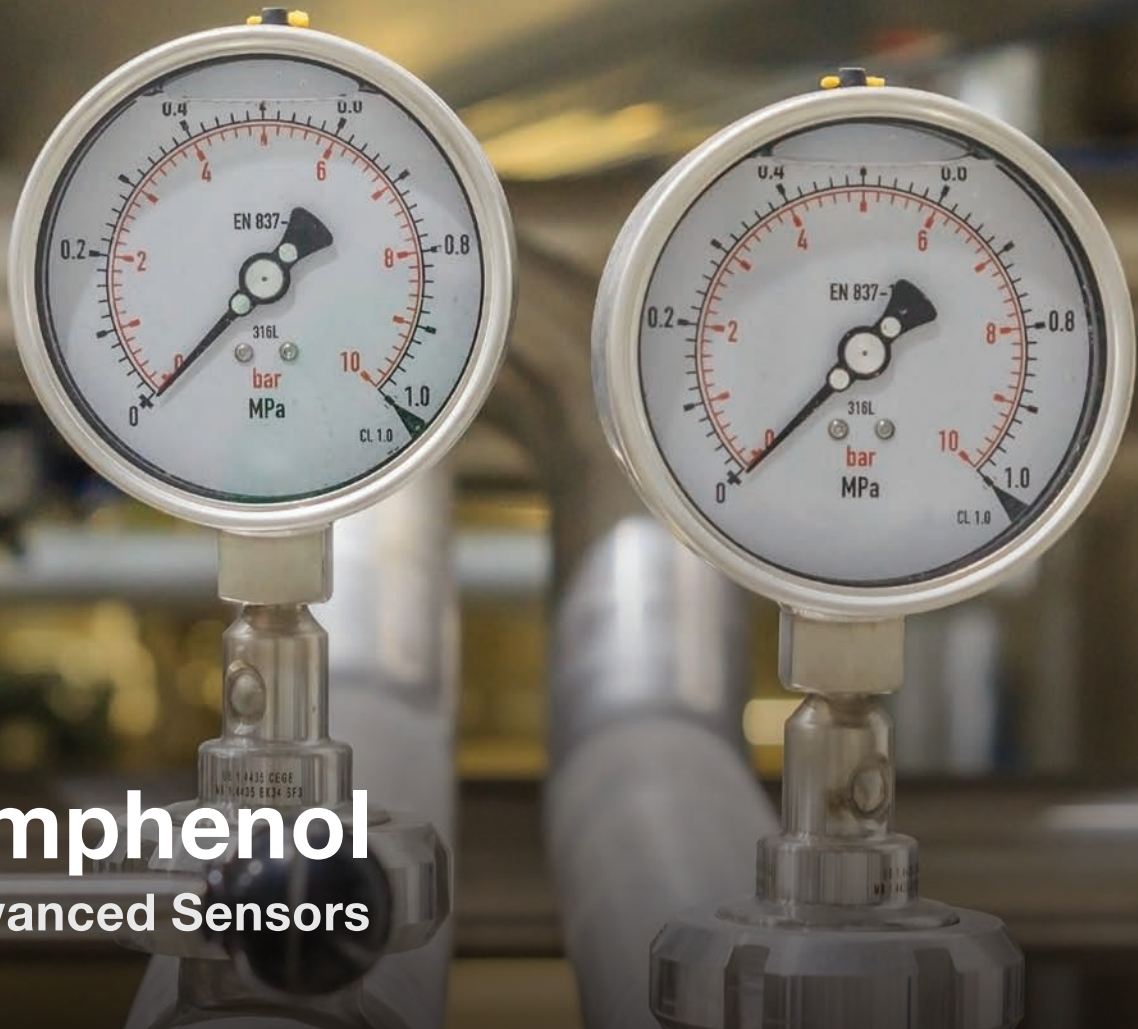


MEMS Pressure Sensors Industrial Solutions



Amphenol
Advanced Sensors

Industrial MEMS

Pressure Sensors Market

The industrial MEMS pressure sensors market is valued at \$256 MM and growing at 3%, according to Yole Development report, May 2018. The growth is driven by growing Industry 4.0 trend: IoT, surging wireless sensors market, and industrial automation. APAC has the largest share. China and Japan are the key countries.

Players

1. First Sensor

Sensor Systems: Industrial, medical, and mobility markets

2. Honeywell

Software & Services: Energy, safety, security, productivity and global urbanization

3. NXP

Semiconductors: Energy efficiency, mobile populations, and national and personal security

4. TE

Connectors: Advanced connectivity and sensors solutions

5. Amphenol

Advanced Sensing Technologies: Embedded measurement solutions customized for regulatory and industry driven applications

NovaSensor Differentiators

NovaSensor has foundry capabilities beyond those of virtually any other MEMS partner. Dedicated production facilities located in the US and Asia offer redundant capacity to enhance productivity and meet global delivery requirements. We produce more than 1 MM die weekly and hold ISO 9001 and ISO/TS 16949 Quality Certifications.

Our mainstream MEMS solutions include pressure sensors in surface mount packages, fully-calibrated and amplified or digital output versions, and media-isolated technology for harsh environments. We can also deliver highly customized value-added solutions from custom designed pressure die to pressure transducers.

Key Target Applications

- Pressure transducers and transmitters
- Pressure gauges and manometers
- Altimeters and barometers
- Pressure switches and controllers
- Pneumatic controls
- Level/depth sensing
- Pressure sensing in consumer appliances

Market Characteristics

Fragmented, diverse “exotic” applications, unclear or evolving customer needs.

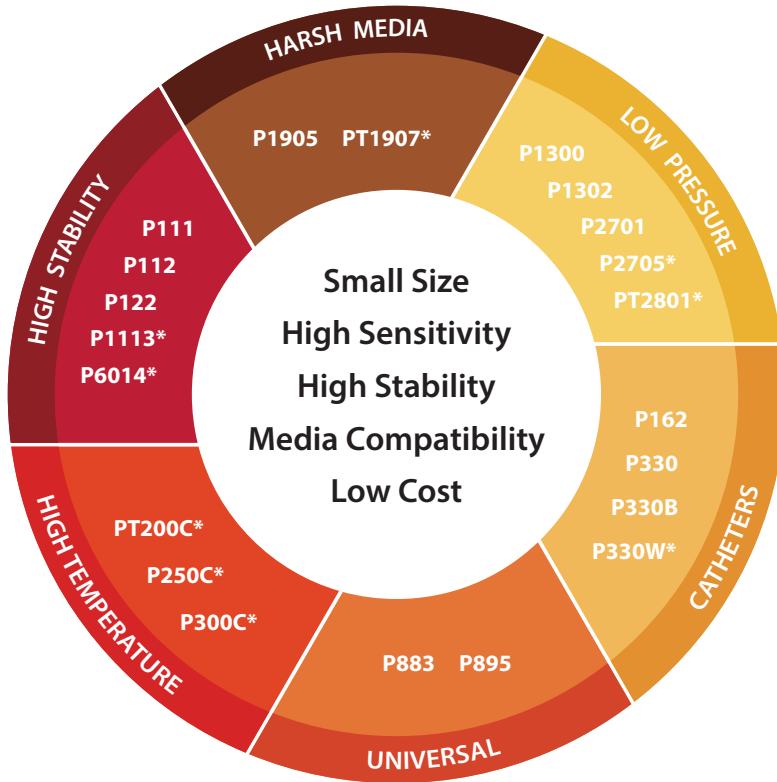
Process Control and HVAC are the main applications. Module players (pressure transducer manufacturers) have a strong position.

Application Examples

Oil Pressure Switches for industrial hydraulics & shipbuilding	Submersible Pressure Transmitters for hydrostatic level tanks	Sanitary Pressure Transmitters for food and beverage sterilizers
<ul style="list-style-type: none">• Valcom Co. Ltd• Trafag Sensors & Controls• Orion Instruments• Hydropa• Gems Sensors & Controls• Ashcroft• Barksdale Control Products	<ul style="list-style-type: none">• Endress + Hauser• Barksdale Control Products• Applied Measurements• Aplisens• Baumer• CELMI• Dwyer	<ul style="list-style-type: none">• Baumer• SICK• ESI• WIKA Instrument• iFm Electronic• Emerson

MEMS Pressure Die Solutions

For customers who want complete control over packaging and signal conditioning, NovaSensor offers MEMS Pressure Sensor Die. Die products are typically delivered as sawn wafers on tape, but other options are available. Sensor Die are 100% electrically- tested and visually inspected before delivery.



Manufactured Die Products

- P883 – universal pressure die (5...15,000 psi)
- P111, P112 – medium pressure die
- P122 – high pressure die
- P1905 – backside absolute pressure die for aggressive environment (harsh media)
- P1300, P1302 – low pressure die products
- P2701 – high-performance low pressure die
- P2705 – small-size low pressure die
- P162, P330 – catheter pressure die
- P330B – catheter pressure die with solder bumps

*Future Products

- **PT1907** – integrated pressure and temperature harsh media sensor die (DV samples)
- **P330W** – catheter sub-assembly, including P330B sensor die with long wires (PV samples)
- **PT200C** – pressure and temperature sensor die with operating temperature up to 200°C (DV samples)
- **P250C, P300C** – pressure sensor die with operating temperature range up to 250°C, 300°C
- **P1113** – high stability medium pressure die (PV samples)
- **P6014** – high stability low pressure and temperature die (PV samples)

NovaSensor MEMS Pressure Die are best-in-class, providing extraordinary performance and long-term stability. Available as gauge (differential) or absolute pressure, with standard operating temperatures of -40°C to +125°C (+140°C for some products), and pressure ranges from 500 Pa (2" H₂O) to 100 MPa (15,000 PSI), our die products are widely recognized by industry experts.

Industrial Applications:

New, solid, promising (> \$50K revenue opportunity) leads are greatly appreciated! Ensuring the full support to the Sales Team in terms of:

- Quick quote turnaround process
- Engagement of Engineering for follow-up on tech questions
- Collaboration on a competitive pricing strategy to secure the business
- Providing product literature

MEMS Pressure Die Solutions

NovaSensor is a leader in the design and fabrication of MEMS Pressure Sensors and the inventor of **SenStable®** Processing Technology providing an excellent stability of its sensors. NovaSensor MEMS Pressure Sensors are known for their accuracy, reliability, and miniature size. Our sensors offer best-in-class performance for Industrial, Healthcare, and Transportation Applications.

NPI Series - Media Isolated Sensors

Designed to operate in hostile environments while providing outstanding sensitivity, high linearity, and low hysteresis.

Features

- Best in class stability
- Stainless steel media isolation
- Suitable for use with liquids or gases
- Pressure ranges from 5 to 10,000 psi (custom specs)
- Absolute, Gauge, or Differential



Applications

- Industrial automation
- Process control
- Level/Depth sensing
- Corrosive fluids and gas measurements

NPA Series - Pressure Sensors

Compact packaging and a cost-effective solution for applications that require calibrated performance and amplified output.

Features

- Best in class stability
- Surface mount SOIC-14 package
- Digital, Analog, or Amplified Analog output
- Multiple port configurations
- Pressure ranges from 2" H2O to 30 psi
- Burst pressure up to 10X for low pressure models
- Absolute, Gauge, or Differential

Applications

- Medical equipment
- Process control
- HVAC
- Consumer appliances



NPC Series - Low/Medium Pressure Sensors

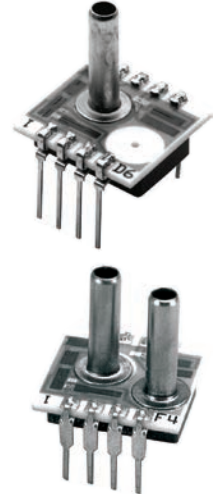
Cost-effective solution for applications that require compensated performance.

Features

- Best in class stability
- PCB mountable DIP packaging
- Multiple tube & pin configurations
- Pressure ranges from 10" H2O to 100 psi
- Absolute, Gauge, or Differential

Applications

- Industrial automation
- Air flow monitors
- Process control
- Medical equipment



NPH Series - Medium Pressure Sensors

Reliability at a low cost and small size.

Features

- Best in class stability
- Standard PCB mountable TO-8 package
- Media compatible with non-corrosive gases and dry air
- Pressure ranges from 2" H2O to 100 psi
- Absolute, Gauge, or Differential

Applications

- Industrial automation
- Process control

