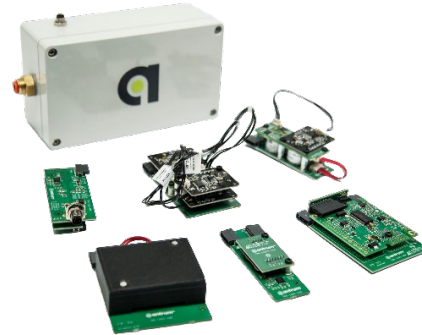


## DESCRIPTION

The Sensor Pack monitors multiple air quality parameters across 16 zones, independently reporting on each. Each sensor pack contains sensors for air velocity, temperature, humidity, and pressure. With a reference to clean air, it cancels sensor drift, ensuring more accurate and consistent data compared to standard wall-mounted solutions. All required sensors for a specific application are pre-installed in one sensor pack, making calibration effortless through a tool-free replacement process.



## WHY

It is well understood that cleanrooms are very energy-intensive and are substantially more energy-intensive than a typical office building. In 2019, the ISO 14644-16 Cleanrooms and associated controlled environments standard was updated to include adaptive control. According to the standard, "The active control of room airflow and/or fresh air is based on feedback from sensors or analytical instruments within the cleanroom space in real time. This approach represents one of the most energy-efficient control schemes possible and involves the airflow within a room being adjusted proportionally to the real-time sensed or measured concentration of particles within the cleanroom."

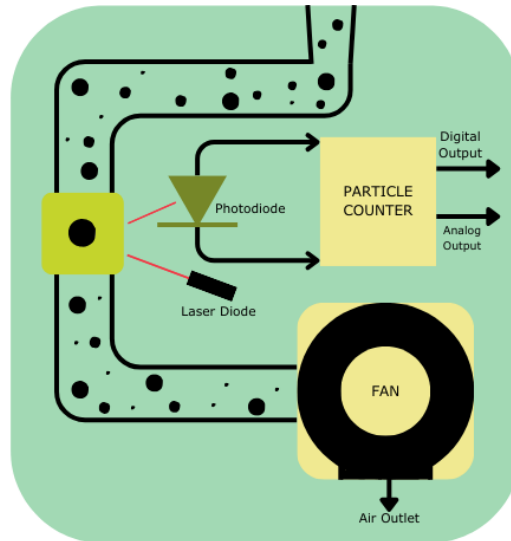
Adaptive control enhances energy efficiency by adjusting HVAC operations based on real-time data. This real-time monitoring and immediate response to deviations prevent issues and maintain compliance with stringent regulatory standards. Adaptive control systems also offer scalability and flexibility, accommodating varying processes and production scales while ensuring consistent environmental conditions for sensitive equipment and processes in industries like pharmaceuticals, biotechnology, and semiconductor manufacturing.

Adaptive control not only maintains optimal environmental conditions and enhances energy efficiency but also offers continuous monitoring instead of intermittent checks. This comprehensive data trail helps ensure regulatory compliance and reduces the risk of contamination ensuring product quality.

While the typical control scheme primarily focuses on particle count, other approaches include managing temperature, humidity, gaseous contaminants, and additional parameters.

## HOW IT WORKS

The device is an optoelectronic particulate sensor that utilizes photon counting readout technology, exhibiting high sensitivity. Using a built-in processor, the sensor is capable of fast data acquisition and readout, as well as categorizing particulates based on the size. Using a sizing and count algorithm to identify different particulates, the sensor is ideal for true real-time precise airborne particulate matter monitoring and particle size distribution analysis. When the particle sensor is ordered with additional sensors for humidity, pressure, and gases, the Sensor Pack helps deliver a superior air quality monitoring solution.



**Figure 1: Particle Sensor**

## SPECIFICATIONS

Parameter	Value	Units
Technology	Laser	
Particle Count (PC) Range	0–40,000,000	#/ m <sup>3</sup>
Size Resolution	15	%
False Count	0	#
Sampling Rate Error	4	%
Response <sup>1</sup>	20	s
Recovery <sup>1</sup>	20	s
Calibration	6	Month(s)
<b>Compliance</b>	<b>ISO 21501-4</b>	
<b>Application</b>	<b>ISO 7, 8 Cleanrooms</b>	

	Bins	Value	Units
<b>PC</b>	0.3	0.3	µm
	0.5	0.5	µm
	1.0	1.0	µm
	2.5	2.5	µm

1. T90