M3SH
We set the standard

D-Series Environmental Monitor

DPM50 DIESEL PARTICULATE MATTER MONITOR

Make diesel risk measurable.

Real-time diesel exposure intelligence for harsh industrial and underground environments.

> The DPM50 provides continuous, real-time diesel particulate readings to help teams identify changing conditions, investigate sources and take timely action. Independent laboratory verification is being arranged to establish how its readings relate to elemental carbon, organic carbon and total carbon measurements.



Real-time DPM Visibility

Continuous diesel particulate readings

IP65

Rugged enclosure rating

AI & ML on the device

Digital signature processing on the device

STANDARD PARAMETERS

Parameters and sensors included as standard.

The DPM50 combines diesel particulate indicators, supporting gas channels, and ambient-condition measurements in one monitor.

Gases And Particulate Indicators

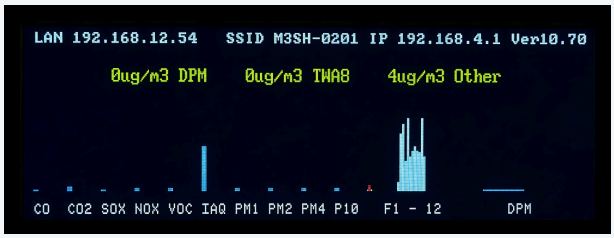
Standard Channel	Role In Diesel Exposure Monitoring
Carbon monoxide (CO)	Included 0-1000 ppm supporting indicator of incomplete combustion and diesel activity.
Carbon dioxide (CO2)	Included 0–50,000 ppm index-point trend indicator for ventilation and combustion context. This is a derived indicator.
Diesel particulate readings (DPM)	Continuous readings from multi-sensor fusion support detection, trend review and operational response.
Sulphur Oxides (SOx), including SO2	Included 0-50 ppm SOx supporting diesel combustion and fuel-quality indicator.
Volatile Organic Compounds (VOC)	Included 0-65,000 index-point trend indicator for combustion byproducts and diesel emission patterns.
Nitrogen Oxides (NOx), including NO and NO2	Included 0-500 index-point supporting indicator for diesel exhaust context.
Combustible gases (LEL index)	Included 0-100% LEL index-point indication.
Polycyclic Aromatic Hydrocarbons (PAH)	Included 0-100% index-point diesel particulate and combustion-context indicator.
PM1, PM2.5, PM4, PM10	Included particle-size fractions, 0-6000 µg/m³, 1 µg/m³ resolution.

Ambient Conditions

Standard Channel	Operational Value
Ambient temperature (C)	Supports measurement context and environmental trend review.
Humidity (%) 0-100%	Shows moisture conditions that can influence particulate and gas readings.
Barometric pressure (mb)	Supports compensation and operating-context interpretation. 300 - 1200 mb.
Air Quality Index (AQI)	Operator-friendly summary indicator for changing air-quality conditions. 1-5.

Optional Sensors

Optional Channel	Use
Methane (CH4)	Optional 0-100% LEL methane indication where site requirements call for it.
Oxygen (O2)	Optional 0-30% oxygen measurement for atmosphere and ventilation context.
Ozone (O3)	Optional oxidizing-gas trend indicator where site conditions require it.



Standard channels are processed on the device for local alarms, trends and integration outputs.

PURPOSE

Real-time visibility where diesel exposure rises fastest.

The DPM50 helps teams identify elevated diesel exposure, verify ventilation effectiveness, and keep logged evidence of conditions.

Real-time DPM Visibility

Uses multi-sensor fusion to help identify changing diesel particulate conditions and support timely action.

Digital Signature Model

Combines particulate and supporting gas-related signals to identify diesel emission patterns in changing site conditions.

Local Alarm Awareness

Multi-colour LED ring, display, and audible alarms provide immediate status visibility for workers and supervisors nearby.

Ventilation Decisions

Trend data helps operators validate whether ventilation, traffic management, and mitigation controls are effective.

Control-Room Ready

Edge processing converts sensor signals into outputs for alarms, trending, PLC, SCADA, and data historian systems.

Harsh-Site Platform

Self-cleaning sampling chamber design reduces dust build-up and helps maintain data continuity in high-particulate areas.



Example field installation for fixed-area diesel exposure monitoring.

DIESEL EXPOSURE

Why measure diesel particulate matter?

DPM can accumulate quickly in high-traffic zones, workshops, headings, fueling bays, and enclosed areas with limited ventilation.

Protect Worker Health

Diesel particulate matter is a complex mixture of microscopic particles and combustion byproducts generated by diesel engines. Exposure can rise rapidly and may not be obvious without measurement.

Continuous real time monitoring helps safety teams detect rising exposure early, investigate events, and maintain documented proof of conditions through logged data.

Applications

- Underground mine headings
- Ramp systems
- Loading areas
- Workshops
- Fueling bays
- High-traffic diesel zones
- Enclosed industrial spaces
- Ventilation validation



High-visibility LED ring and local display for immediate exposure status.

What You Get

Capability	Operational Benefit
Real-time DPM visibility	Live view of diesel exposure where it matters most.
Configurable alarms	Warning and alarm thresholds matched to site response philosophy.
Logged data	Trend review, audit support, and incident investigation evidence.
Ventilation verification	Confirms whether ventilation and operational controls are effective.
PLC / SCADA integration	Connects diesel exposure intelligence to control-room workflows.

Built To Stay Clean

The DPM50 incorporates a heated self-cleaning sampling chamber engineered to reduce dust build-up in the measurement path. This helps support stable performance in high-particulate areas and reduces routine cleaning and inspection effort.

Measurement Philosophy

DPM50 readings support operational monitoring. They are not direct measurements of elemental carbon or total carbon and must not be compared directly with carbon-based occupational exposure limits.

Laboratory comparison

Independent laboratory verification is being arranged. NIOSH Method 5040 may be used to analyse comparison samples; this does not establish compliance, equivalence or a validated conversion of DPM50 readings.

DETECTION LOGIC

Diesel risk through a combined digital signature.

The DPM50 is designed to quantify diesel particulate risk through correlated signals rather than a single isolated sensor reading.

Measurement Area	DPM50 Approach	Why It Matters
Particle measurements	PM1, PM2.5, PM4, PM10, and particle-count context.	Shows particulate intensity and supports event interpretation.
Supporting gases	CO, CO2, NOx including NO2, SOx/SO2, VOC, PAH, and LEL index indicators.	Helps identify diesel emission patterns and ventilation context.
Optional gas channels	CH4, O2, and O3 only, where specified by site requirements.	Prevents unavailable gases from being represented as selectable options.
Air quality context	AQI, temperature, relative humidity, and barometric pressure.	Supports compensation and interpretation of changing site conditions.

Important Gas Measurement Note

The DPM50 is not configured by default as a certified ppm-accurate gas analyser. CO, SO2, and NOx including NO2 are measured as supporting indicators. A calibrated option can provide ppm readings for CO and SO2 using high-accuracy sensors; CO2, VOC, and NOx values remain derived values for trend and detection unless otherwise specified.

Customer-configurable alarms

LED indication and audible alarms support local awareness. Alarm thresholds and response actions are configured for the site. The indicator colours below illustrate the product; they do not represent country-specific exposure limits.



Green LED status



Amber LED status



Red LED status

RELIABILITY

Designed for harsh underground conditions.

The DPM50 reduces single-sensor risk by using environmental context to support stable diesel exposure decisions.

Why The Method Matters

Unlike simple optical dust sensors that can be biased by humidity and coarse dust, the DPM50 tracks humidity, temperature, and pressure to improve reliability in harsh conditions.

Real-time readings, rolling averages and TWA outputs help reduce incorrect decisions caused by short spikes and sensor drift. Periodic bump testing helps check alarm performance over time.

Service Benefits

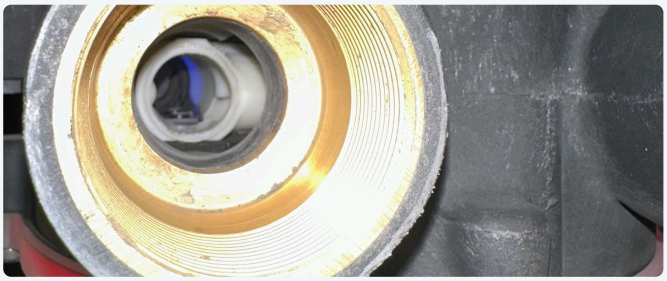
Feature	Benefit
5-year sensor life	Longer operating window between major sensor replacement planning.
Up to 2 years between calibrations	Reduced maintenance burden where site and regulatory requirements allow.
Bump-test kit available	Practical verification of alarm response and sensor function.
Less maintenance and cleaning	Self-cleaning airflow design reduces particle build-up.
Compact wireless connection	Easy connection options for fixed or mobile monitoring layouts.
Optional mesh network	Wireless connection into a site mesh network where cabling is limited.

Design / Functioning Benefits

Design Element	Operational Value
Forced airflow	Not dependent on natural airflow to bring sample air into contact with sensors.
Constant sample flow	Three centrifugal fans maintain a consistent 2 L/min airflow across changing environmental conditions.
Heated Chamber	Keeps sample humidity under 40%, prevents measurement deviations and debris build-up. Lower humidity ensures dust remains airborne for accurate sensing and reduces false alarms.
>10 µm particle dust impactor	Designed to filter out coarse dust particles before the measurement path.
Automatic air-purge function	The chamber is automatically purged with air for a preset duration.
Patented airflow and self-cleaning	Helps prevent particle build-up and helps support stable long-term operation.
Inlet and exhaust flow sensors	Blockage alarm indicates when the monitor is blocked and requires cleaning.

Field-proven low-maintenance durability

Field-proven airflow and self-cleaning design supports long-term operation in harsh underground environments with reduced routine maintenance.



Clear airflow after severe dust exposure

TECHNICAL DATA

Core specifications.

Communications

Area	Capability
Standard wired	RS485; Ethernet and PoE for Non-IS configurations. Ex ia: RS485 and/or the P5G option when selected.
Protocols	Modbus RTU/TCP, Modbus TCP/IP, EtherNet/IP, PoE (non-IS)
SCADA	Register map for customer DCS, PLC, SCADA, and data historian integration
Outputs	Alarms, trends, logged data, dashboard reporting, and configurable thresholds
Data logging	Records every 4 seconds, creates a new CSV file every 24 hours, and allows file download at any time

Service And Compliance

Measure	Value
Warranty	1-year limited warranty
Calibration interval	12 months standard; up to 2 years where approved by site requirements and service plan
Functional / electrical safety	Yes
Intrinsic safety approval	Ex ia I Ma - IA Certificate MASC M/26-8198X, Issue 0 (South Africa only; SANS 60079-25 loop approval required). Global IECEx approval pending; expected Q4 2026.

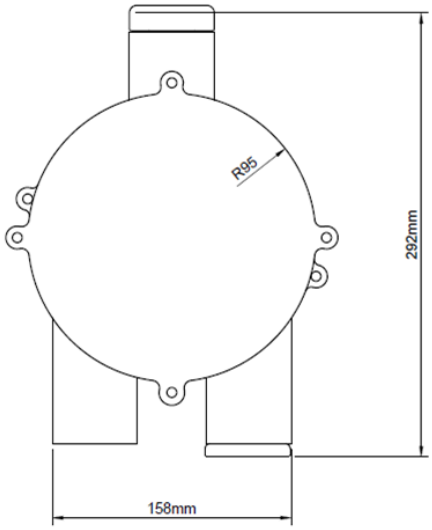
Product Specifications

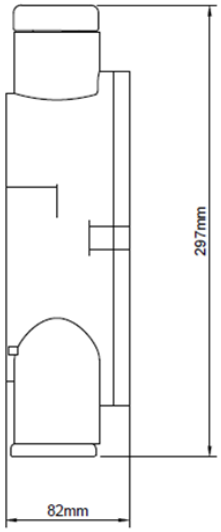
Item	DPM50 Diesel Particulate Matter Monitor
Main role	Real-time DPM monitoring and diesel exposure intelligence
Particle count	0-6000 µg/m³; 1 µg/m³ resolution
Operating temperature	-20 C to +60 C
Storage temperature	-40 C to +85 C
Supply voltage	Ex ia: 9–18 VDC (no AC or PoE). Non-IS: 9–48 VDC standard; 85–265 VAC optional.
Power consumption	<18 W typical
Local storage	8 GB industrial SD card; approximately 2 years of continuous logging before older data are overwritten cyclically.
Ingress protection	IP65
Enclosure material	Reinforced thermoset GRP; stainless steel available on request

Dimensions And Weight

Item	DPM50
Dimensions	L 298 mm x W 196 mm x H 82 mm
Weight	~3.24 kg

Construction	Mounting
M3SH standard grey/black	Side mounting holes or hanging bracket / roof bolt







DPM50 Diesel Particulate Matter Monitor

Real-time DPM visibility, configurable alarms, and logged diesel exposure intelligence for underground mines, workshops, fueling bays, and enclosed industrial spaces.

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