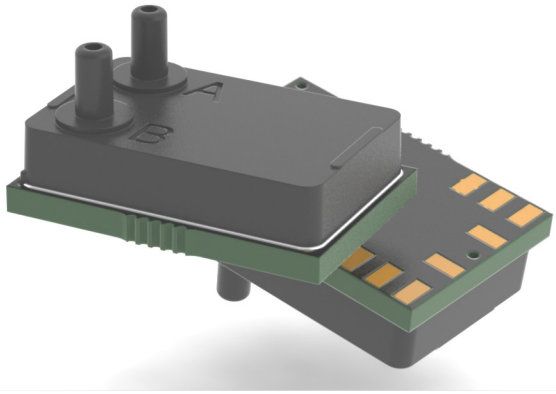
WP-0001
Pressure Sensing Sub-System Capabilities

Capability Highlights

- Multiple Selectable Pressure Ranges in a Single Device
  Lowers system inventory cost by up to 8x, minimizing skews
- Advanced Multi-Order Digital Filtering
  Eliminates noise sources such as fans and blowers
- Direct Closed Loop Motor Control to a Target Pressure
  Enhances system performance and simplifies design
- Zero Error Reduction - *Z-Track ™*
  Significantly reduces zero error in applications such as Spirometry
- Proprietary Zero-Noise Suppression
  Improves zero threshold detection by 10x
- Early warning prior to sensor failure to Improve System Reliability
  Improves system reliability by up to 1000x during critical therapy cycles



The Architecture

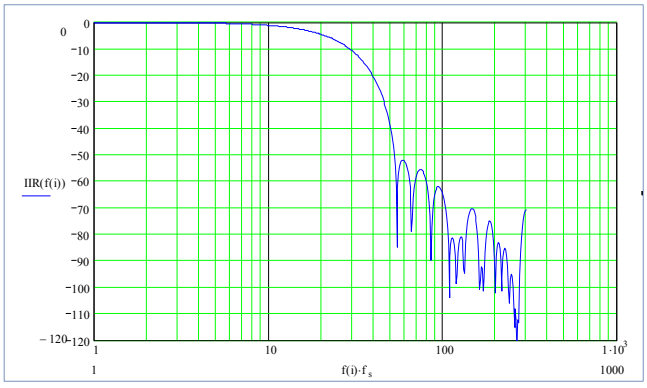
Superior Sensor Technology's NimbleSense™ architecture has enabled a new generation of very high performance, low noise pressure sensing sub-systems. With enhanced internal DSP capabilities, the NimbleSense architecture allows for inclusion of various interchangeable functional blocks. These functional blocks can then be used to create sub-systems which vary from simple traditional sensor modules to advanced multi-sensor closed loop control solutions. Some examples of these unique technical capabilities include – Industry's first solution to:

Multi-Range

Support up to 8 pressure ranges in a single sensor, each performance optimized and calibrated to the selected range. For example, the HV210 supports 7 pressure ranges, from as low as 25 Pa to 2500 Pa in the same sensor module while achieving 0.1% accuracy for each selected range and <0.2% TEB FSS.

Advanced Multi-Order Filter

Utilize advanced filtering capabilities on the front-end of the sub-system to characterize and eliminate critical noise created by fans, blowers, or other dry air / gas sources prior to reaching the pressure sensing sub-system – Greatly improving system performance. The example below is of a 4th order FIR filter used to block 40-100Hz pump noise which has noise of equal magnitude as the signal of interest.



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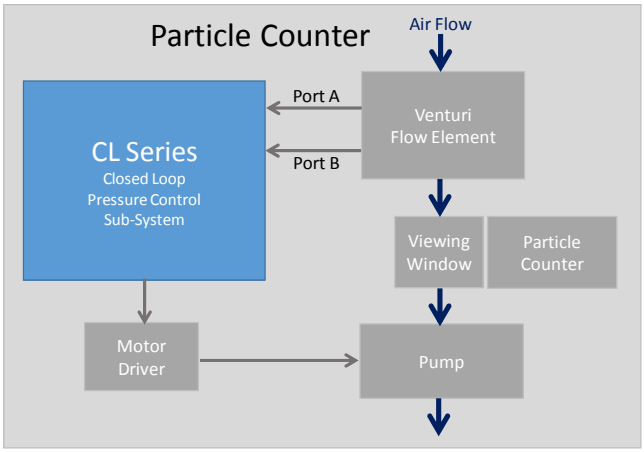
Closed Loop Control

Use a closed loop, low noise modulated output to directly control fan blowers / motors via dynamically controlling air flow to reach / maintain a user programmable pressure level - Greatly simplifying system design, lowering system complexity and improving loop delays.



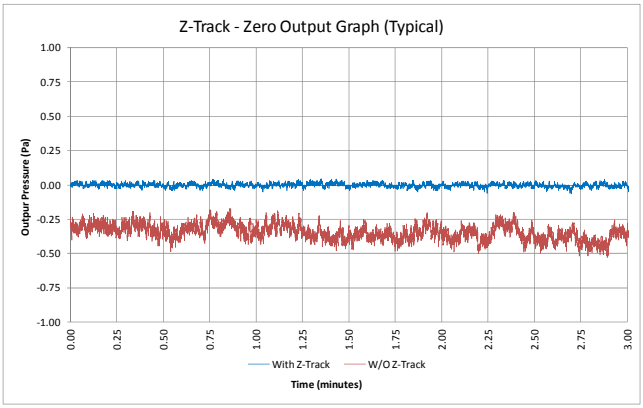
Zero Error Reduction

Z-Track essentially eliminates zero drift for pressure sensing applications where the pressure level goes to zero on regular intervals through a proprietary algorithm which detects and automatically tracks zero. This capability has been launched in our SP Series for Spirometry applications.

Advanced Noise Reduction

Add an advanced noise suppression algorithm to further reduce system noise at zero level by up to 10x. Our standard sensor products already have a noise floor up to 100x lower relative to leading competitive solutions.

The illustration below represents the application of Z-Track and Advanced Zero Noise Reduction (signal in blue) in comparison to that without (red).



Enhanced System Reliability

Enable life critical ventilator / anesthesia systems to read the magnitude of error at any given time, replacing sensors if required, to improve system reliability by >1000x during patient therapy cycles.

Our extremely powerful and flexible architecture is often able to solve customer's toughest system problems. With early discussions at the architectural planning stage, we then propose unique, highly targeted solutions for a variety of industrial and medical systems, where a pressure sensing element is used within the system.

3080 Oakmead Village Road
Santa Clara, CA 95051

www.SuperiorSensors.com
info@SuperiorSensors.com
+1.408.703.2950