolutionary manufacturing methods. The result is a sensing element comprised of silicon, stainless steel, glass, and other metals joined on a molecular level to form a pressure transducer that is impervious to aging. If your application requires long life components, Gems Psibar® transducers are designed with you in mind. Psibar® pressure transducers bring exceptional performance to a wide variety of applications across multiple industries. The strength of Psibar® pressure sensors starts with the science of CVD.

Psibar® transducers are manufactured using plasma-enhanced Chemical Vapor Deposition (CVD) technology. This sophisticated technique uses a chemical vapor to deposit thin layers of silicon and silicon dioxide on a stainless steel substratum to form a very sensitive and accurate polysilicon strain gauge. Since the elements of the strain gauge are fused together at the atomic level, the strength and integrity of the bond far exceeds the adhesives used in common pressure sensors. Psibar® transducers are inherently more stable and less sensitive to thermal exposure and pressure cycling than silicon-based pressure transducers. Your reward is a lower total cost of ownership.

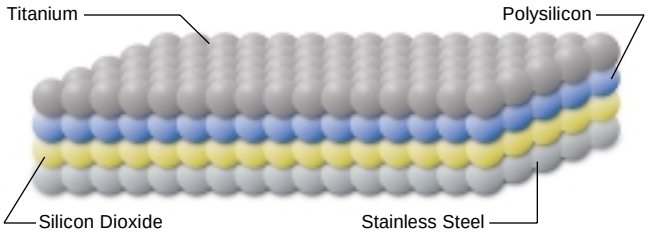
All sensor conditioning, including amplification, temperature calibration and filtering is performed by our unique ASIC. It allows configurable output and pressures ranges, sets the zero and span tolerance and ensures interchangeability from unit to unit. The use of an ASIC eliminates laser trimming for temperature compensation, and unnecessary external components. Besides reducing size and complexity, the best reduction our ASIC accomplishes is in the price of a Psibar® transducer.

The CVD sensor and ASIC circuitry is complemented by all stainless steel construction delivering excellent media compatibility; all major components are joined by welding. This construction technique produces a highly stable pressure transducer that withstands harsh media, and is configurable to satisfy specific application requirements. Psibar® pressure transducers are produced in an automated, zero-defect manufacturing process that incorporates calibration, configuration and test systems to improve sensor accuracy and quality. Psibar® pressure transducers deliver exceptionally superior, long-term performance.

Advanced sensor manufacturing techniques allow Psibar sensors to deliver superior stability and long-life reliability.



Stainless steel Psibar wafers lie in a gas stream of plasma-enhanced gases. The PECVD process is used because it deposits high quality silicon at low temperature, which does not affect the state of the steel gauge. After deposition, the silicon is ion implanted to modify resistivity.



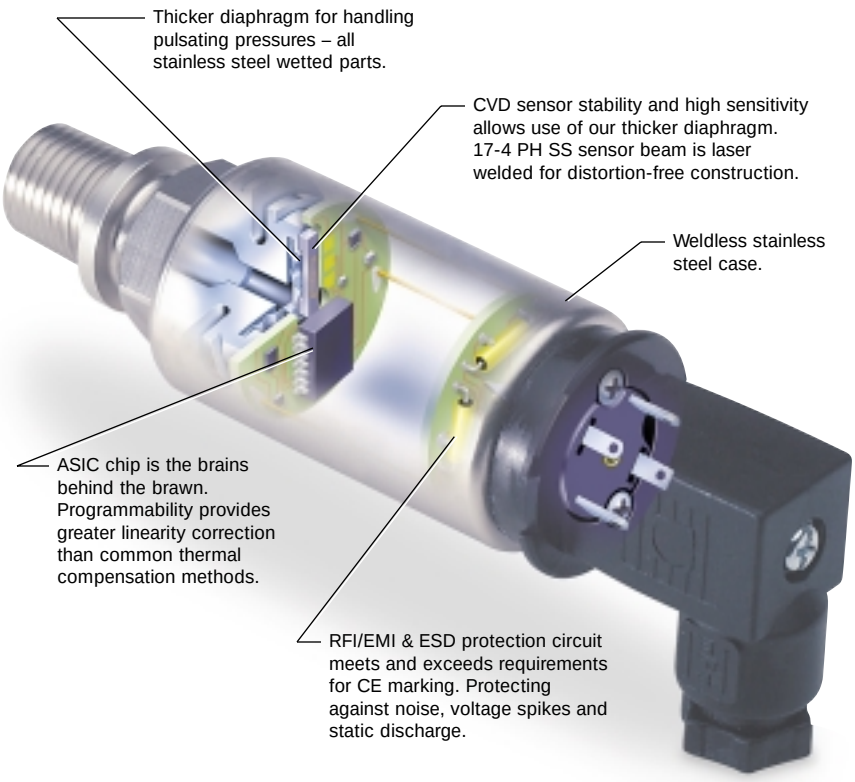
The thin film is atomically fused directly to the steel surface of the gauge beam and therefore follows the shape of the beam very accurately. This atomic fusion is the foundation for excellent performance and stability.

Cool, Laser Welded

The CVD strain gauge is affixed to the sensor assembly in a precise, automated laser weld process. A spot weld is made at each end and both sides of the beam to assure there is no twisting or tilting of the beam while a stitch weld is applied. Laser welding is fast and cool to prevent any distortion to the strain gauge.

Next...surround the CVD Sensor with a Superior Supporting Cast of Components

Along with the superiority of the CVD strain gauge, we add key components to leverage the sensing element's strength. The output is a product with a unique balance of performance and value unmatched in today's pressure sensing market.



Modular Design Configurability without High Costs or Delays

Modular electrical and pressure connections, versatile pressure sensing cores, and modern cellular manufacturing enable us to deliver Psibar pressure sensors specifically suited to your application without a premium in cost or time. In fact most orders ship within just 3 days!

Psibar® CVD Advantages

- **Stability –** Very repeatable from day to day. Eliminate recalibration costs and reduce total cost of ownership.
- **Drift Free Performance –** ASIC makes external components or laser trimming unnecessary. Each parameter can be adjusted for optimal performance and configuration. ASIC requires fewer components which improves product quality and performance.
- **Robust Construction** – Automated manufacture improves the sensor's consistency, quality and reliability while reducing production cost. Revolutionary manufacturing provides tighter control improving the sensor's performance in harsh environments.
- **No Fill Fluids to Leak or Thin Diaphragm to Rupture**

Typical Applications

- Off Highway Vehicles – Load Weighing Systems and Load Moment Indicating
- Natural Gas Equipment – Compressors; Dispensing Equipment
- Semiconductor Processing – Wafer Manufacturing
- Power Plants – Piping Steam Pressures
- Refrigeration – Compressors and Lube Oil Pressure Equipment
- Robotics – Factory Automated Equipment
- HVAC – Compressors

Specifications

Input	
Pressure Range	Vacuum to 400 bar (6000 psi)
Proof Pressure	2x Full Scale (FS) – 2200/2600 Series 4x Full Scale (FS) – 1200/1600 Series (1.5x FS for 400 bar, ≥ 5000 psi)
Burst Pressure	>35x FS ≤ 6 bar (100 psi); >20x FS ≤60 bar (1000 psi); >5x FS ≤ 400 bar (6000 psi)
Fatigue Life	100 million FS cycles
Performance	
Long Term Drift	0.2% FS/year (non-cumulative)
Accuracy	0.25% FS typical (optional 0.15% FS) (.50% FS for 1200/1600 series)
Thermal Error	1.5% FS typical (optional 1% FS) (2% FS for 1200/1600 series)
Compensated Temp.	-20 to 80°C (-5 to 180°F)
Operating Temp.	-40 to 125°C (-22 to 260°F) for electrical codes A, B, C, 1 -20 to 80°C (-5 to 180°F) for electrical codes 2, D, G, 3 -20 to 50°C (-5 to 125°F) for electrical codes F, M, P Amplified units >100C maximum 24 Vdc supply
Zero Tolerance	1% of span
Span Tolerance	1% of span
Mechanical Configuration	
Pressure Port	See ordering chart
Wetted Parts	17-4 PH Stainless Steel
Electrical Connection	See ordering chart
Enclosure	316 Ss, 17-4 PH ss

Mechanical Configuration – cont.	
	IP65 for electrical codes B,G,C,1, D, 3 IP67 for electrical code "F" IP68 for electrical codes M, P (200 M Max.) IP30 for electrical code "3" with flying leads
Vibration	35g peak sinusoidal, 5 to 2000 Hz
Acceleration	100g steady acceleration in any direction 0.032% FS/g for 1 bar (15 psi) range decreasing logarithmically to 0.0007% FS/g for 400 bar (6000 psi) range
Shock	Withstands free fall to IEC 68-2-32 procedure 1
Approvals	CE, cULus, Intrinsically safe versions available. Meets requirements of EN50081-2 Emissions and EN50082-2 Susceptibility.
Weight	Approx. 100 grams (additional; cable 75 g/m)
Individual Specifications	
Voltage Output units	
Output	See ordering chart
Supply Voltage (Vs)	1.5 Vdc above span to 35 Vdc @ 6 mA
Supply Voltage Sensitivity	0.01% FS/Volt
Min. Load Resistance	(FS output / 2) Kohms
Current Output units	
Output	4-20 mA (2 wire)
Supply Voltage (Vs)	24 Vdc, (7-35 Vdc)
Supply Voltage Sensitivity	0.01% FS/Volt
Max. Loop Resistance	(Vs-7) x 50 ohms
Millivolt Output units (2200/2600 only)	
Output	100 mV +/-1 mV
Supply Voltage (Vs)	10 Vdc (15 Vdc max.) Regulated
Bridge resistance	2600-6000 ohms

Psibar Part Number Structure

HOW TO ORDER

Use the Bold characters from the chart below to construct a product code

SELECT: **2200 B G G10 02 A 3 U A**

1. **2200, 2600, 1200,** or **1600** series

2. Output: (1200 and 1600 are not available with "A" output)
   A 100 mV **C** 1-6 V **F** .1-5.1 V **H** 1-5 V **R** 0 -5 V
   B 4-20 mA **D** 1-11 V **G** .2-10.2 V **J** .5-5.5 V **S** 0-10 V

3. Pressure Datum: **G** gauge **A** absolute (1200/1600 not available in "A")

4. Insert pressure range code from table below
   Pressure Range – psi

F15 – 0-15	**G20** – 0-200	**H15** – 0-1,500	**H60** – 0-6,000	**1Go** – Vac-85
F30 – 0-30	**G30** – 0-300	**H20** – 0-2,000	**Vac** = –15 psi	**1G5** – Vac-135
F60 – 0-60	**G50** – 0-500	**H30** – 0-3,000	**1F5** – Vac-0	**2Go** – Vac-185
G10 – 0-100	**G60** – 0-600	**H40** – 0-4,000	**3Fo** – Vac-15	**3Go** – Vac-285
G15 – 0-150	**H10** – 0-1,000	**H50** – 0-5,000	**6Fo** – Vac-45	

   Pressure Range – bar (optional)

A10 – 0-1	**B10** – 0-10	**C10** – 0-100	**1Ao** – Vac-0	**1Bo** – Vac-9
A16 – 0-1.6	**B16** – 0-16	**C16** – 0-160	**1A6** – Vac-0.6	**1B6** – Vac-15
A25 – 0-2.5	**B25** – 0-25	**C25** – 0-250	**2A5** – Vac-1.5	**2B5** – Vac-24
A40 – 0-4	**B40** – 0-40	**C40** – 0-400	**4Ao** – Vac-3	**4Bo** – Vac-39
A60 – 0-6	**B60** – 0-60	**Vac** = –1 bar	**6Ao** – Vac-5	

5. Pressure Port (for additional ports see chart or contact sales)

02 1/4 NPT Male	**OJ** 1/4 NPT male w/snubber	European Threads
08 1/8 NPT Male	Submersible	**01** G1/4 Male
04 7/16 Male SAE #4	**19** Plastic Nose Cone (2600 only)	**09** G1/8 Female
IP 9/16 Male SAE #6	**29** SS Nose Cone (2600 only)	

6. Electrical Connection
   2200/1200 series
   A Mini DIN 9.4 mm w/mate
   B Mini DIN 9.4 mm w/o mate
   2 Cable, NEMA 4, Plastic Cable Gland
   F Cable, IP67, Metal Cable gland
   2600/1600 series
   C 10-6 Bendix Twist Lock Plug
   G Large DIN 43650A with mate
   M Submersible Cable, ≤150 Meters
   P Submersible Cable, >150 Meters
   1 8-4 Bendix Twist Lock Plug
   3 1/2" NPT Conduit w/cable

7. Approvals/Protection
   3 CE **2** CE for Millivolt output units

8. Cable Length in meters

U none	**D** 1	**J** 20	**P** 75	**5** 200
	E 3	**K** 25	**Q** 100	**6** 225
	F 5	**L** 30	**R** 125	
	G 10	**M** 40	**S** 150	
	H 15	**N** 50	**4** 170	

9. Performance Code
   A .25% Accuracy (2200/2600)
   (.5% 1200/1600)
   B .15% (optional on 2200/2600 only)

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