

Technology Advantages

Unique Features for Medical Applications

The Architecture

Superior Sensors' proprietary NimbleSense™ architecture is the industry's first System-in-a-Sensor integrated platform. Incorporating a highly differentiated advanced pressure sensing system with application-specific building blocks provides a combination of the highest accuracy and reliability with exclusive medical specific features.

The NimbleSense architecture was developed with the overarching goal of knocking out every bit of noise before reaching the host system. Noise is anything that is not the ideal sensor information, including long-term drift, thermal errors, thermal or pressure hysteresis, etc. The result is a pressure sensor architecture with a very clear signal and practically no noise. In addition to maximizing performance, the NimbleSense architecture is also flexible enough to insert 'building blocks' that add application-specific functionality.

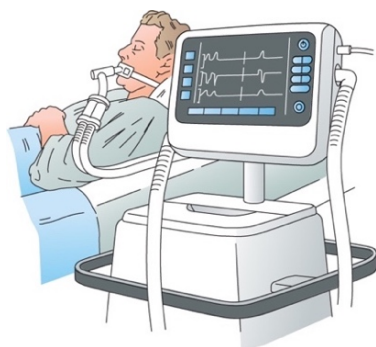
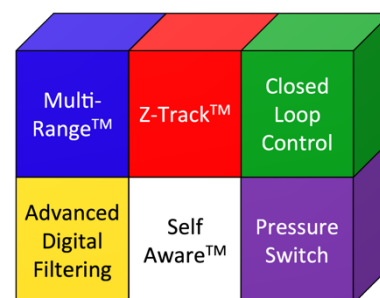
Industry's Lowest Noise Floor

Incorporating advanced digital filtering optimized for each application, our sensors have a noise floor up to 100x lower than leading competing solutions. An optional advanced noise suppression algorithm can further reduce system noise at zero level by up to 10x.

Highest Levels of Accuracy

Sensor accuracy is critical in medical care, as even a small error can have a life changing effect. Superior's pressure sensors have typical accuracy within 0.05% of the selected range, and typical TEB (total error band) and first-year long-term stability within 0.10% of the FSS.

Application Specific Features



Ventilators

As it is often a matter of life and death, medical ventilators are carefully designed to ensure single points of failure do not harm patients. With a family of sensors designed for multiple system applications from measuring flow to inlet, inspiratory, expiratory, and barometric pressures, Superior Sensor offers many capabilities that significantly improve patient-ventilator synchrony and overall system performance:

Self Aware™ Technology

Implemented only in close collaboration with select ventilator manufacturers, Self Aware ensures maximum uptime by tracking error-level changes. The technology eliminates a single point of failure service interruption and reduces false positives concerning error notifications. With Self Aware, ventilators can reduce pressure sensor-related alarm rates by up to 1000x.

Proprietary Oversampling

Proprietary oversampling with advanced digital filtering effectively rejects all noise outside the band of interest without impacting sensor response time. This solution allows the system to use sensor outputs directly at full speed, eliminating oversampling of sensor outputs that can slow overall ventilator response times by up to 10x.

Extreme Resolution

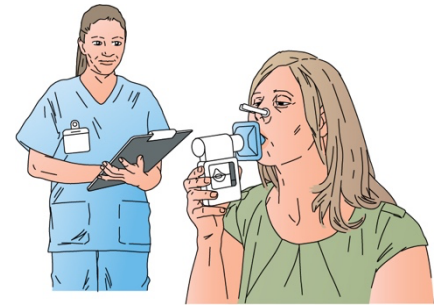
With an industry-leading 24-bit output resolution and a 12 kHz sample rate, Superior Sensor improves patient synchrony with unparalleled levels of accuracy and responsiveness. With the expanded dynamic range of the unique extreme resolution sensors, manufacturers can more easily design one ventilator to support all patients, from neonates to adults.

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Spirometry

Vital in the treatment plan of many different types of lung diseases, spirometers require high-performance differential pressure sensors to diagnose a patient's lung functions accurately. Superior Sensors offers several features that significantly improve the calibration, real-time accuracy, and usability of these mostly portable handheld devices:



Z-Track™ Auto Zero

Superior's Z-Track technology virtually eliminates zero drift by maintaining minimal zero-point deviation. Results remain consistent regardless of elapsed time, eliminating the need to calibrate the spirometer before each use or wait for the device to reset between readings.

Position Insensitivity

Superior's dual-die implementation maintains consistent, highly accurate handheld readings regardless of the spirometry device's physical orientation. Rated with positional sensitivity to within 0.25 pascal, spirometers can provide extremely accurate measurements regardless of how a patient holds the device.

Multi-Range™ Technology

Allowing one sensor to replace several, Multi-Range expands the usability of spirometers by enabling one device to support all patients, from children to adults, regardless of lung capacity. Each pressure range is factory-calibrated and optimized, ensuring consistent accuracy for all patients and respiratory conditions.



CPAP / BiPAP / APAP

Addressing the needs of many sleep disorders, including sleep apnea, positive airway pressure machines (CPAP/BiPAP/APAP) ensure proper breathing during sleep. Superior Sensors offers several building blocks that significantly improve the safety, accuracy, and capabilities of these devices while lowering overall system costs:

Integrated Dual Sensor Solution

Superior provides an airflow controller subsystem that combines two pressure sensors in one device: differential (airflow) and gage (patient pressure). This tight integration simplifies product design, speeds up time to market, and reduces product cost. By combining two sensors, PCB space and overall product dimensions can be reduced, lowering manufacturing costs and making the devices more attractive to consumers.

Closed Loop Control

Integrated closed-loop control improves CPAP/BiPAP/APAP design and performance by ensuring accurate targeted pressure. By directly controlling motors, valves, and actuators, this feature simplifies product design, reduces system overhead, and provides a modest improvement in accuracy. By implementing the loop control directly in the sensor, the subsystem also reduces CPU load.

Snore Detection

The snore detection capability is easily customizable with eight band-pass and four low-pass filter settings, delivering precise snore detection for better therapy performance. By reducing sleep disruptions and enhancing device response, it helps users sleep more soundly and wake up feeling refreshed. Reliable snore detection is key to adjusting therapy in real time and improving long-term sleep health.

For more information, please contact: info@SuperiorSensors.com

*NimbleSense, Multi-Range, Z-Track and Self Aware
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