CUBIC

Outdoor Particulate Matter Sensing Solution

Cubic Sensor and Instrument Co.,Ltd.

About Cubic

Cubic Sensor and Instrument Co., Ltd. (hereinafter referred to as "Cubic") is a publicly listed company in SSE STAR Market (stock code:688665), specializing in smart gas sensors and superior gas analyzers. Set up in 2003, situated at “Optics Valley” of Wuhan, China, Cubic has established gas sensing technology platforms including optical technologies (NDIR, Ultraviolet, Light Scattering, Laser Raman), ultrasonic technology, MEMS metal oxide semiconductor (MOX) technology, electrochemical technology, ceramic thick-film technology based high temperature solid electrolyte technology and so on. At present, Cubic has obtained more than 160 patents at home and abroad, with abundant products widely used in various fields of HVAC, industrial safety,automotive electronics, medical & healthcare, smart metering, scientific instruments, low-carbon thermal engineering.

Cubic has established four major R&D and industrialization bases, including Cubic Headquarter, Cubic R&D Center, Cubic Jiashan Facotry, and Cubic Hungary Factory, with a total area of nearly 100,000 square meters.Cubic has a provincial-level enterprise technology center and a gas analysis instrumentation engineering technology research center in Hubei Province of China. At the same time, Cubic energetically participates in the national technological innovation system and has successively obtained many national and provincial projects which support Cubic incessant innovations. Those projects contain the National Major Scientific Instrument and Equipment Development Project, the Ministry of Industry and Information Technology Internet of Things Development Special Project, the Ministry of Industry and Information Technology Strong Foundation Engineering Sensor "One-stop" Project, the Ministry of Science and Technology Science and Technology Boost the Economy 2020 Key Special Project, and the Hubei Province Technical Innovation Major Project, etc. Cubic has been regarded as a major gas sensor manufacturer and representative enterprise by industry authorities at home and abroad and won the "Most Influential IoT Sensor Enterprise Award" by the China Internet of Things Industry Alliance.

With decade-long dedications in technical innovations, strict quality control and global business strategies, Cubic, as a leading manufacturer of high-quality gas sensors and sensor solutions, has obtained the recognition of many well-known Fortune 500 companies as well as other domestic and overseas leading companies in different fields. Cubic products have been exported to more than 80 countries and regions, besides, Cubic is moving towards a higher target to be the international brand in the field of gas sensors.

Cubic At Glance


Cubic Headquarter

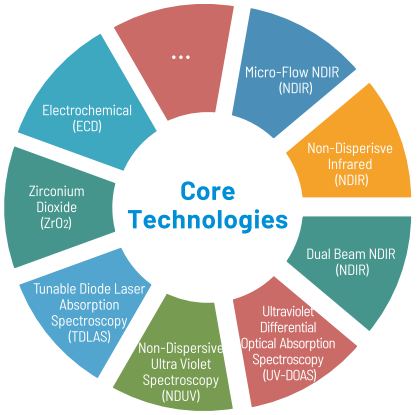

Cubic R&D Center


Cubic Jiashan Factory

Cubic Hungary Factory

CUBIC

Sensing Technology Platforms



22 Years
22 years of development and application of NDIR technology

17 Years
17 years of development and application of Ultrasonic technology

15 Years
15 years of development and application of Light scattering technology

7 Years
7 years of development and application of TDLAS technology

Patents

Total **233** patents obtained

Quality Management

ISO 9001:2015

IATF 16949:2016

ISO 14001:2015

ISO 45001:2018

A-SPICE Level 2

Why Cubic Outdoor Particulate Matter Sensor?

Outdoor air pollution is one of the world's largest environmental problems, and which also causes severe health problems. PM is a common and first proxy indicator for air pollution. Many countries have introduced legislation that require ambient PM monitoring in cities and industrial & construction worksite. Without measurement there is no control. Intensive grid monitoring becomes more and more necessary.

There are two kinds of laser particle matter sensors in the market - indoor application laser PM sensor and especially designed outdoor application PM sensor. Indoor application PM sensor cannot be used for outdoors due to outdoor temperature, humidity, dust concentration conditions challenges. Therefore, the especially designed outdoor PM sensor is irreplaceable for outdoor PM monitoring.

Cubic Outdoor PM Sensor Three Core Advantages

01

Advanced Particle Recognition Technology

Equipped with an industrial-grade laser (>100mW / 81530H), Cubic Outdoor PM Sensor delivers highly accurate particle recognition. The laser module features constant optical power design, with built-in compensation for temperature variations—ensuring stable performance even under extreme outdoor conditions up to 70°C.

02

Stable Sampling Technology

Utilizing automotive-grade high-flow centrifugal blowers or long-lifespan brushless pumps, our system ensures efficient sampling—especially for larger particles. Compared to axial fans, this design offers stronger resistance to negative pressure (up to 100 Pa). Combined with Cubic's self-developed ultrasonic flow sensor, the system continuously monitors and corrects flow rates in real time, guaranteeing sampling stability.

03

Precision Calibration Technology

Cubic adopts a reference calibration approach using MetOne beta attenuation monitors. Carry out matrix calibration of multiple concentration points, temperature points, and different dust sources. Leveraging Cubic's advanced Auto Particle Identification (API) technology, our sensors achieve excellent correlation with Met One which R2>0.9.

Applications


Weather Station


Smart City


Metro Tunnel


Industry

Applications


Wild Fire Watching


Construction


Steel Plant


Mining Site

Outdoor Particulate Matter Sensing Solution

OEM /ODM PM Monitor

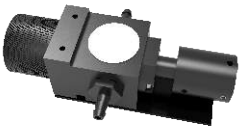
Online Outdoor Dust Monitor
OPM-6303M

Industrial-grade Online Dust Concentration Monitor
OPM-6303Q

Fine Dust Aerosol Spectrometer
OPC-6510A

PM Sensor Module

Outdoor Laser Particulate Matter Sensor Module
PM3003S



Industrial High Concentration Dust Sensor Module
PM3003Q

Outdoor Laser Particulate Sensor Module with fan Sampling
PM3006S

Accessories

Heating and Dehumidifying Apparatus
PMHT01

Ultrasonic Flow Sensor
Gasboard-7500H-OPC

Stable Sampling Air Pump

Product Selection Table

The comprehensive selection table covers a wide range of outdoor air quality monitoring sensors.

No matter what the situation is, including particulate matter system integrator, solution provider for environmental monitoring, contractor in projects such as construction, tunnels and mining, Cubic offers a complete portfolio of advanced particulate matter sensors and devices to meet your demands.

Browse our selection table to quickly identify the most suitable model, ensuring precise alignment with the specific measurement range and environmental conditions.

Product	 OPM-6303Q	 OPM-6303M	 OPC-6510A	 PM3003Q	 PM3003S	 PM3006S
Typical Application	Mining Open Pit	Smart City	Ambient Air Monitoring	Mining Open Pit	Smart City	Weather Station
Measurement Range	0~1,000,000μg/m3	0~30,000μg/m3	0~200μg/m3	0~1,000,000μg/m3	0~30,000μg/m3	0~30,000μg/m3
Protocol	RS485	RS485	RS485	UART_TTL	UART_TTL/I²C	UART_TTL/I²C
Four Output Channel (PM1.0, PM2.5, PM10&TSP in μg/m3)	PM2.5, PM10, TSP	✓ (PM4.25 output optional)	PM1.0, PM2.5, PM10	PM2.5, PM10, TSP	✓ (PM4.25 output optional)	✓
Industrial Laser Diode	✓	✓	✓	✓	✓	✓
Fan Sampling						✓
Pump Sampling	✓	✓	✓			
Particle Number Output (in pcs/L)			✓			

Online Outdoor Dust Monitor OPM-6303M

Description

Online outdoor particulate monitor OPM-6303M adopts a pump-suction sampling method, and has a solid and reliable metal structure with intelligent auto particle identification (API) technology which enable the measurement accuracy in different dust source scenarios. It can accurately and stably output PM2.5, PM10, TSP mass concentration. The built-in pretreatment heater and flow monitoring sensor to make sure the device can output stable values and no affect by the humidity of the outdoor working environment.

OPM-6303M

Features

- 5 in 1 integrated particulate monitor with heater, dust sensor, filter, flow sensor and pump
- Built-in pump and flow sensor for constant stable sampling
- Built-in constant temperature pretreatment, suitable for high humidity environment
- Concentration measurement of PM1.0, PM2.5, PM4.25(optional), PM10 and TSP
- Wide working temperature -30℃~70℃, suitable for extreme weather environment
- Modbus RS485 output for online remote monitoring

Specifications

Operating principle	Light scattering
Measurement range	0~30,000μg/m^3
Output channels	PM1.0, PM2.5, PM4.25(optional), PM10 and TSP
Accuracy	PM1.0/PM2.5: ≤100ug/m^3: ±10μg/m^3, 100~1000μg/m^3: ±10% of reading PM10: ≤100μg/m^3: ±15μg/m^3, 100~1000μg/m^3: ±15% of reading Condition: 0℃~40℃, 50±10%RH, calibration instrument: Met One
Time to first reading	⩽ 8s
Data refresh time	1s
Sampling flow rate	1L/min
Working condition	-30°C ~ 70°C,0-95%RH (non-condensing)
Storage condition	-40°C ~ 85°C, 0-95%RH (non-condensing)
Power supply	DC 12V, ripple wave < 50mV
Working current	⩽ 4.5A
Communication	RS485
Dimensions	W202*H90*D125 (mm)
Life span	⩾3 years

* For more information, please contact: sales@gassensor.com.cn

Industrial-grade Online Dust Concentration Monitor OPM-6303Q

Description

Cubic OPM-6303Q is an industrial-grade dust concentration monitor that employs light scattering technology for precise real-time measurement of airborne particulate matter.

Integrating a high-precision industrial laser, OPM-6303Q can accurately and stably output PM2.5, PM10, TSP mass concentration. The built-in pretreatment heater and flow monitoring sensor to make sure the device can output stable values and no affect by the humidity of the outdoor working environment. OPM-6303Q provides measurement accuracy in high concentration dust scenarios, which is suitable for open pit mining, bulk handling facilities, and iron, steel, cement plants among others.

OPM-6303Q

Features

- Light scattering technology with an industrial-grade laser for reliable and accurate particle detection
- Real-time measurements of PM2.5, PM10, and TSP within a range of 0 to 1000 mg/m^3
- Stable sampling flow for consistent performance in complex outdoor environment
- Anti-dust design, suitable for high dust concentration environment
- Wide working temperature -30°C~70°C, suitable for extreme weather environment
- Modbus RS485 communication for online remote monitoring

Specifications

Working Principle	Light scattering
Measurement Range	0~50mg/m^3 (Maximum display 1,000mg/m^3)
Accuracy	0~1 mg /m^3: ±200μg/m^3 1~50 mg/m^3: ±20% of reading 25±2°C, 50±10%RH
Time to First Reading	⩽ 8s
Data Refresh Cycle	1s
Working Condition	-30°C ~ 70°C,0-95%RH (non-condensing)
Storage Condition	-40°C ~ 85°C, 0-95%RH (non-condensing)
Power Supply	DC 12V
Average Working Current	⩽4.5A
Communication Interface	RS485
Dimensions	W216.8*H152*D86.8 (mm)

* For more information, please contact: sales@gassensor.com.cn

6LPM Light-Scattering Aerosol Spectrometer OPC-6510A

Description

Cubic OPC-6510A is a high-performance light-scattering aerosol spectrometer for precise measurement of PM1.0, PM2.5, and PM10. Leveraging the optical properties of aerosol, OPC-6510A delivers accurately measures particle sizes ranging from 0.3μm to 10μm through 12-channel output. With Modbus-RTU and MQTT communication capabilities, OPC-6510A facilitates continuous monitoring and real-time collection of PM fractions. OPC-6510A is suitable for different applications, including evaluating air purifier efficiency, monitoring both indoor and outdoor air quality, and conducting source analysis under varying temperature and humidity conditions maintaining accuracy and performance.

OPC-6510A

Features

- Light-scattering technology for accurate, real-time, and continuous particulate measurement
- 12 channels with outputs ranging from 0.3 to 10 μm, achieving a volume flow rate of 6 LPM
- Integrated temperature and humidity sensors enhance performance and accuracy
- Adapt to a wide range of temperature environments, including high humidity conditions
- Customization options for diverse applications and complex environments

Specifications

Working Principle	Light scattering
Particle Concentration Output	PM1.0, PM2.5 and PM10 at μg/m^3
Particle Quantity Output	12 channels (>0.3μm, >0.4μm, >0.5μm, >0.6μm, >0.8μm, >1.0μm, >1.5μm, >2.0μm, >2.5μm, >5.0μm, >8.0μm, >10μm) in pcs/L
Measurement Range (size)	0.3μm to 10μm
Measurement Range (mass)	0~200 μg/m^3
Accuracy(mass)	PM1.0/PM2.5: 0~50μg/m^3: ±5μg/m^3 50~100μg/m^3: ±10% of reading PM10: 0~50μg/m^3: ±7μg/m^3: 50~200μg/m^3: ±15% of reading
Volume Flow	6LPM
Interface	RS485 and RJ45
Communication	Modbus-RTU, MQTT
Operating Voltage	DC 24V±15%
Working Condition	0°C~45°C, 0~95%RH (Non-condensing)
Storage Condition	-20°C~60°C, 0-95%RH (Non-condensing)
Dimension	217*124*87 mm (Main body dimension)

* For more information, please contact: sales@gassensor.com.cn

Outdoor Laser Particulate Matter Sensor Module PM3003S

Description

Outdoor particulate sensor PM3003S is a linear light source-based particle sensor module with light scattering technology. It is designed to measure the quantity per unit volume of different particle size and can output particle mass concentration PM1.0, PM2.5, PM4.25(optional), PM10 and TSP in μg/m^3 at the same time via mathematical algorithm and scientific calibration. It is flesible to have an external stable flow air pump, with built-in Cubic auto particle identification technology, it can realize the accurate measurement in different ambient dust source environment.

PM3003S

Features

- Concentration output PM1.0, PM2.5, PM4.25(optional), PM10 and TSP in μg/m^3
- High power industrial grade linear laser, accurate identification
- Flexible to have a pump for sampling
- Cubic API technology for intelligent dust source identification
- Wide working temperature -30°C~70°C, suitable for outdoor working environment
- With voltage regulator design and EMC compatibility, strong antistatic ability

Specifications

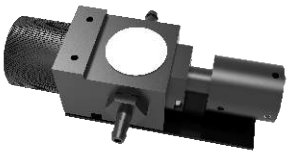
Operating principle	Light scattering
Measurement range	0~30,000μg/m^3
Output channels	PM1.0, PM2.5, PM4.25(optional), PM10 and TSP
Accuracy	PM1.0/PM2.5: ≤100ug/m^3: ±10μg/m^3, 100~1000μg/m^3: ±10% of reading PM10: ≤100μg/m^3: ±15μg/m^3, 100~1000μg/m^3: ±15%Reading Condition: 0℃~40℃, 50±10%RH, calibration instrument: Met One
Time to first reading	⩽ 8s
Data refresh time	1 second
Sampling flow rate	Recommend 1 L/min
Working condition	-30°C ~ 70°C,0-95%RH (non-condensing)
Storage condition	-40°C ~ 85°C, 0-95%RH (non-condensing)
Power supply	DC 5V±0.1V, ripple wave < 50mV
Working current	< 150mA
Standby current	< 25mA
Dimensions	W82*H40.2*D26.3 mm
Digital output	UART_TTL/I^2C （3.3V/5V）
Life time	> 5 years

* For more information, please contact: sales@gassensor.com.cn

Industrial High Concentration Dust Sensor PM3003Q

Description

PM3003Q is developed based on light scattering technology and specially designed to be used in high concentration particulate dust scenarios to measure PM2.5, PM10, and TSP. A specifically designed anti-dust structure is adopted by PM3003Q, which makes the sensor capable and durable applicability for high dust concentration environments up to 50mg/m^3. PM3003Q has been widely considered for applications in iron plants, thermal power plants, coking plants, cement plants, the mineral industry, flour mills, etc.



PM3003Q

Features

- 3 channels concentration output PM2.5, PM10 and TSP in μg/m^3
- Industrial grade laser diode with high reliability particle identification
- Anti dust design, suitable for high dust concentration environment
- Compact size and easy for installation

Specifications

Operating principle	Light scattering
Measurement range	0~50mg/m^3 Maximum display 1000mg/m^3
Output channels	PM2.5, PM10 and TSP
Accuracy	0~1 mg /m^3: ±200μg/m^3 1~50 mg/m^3: ±20% of reading (Test under typical working conditions, 25±2°C, 50±10%RH, with TSI8533 as the reference)
Time to first reading	⩽ 8 seconds
Data refresh time	1 second
Sampling flow rate	Recommend 2 L/min
Working condition	-30°C ~ 70°C, 0-95%RH (non-condensing)
Storage condition	-40°C ~ 85°C, 0-95%RH (non-condensing)
Power supply	DC 5V±0.2V, ripple wave < 100mV
Working current	< 150mA
Standby current	< 25mA
Dimensions	W90.8*H60.2*D37.6 mm
Digital output	UART(TTL 3.3V)

* For more information, please contact: sales@gassensor.com.cn

Outdoor Laser Particulate Sensor Module with Sampling Fan PM3006S

Description

Outdoor particulate sensor PM3006S is a linear light source-based particle sensor module with light scattering technology. It is designed to measure the quantity per unit volume of different particle size and can output particle mass concentration PM1.0, PM2.5, PM10 and TSP in μg/m^3 at the same time via mathematical algorithm and scientific calibration. Built-in Cubic auto particle identification technology for accurate measurement in different dust source for ambient air quality.

PM3006S

Features

- 4 channels concentration output PM1.0, PM2.5, PM10 and TSP in μg/m^3
- High power industrial grade linear laser, accurate identification
- Vehicle-grade constant current sampling structure fan, ensure constant stable sampling flow
- Cubic API technology for intelligent dust source identification
- Wide working temperature -30°C~70°C, suitable for outdoor working environment
- With voltage regulator design and EMC compatibility, strong antistatic ability

Specifications

Operating principle	Light scattering
Measurement range	0~30,000μg/m^3
Output channels	PM2.5, PM10 and TSP
Accuracy	PM1.0/PM2.5:<50ug/m^3: ±5μg/m^3;50~1000μg/m^3: ±10% PM10: ≤100μg/m^3: ±15μg/m^3, 100~1000μg/m^3: ±15% of reading Condition: -30℃~70℃, 50±10%RH, calibration instrument: Grimm
Data refresh time	1 second
Time to first reading	⩽ 8 Second
Working condition	-30°C ~ 70°C,0-95%RH (non-condensing)
Storage condition	-40°C ~ 85°C, 0-95%RH (non-condensing)
Power supply	DC 5V±0.1V, ripple wave < 50mV
Working current	< 250mA
Standby current	< 25mA
Dimensions	W85*H74*D24.9 mm
Digital output 1 (default)	UART_TTL/I^2C （3.3V/5V）
Life span	>5 years (continuous working)

* For more information, please contact: sales@gassensor.com.cn

Heating and Dehumidifying Apparatus PMHT01

Description

Heating and dehumidifying apparatus PMHT01 is for outdoor particle sensor, works through filtration and heating to effectively prevent the water mist or droplet impact in rainy and humid conditions, which helps particle sensors to have best performance in all outdoor conditions. It is an accessory for outdoor particle sensor to avoid water mist or droplet to effect dust measurement value.

PMHT01

Features

- Different heating temperature can be set
- Precise monitoring data on tube temperature, real-time temperature control
- Uniform heat conduction, slight influence by ambient temperature
- All-metal built, simple structure, easy to install

Specifications

Heating stabilization time	⩽5min (Condition: 25℃)
Heating temperature range	40~60℃ (45℃ as default)
Working condition	-30~70℃, ≤99.9%RH
Storage condition	-40~85℃,0~95%RH (non-condensing)
Working voltage	DC 12V±0.5V
Average power	⩽5W (@12V DC, 25℃)
Peak power	⩾30W (@12V DC)
Standby current	⩽25mA
Communication	UART (TTL_3.3V)
Dimensions	W145*H35*D35 mm
Lifespan	⩾3 years

* For more information, please contact: sales@gassensor.com.cn

0~5LPM Ultrasonic Flow Sensor Gasboard-7500H-OPC

Description

Ultrasonic flow sensor Gasboard-7500H-OPC is an economical sensor for measuring air flow. This sensor has full scale matrix temperature and humidity compensation, it has outstanding characteristics of high accuracy, great stability, no drift, etc. Very suitable for digital gas analysis and detection instrument, particle counter and other air monitoring equipment for ambient air flow measurement.

Gasboard-7500H-OPC

Features

- Measure air flow rate 0~5L/min
- Full scale matrix temperature and humidity compensation
- Quick response, stable measurement, high accuracy
- Self-calibration, maintenance-free, no drift
- Perfect EMC performance, long life span

Specifications

Detect Principle	Ultrasonic Technology
Detection Range	0~5L/min (Note 1)
Detection Accuracy	±3% or ±0.06L/min (Condition:5~45 °C)
Resolution	0.01L/min
Response time	<0.3S
Work Condition	-20~60℃； 0~95% RH (Non-condensing)
Storage Condition	-20~60℃； 0~95%RH (Non-condensing)
Work Voltage	DC 4.75-12.6V, Ripple Wave <50mV
Average Work Current	<35mA
Communication Interface	UART_TTL (3.3V)
Product Size	W80*H22*D25 mm
Life span	⩾5 Years

* For more information, please contact: sales@gassensor.com.cn

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