

# Dustroid<sup>®</sup>

Real Time Dust Monitor



# About Dustroid®




Dustroid® is an MCERTs-certified Real-time Particulate Monitoring System that measures the concentration of dust particles in ambient air. It is capable of monitoring various particulate sizes ranging from 1 micron to 100 microns, such as Ultrafine Suspended Particulate Matter (UFPM), Suspended Particulate Matter (SPM), Respiratory Suspended Particulate Matter (RSPM), and Total Suspended Particulates (TSP). The system works on the Active Sampling method to count particulate matter using a highly accurate laser beam.


Dustroid® can be used for dust monitoring in areas with dust-laden activities like Construction, Mining, Quarrying, Ports, Metallurgical Processes, and many more. The data gathered from Dustroid® can assist in dust suppression automation, for instance, to activate suppressants at the location once the threshold is breached.




## Product Features


 **Heated Inlet**  
Dehumidifies the sample to nullify the effect of humidity for better accuracy.  
*(only available in Pro & Max variant)*


 **Weather Resistant (IP66)**  
IP66 Grade (certified) enclosure for endurance against harsh weather conditions.


 **Retrofit Design**  
Plug and play design for ease of implementation.


 **Over-The-Air Update**  
Automatically upgradeable from a central server without any onsite visit.


 **Compact**  
Lightweight and compact system that can be easily installed on a pole or wall.

 **Real-Time Data**  
Continuous monitoring and real-time data transfer at configurable intervals.

 **Internal Storage**  
Internal data storage capacity of upto 8 GB or 90 days.

 **Network Agnostic**  
Supports a wide range of connectivity options like GSM / GPRS / WiFi / LoRa / NBIoT / Ethernet / Modbus / Relay / Satellite.

 **Identity And Configuration (Geo-tagging)**  
Geo-tagging allows you to get the exact location of the device, consisting of latitude and longitude coordinates.

 **Supports High Dust concentration**  
Measures up to 30000 µg/m<sup>3</sup> dust concentration to provide accurate dust data.

# Key Benefits



## Robust And Rugged

Robustly built enclosure to sustain extreme climatic conditions.



## Multi-parameter Capability

Provision to add gases, noise, meteorological, and vibration sensors to existing Dustroid® Units.



## Noise & Vibration Monitoring

Critical applications can utilise Dustroid with Noise Sensor to understand decibel trends.



## Easy to install

Effortless installation with versatile mounting arrangements.



## Accurate Data

Gives accurate readings in real-time to detect dust concentrations in ambient air.



## Relay-Based Automation

Dust Suppression systems such as Mist Cannons can be activated based on data thresholds configured.

# Dustroid® Usecases



## Mining

Dustroid® ensures that effective alerts are deliverable to the authorities and the triggers automate the dust suppression systems on time.



## Construction

Dustroid® monitors dust at construction sites and alerts authorities when dust concentrations breach the threshold limit.



## Industrial Monitoring

Dustroid® provides real-time data on dust emissions from industrial processes. Tracking PM levels helps industries maintain clean air and comply with regulations.



## Open Pit Mining

Dustroid® helps open-pit mines to comprehensively manage air quality, tackling dust at critical sites like drilling and blasting.

# Dustroid® Variants

Variants	Applications	Parameters
Dustroid® Smart	Construction and Mining	PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , PM <sub>100</sub> (TSP), Temperature, Humidity, Pressure
Dustroid® Pro <i>(with heated inlet)</i>	Quarrying, Sea Ports (for High Humidity Regions)	PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , PM <sub>100</sub> (TSP), Temperature, Humidity, Pressure
Dustroid® Max	For Critical Applications	Industrial Dust Sensor, Light, UV, Noise, Temperature, Humidity, Pressure and Vibration

## Parameters

Sensor	ID	Range	Resolution	Min. Detection	Working Principle	Expected Sensor Life
Suspended Particulate Matters with size less than 2.5µ (PM <sub>2.5</sub> )	OZPM_1	Upto 5000 µg/m <sup>3</sup>	0.1 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Optical Particle Counter	18 Months
Suspended Particulate Matters with size less than 10µ (PM <sub>10</sub> )						
Ultra Fine Particulate Matters with size less than 1µ (PM <sub>1</sub> )						
Total Suspended Particulates (TSP) (PM <sub>100</sub> )		Upto 30 mg/m <sup>3</sup>				
Ambient Noise	OZLN_1	Upto 140 dB	1 dB	0.5 dB	Capacitive	2 years
Temperature	OZTEMP_1	-40 to 125°C	0.01°C	-40 °C	Solid State Semiconductor Sensing	
Humidity	OZHUM_1	100% Rh	0.10%	0.10%		
Barometric Pressure	OZPRES_1	300-1100 hPa	0.18 Pa	300 hPa		
Pyranometer Solar Radiation 300 - 1100 nm	OZUV_1	Up to 1,00,000 Lux	1 Lux	1 Lux	Photoconductivity	3 years
		Upto 5000 Lux	0.1 Lux	0.1 Lux		
		0.1-100,000 uW/cm <sup>2</sup>	0.1 uW/cm <sup>2</sup>	0.1 uW/cm <sup>2</sup>		
		0-12	-	-		

**Note:** Expected Sensor Life can vary, subject to actual concentration on-site. In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only, Oizom® accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within.

### External Modules

 <p><b>Anemometer</b> OZWSD_1* Wind Speed: 0-40 m/s Wind Direction: 0-359° Working Principle: Ultrasonic</p>	 <p><b>Rain Gauge</b> OZRAIN_1* Resolution: 0.25 mm Working Principle: Tipping Bucket</p>	 <p><b>Noise Sensor</b> OZLN_1* Working Principle: Capacitive Range: Upto 140 dB</p>	 <p><b>Vibration Sensors</b> PPV: +/- 2G Range frequency: 0.5 - 250 Hz Range velocity: ±50 mm/s (±2 in/s) Working Principle: MEMS</p>
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\*Indicates standard delivery timeline.

**NOTE: Vibration & Class I Noise sensors are available as optional features upon specific customer request.**

# Specifications

## Mechanical

Size	360mm (H) x 328mm (W) x 200mm (D)
Weight	6.5 Kg (instrument weight)
Material	Aluminum Magnesium Alloy, Mild-steel (With Powder Coating), FRP
Certifications	CE, NEMA 4X, IP66, RoHS

## Electrical

Avg. Power Consumption	Up to 7 Watt (Actual consumption will vary upon the number of parameters)
Power Input Options	AC : External 110-240V AC, 50-60Hz DC : Uninterrupted 24V DC, 2 Ampere 60 Watt 24V Solar Panel
SMPS Specs	24V, 2Amps output UL-62368 & CAN/CSA C22.2 Certified
Battery Backup Time	Up to 12 Hours (Not available in Pro variant)
Battery Specs	Lithium iron phosphate (LiFePO4) battery cell with rated voltage 12.8V Capacity 6Ah

## Technical

Processor	Quad Core ARM Cortex
Memory	2GB RAM / 8GB eMMC ROM
Device Interface	On-device Software / API / Cloud Platform
Internal Data Storage	Upto 8 GB or 90 days

## Environmental

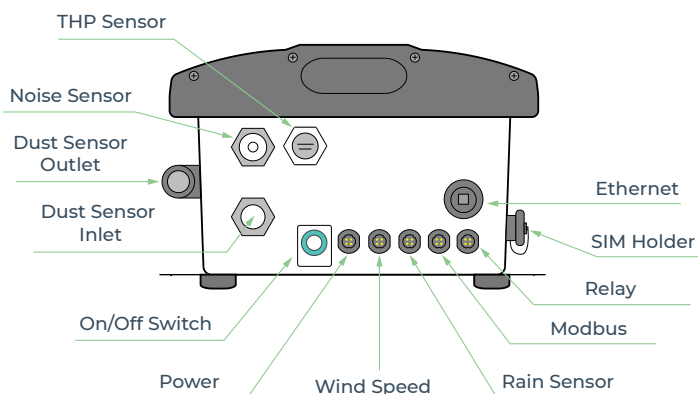
Operating Temperature	-20 °C to 60 °C
Operating Humidity	0-93% RH
Recommended Humidity	15-90% RH
Storage Conditions	10 - 40°C











## Sensing

Dust Measurement Principle	Active Sampling with Sampling rate of 1 L / min
Warm up time	< 2 minutes for data stabilisation

## Communication

Data Interval	2-30 minutes (configurable)
Data-push Protocol	HTTP post request to host server
Data-pull	HTTP request on device IP
Firmware Updates	Over-The-Air Firmware Update
Standby Connectivity	GSM (2G/3G/4G) for remote diagnosis, FOTA updates, and cloud calibration
Certification	PTCRB, CE, FCC, RoHS, ICASA

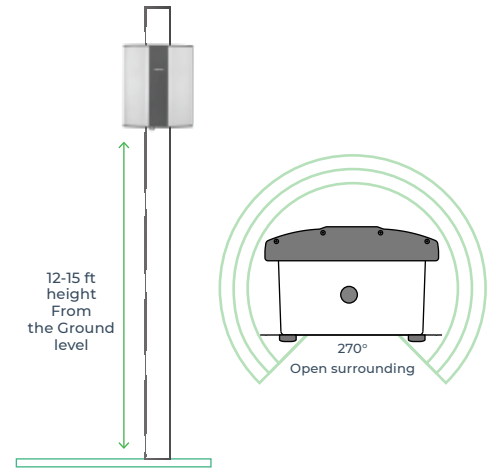


Connectivity Options		Specification
Wireless	 GSM	Global 2G / 3G / 4G
	 LoRa	868 MHz / 915 MHz
	 LTE	CAT-M1
	 NB-IoT	CAT-NB1
	 sigfox	868 to 869 MHz, 902 to 928 MHz
	 Wi-Fi	AP Mode and Station Mode
Wired	 Satellite	
	 ETHERNET	Static / DHCP Configuration
	 Modbus	RS485 RTU / TCP
	 RELAY	2 Channel Relay

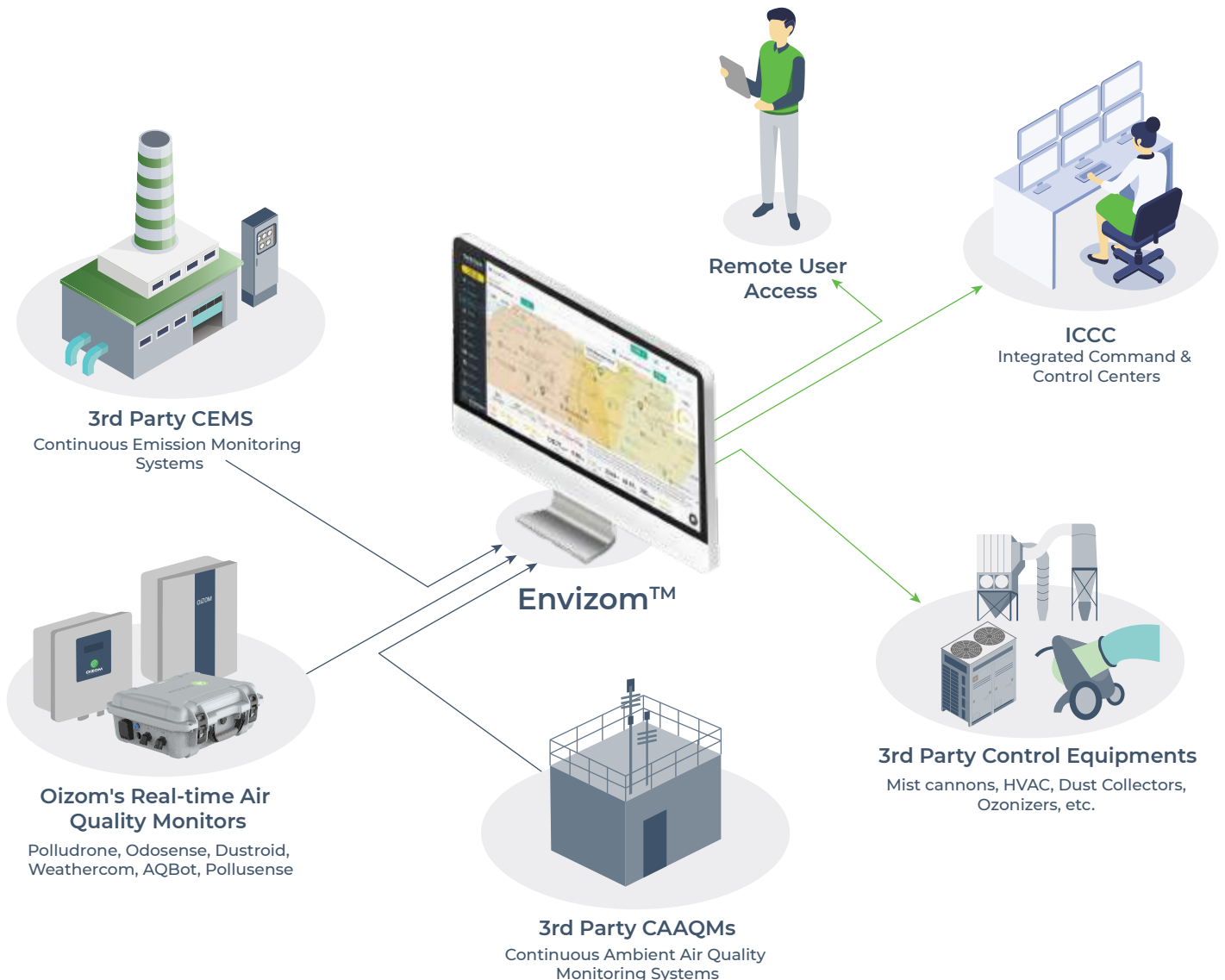
# Functional Specifications

Proper location selection is critical for optimised data collection. It varies as per the purpose of the project. According to U.S. EPA QA handbook (Vol II, Section 6.0 Rev.1), the selection of locations should be based on monitoring purposes.

<b>Preferred Mounting</b>	Pole / Wall (preferably 270° open surrounding)
<b>Installation Height</b>	12-15 feet (4-5 meters)
<b>Direction</b>	As per maximum direct sunlight exposure
<b>Power Availability</b>	Constant AC / DC supply within a 2-meter range from the unit or solar panel
<b>Network Availability</b>	Uninterrupted network connection



# Solution Architecture



# Envizom™

## Data Visualisation and Analytics Platform



Envizom™ is an Environmental visualisation and analytics platform for real-time air quality data acquisition. Our Environmental Data Interpretation Engine, powered by Artificial Intelligence & Machine Learning algorithms, provides highly accurate data and actionable insights, empowering users to make well-informed decisions. Envizom™ uses secured HTTPS servers for data storage. Alternatively, this data can also be stored on-premise local servers.

Envizom's modules empower users to make informed decisions and implement effective strategies to mitigate air quality issues on time. Envizom offers an automation feature based on user-defined thresholds to trigger mist cannons for dust control to nullify the dust impacts based on real-time environmental data.

## Envizom™ Capabilities



Real-time Data



Smart alerts



Automated Reports



Easy to Integrate API



Advanced Analytics



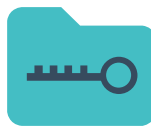
Process Automation

## Privacy First Platform



Data Privacy

The data shared with the client uses an encryption server through HTTPS Secure Socket layers. Envizom™ also uses AES encryption for connection that adds to data safety.



Data Ownership

Envizom™ creates a secured and encrypted password combination for the user login. Oizom® ensures 100% privacy of the data and doesn't share without relevant permissions.



Data Transparency

Data collected from Oizom® equipment runs through the Environment Data Interpretation Engine. It processes various algorithms and eliminates environmental impact interferences on the sensors.



SANS



IEC 62443-4-1



Security Tested



100w Cybersecurity Practices



TCM SECURITY

# Case Studies



## Ensuring Workers' safety by dust monitoring at the Red Sea Airport

Oizom® installed Dustroid® to monitor the dust levels and warn the authorities in case of sandstorms in Saudi Arabia's Red Sea Development luxury project



Saudi Arabia



Dustroid Smart



Airports

## Analysing challenges and monitoring a wide range of pollutants in Umnu Gobi province

Oizom® installed Dustroid® in Umnu Gobi province to monitor harmful dust and pollutants to protect the environment and miners from harsh conditions.



Mongolia



Dustroid Smart



Mining



## Monitoring dust for one of the largest coal mines in the world

Oizom® is monitoring the Dust and other air pollutant emissions from one of the largest Coal mines in the world, in Singrauli, India



India



Dustroid Smart



Mining & Quarrying



# Case Studies



## Monitoring dust to ensure a healthy environment at Birla Estate's projects in Mumbai

Aditya Birla Group's real estate company installed Dustroid® at their construction sites to regularly monitor the dust levels at its Kalyan Birla Vanya and Walkeshwar Malabar Hill projects.



India



Dustroid  
Smart



Construction

## Construction company in Florida maintaining their environmental responsibility with Dustroid®

A renowned construction company in South Florida installed Oizom's Dustroid® to ensure effective dust management at their construction sites and maintain its environmental commitments.



South Florida



Dustroid  
Smart



Construction



## World's largest gold undermine chose Oizom's Dustroid® for dust monitoring

The Guinness World Record holder for the deepest and richest mine chose Oizom's Dustroid® as the optimal solution for maintaining health and safety while protecting the environment.



South Africa



Dustroid  
Smart

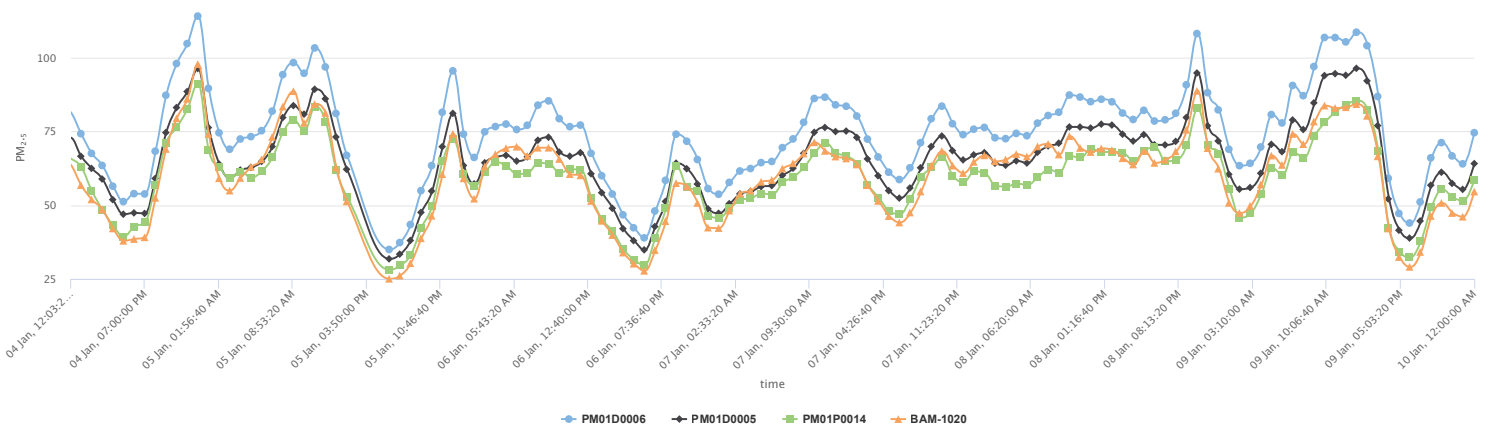


Mining

# Data and Calibration

## Collocation Calibration

The monitors are operated adjacent to a custom-built reference station, beta attenuation monitor (BAM), housing U.S. EPA-designated Federal Equivalent Method (FEM) for 72 hrs for collocation calibration to ensure accurate data quality. Dustroid demonstrates data accuracy even in the lowest dust concentrations, with an  $R^2 > 0.85$  when collocated with Horiba's FRM.



# About Oizom®



Leaders in sensor based  
air quality monitoring



Plug and play monitors  
for hassle free setup



Low powered solutions  
for multiple applications

Oizom® is an environmental monitoring company that offers accurate air quality monitoring solutions for better decision-making. Using our patented monitoring technology, Oizom's system monitors various environmental parameters related to Air Quality, Noise, Odour, Weather, Radiation, etc. Our data analytics platform derives various actionable insights for authorities, communities, and industries. With smart environmental solutions, Oizom® aims to empower future cities with reliable and accurate environmental monitoring.

Over the past decade, Oizom® has focused on environmental monitoring technology and solutions, and till now, we've deployed 3000+ devices. We are monitoring the environmental health of more than 200 million people worldwide. The solutions we provide are in 65+ major cities worldwide. With a network of partners, Oizom® has expanded its reach and made a strong presence in over 70 countries worldwide.

## Other Oizom® Products



**Odosense®**  
Odour Monitoring System

Odosense® monitors various odourful and toxic gases in the environment and provides insight into odour dispersion.



**AQBot™**  
Single Parameter Air Quality Monitor

AQBot™ is an industrial grade single parameter air quality monitor with automation capabilities.



**Weathercom®**  
Automatic Weather Station

Weathercom® is an automatic weather station designed to measure various meteorological parameters.



**Polludrone®**  
Ambient Air Quality Monitoring

Polludrone® is ideal for real-time ambient air quality monitoring for urban and industrial applications.



**Pollusense™**  
Portable Air Quality Monitor

Pollusense™ is a Portable Air Quality Monitoring System that measures multiple toxic gases and particulate matter.





Trusted by

**70+ Countries**



Solutions Installed in

**65+ Cities**



Total Devices Installed

**3000+**



Total Population Covered

**200 million+**

## Oizom Customers



**Changing the way Industries monitor air quality**



Get in touch



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