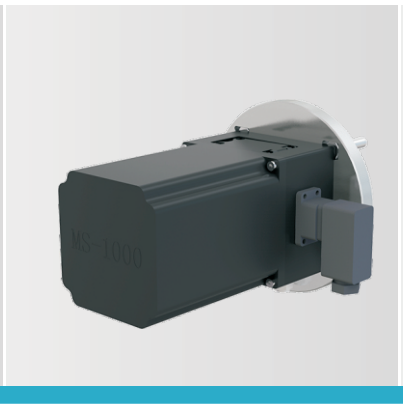
ZETIAN
Process & Environmental

# Online Dust Monitor

## DMS Series

### DMS–100 / MS–1000 / DMS–200 / DMS–300

Focusing on
Environmental & Industrial Analysis

HANGZHOU ZETIAN TECHNOLOGY CO.,LTD.

# DMS Series

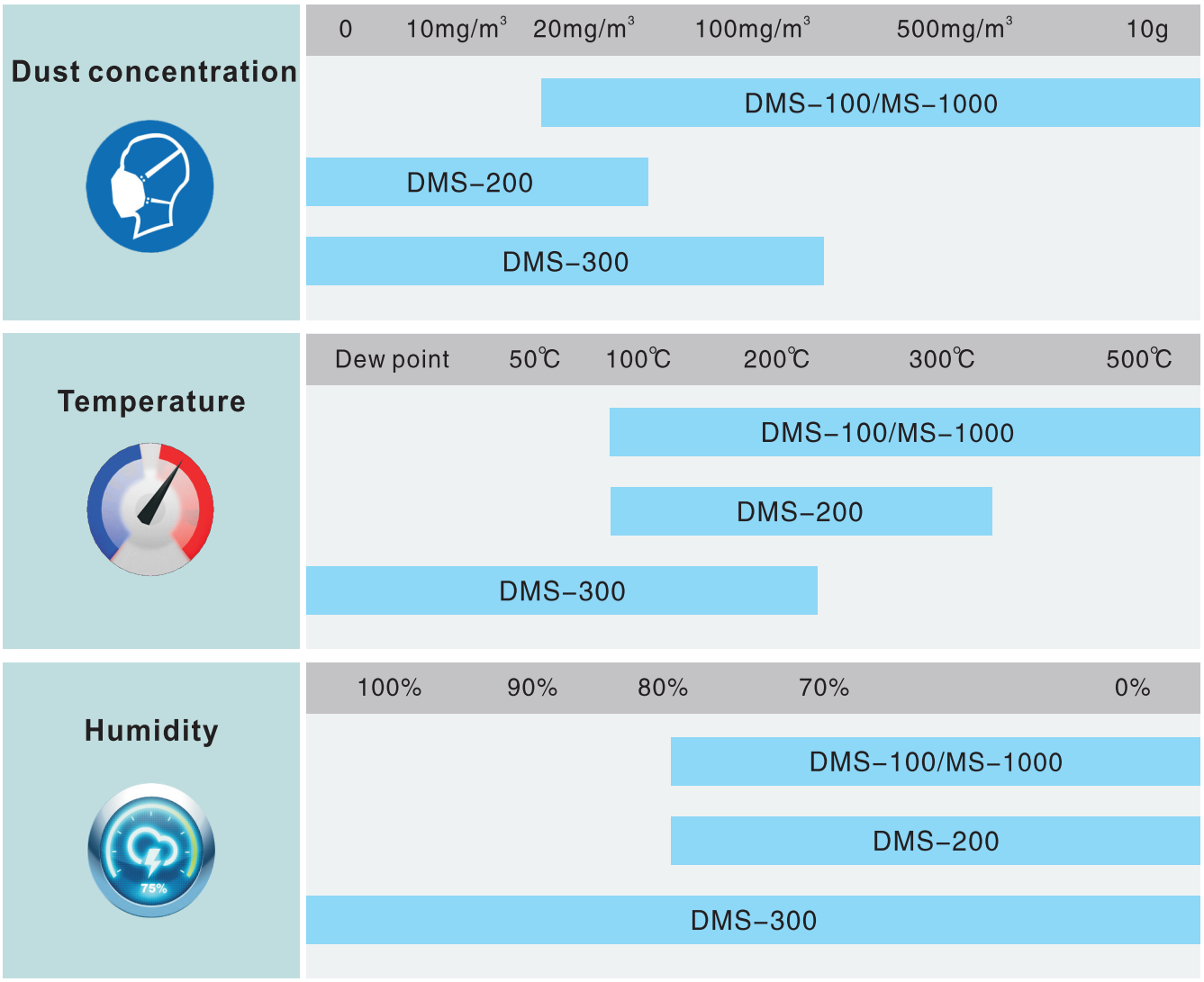
## Dust Monitor Function Comparison

| Model | | DMS–100 | MS–1000 | DMS–200 | DMS–300 |
|---|---|---|---|---|---|
| Measuring Principle | | Laser Backward Scattering | Laser Backward Scattering | Laser Forward Scattering | Laser Forward Scattering |
| In-situ | | ● | ● | ● | |
| Extractive | | | | | ● |
| Info Record | | | | ● | ● |
| Auto Zeroing | | | | | ● |
| Auto Calibration | | | | ● | ● |
| Auto Purging | | | | | ● |
| HMI | Key+OLED | ○ | | ● | ● |
| | Upper computer | ● | ● | ○ | ○ |
| | Remote control | ○ | | | |
| Range Switching | | | | ● | ● |
| Alarm Output | | | ○ | ● | ● |
| RS485 | | ○ | ● | ● | ● |
| RS232 | | ○ | ○ | ○ | ○ |
| Detection Lower Limit | | 1mg/m$^3$ | 1mg/m$^3$ | 0.05mg/m$^3$ | 0.05mg/m$^3$ |
| Typical Range | | 0 ~ 500mg/m$^3$ | 0 ~ 500mg/m$^3$ | 0 ~ 10mg/m$^3$ | 0 ~ 10mg/m$^3$ |

● Existing ○ Optional

# DMS Series

## Dust monitor comparison under different working condition




DMS Series Dust Monitor can be applied in power plant, cement plant, metallurgical and wood industry, chemical plant, waste incineration plant and etc.

Specific application:

DMS–100/MS–1000 is suitable for PM measurement of conventional stack, high concentration PM measurement before dedusting and high temperature occasion.

DMS–200 is suitable for occasion with ultralow PM concentration and low flue gas humidity (no condensation).

DMS–300 is suitable for occasion with high flue gas humidity (saturation humidity) and low PM concentration.

# DMS Series

## For continuous PM monitoring in high temperature and high concentration

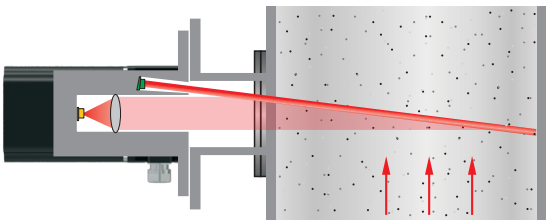
## Overview

DMS-100/MS-1000 is a self-developed online dust analysis product, adopting laser backward scattering measuring technology with imported core components. It is mainly used for continuous monitoring on PM emission concentration of various pollution sources. It can be not only matched with CEMS, but also be used separately or together with multiple dust monitors to form dust monitoring network, sharing the same data collection and processing background.

The product is widely applied in enterprises including thermal power, ferrous metallurgy, petrochemical industry, cement production, potting, waste incineration; flue gas emission monitoring in all kinds of power generating boiler, industrial kiln, and industrial boiler; monitoring and control in gas desulphurization and dust removal process.

## Principle

DMS-100/MS-1000 dust monitor consists of optical part, circuit and signal processing part, calibrator and air curtain protection part.



The laser beam (650nm) emitted by semiconductor laser enters stack and produce scattering light by interaction with dust particles. The backscattered light enters photosensitive detector through convergence of lens. The signal processing circuit converts light signal into standard signal in proportion to dust concentration and output, thus dust particle emission concentration of pollution source is obtained.

## Specification

| | | | |
|---|---|---|---|
| Measuring principle | Laser backward scattering | Stack diameter | ≥0.5m |
| Measuring range | 0 ~ 200mg/m$^3$, 0 ~ 10g/m$^3$(customizable) | Analog output | 4-20mA, maximum load 800Ω |
| | | COMM interface | RS485, 2 ×relay output, bluetooth |
| Indication error | ≤ ±20% | HMI | IPC, APP（for MS-1000） |
| Indication repeatability | 10% | Weight | 4kg |
| Laser device | 650nm | Power | <3W |
| Medium temperature | <300℃ | Dimension | 158mm* 158mm*234mm (square) |
| | | | 158mm* 158mm*273mm (circular) |
| Ambient Temperature | -20 ~ +45℃ | Supply voltage | 24VDC ± 10% |

## Feature

- Support online zero and span calibration
- Automatic gain control function and temperature compensation
- Convenient for installation, disassembly and cleaning with small and compact structure
- Able to eliminate influence of background stray light

## Installation

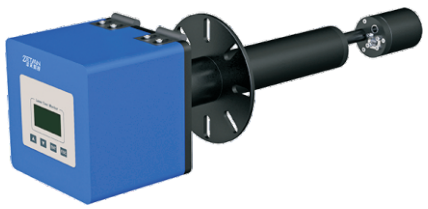
1. Instrument is installed on stack by flange
2. Rain cover will be installed at back end of monitor
3. Power and gas source are connected at back end of monitor

# DMS Series

## For dust concentration detection of ultralow range

## Overview

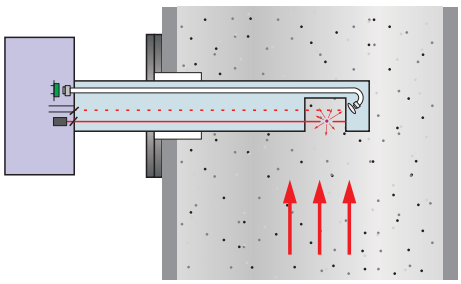
DMS-200 dust monitor is a self-developed probe-in monitor, based on years of research on dust detection technology. Different from traditional back scattering dust monitor (such as DMS-100/MS-1000), DMS-200 installs dust measurement module at the top of probe, which directly stretches into the stack for dust measurement in close distance and it adopts laser forward scattering method to realize low detection limit.



## Principle

DMS-200 adopts laser forward scattering principle to detect dust concentration in measured stack. Detection schematic diagram is in the right.

Modulated laser irradiates on the dust particles in stack and produces scattered light to emit around. The lens collects forward scattered light to converge and then enter high temperature resistant fiber; transfer the optical signal to the detector; signal processing unit will analyze the optical signals. The intensity of scattered light is in direct proportion to the PM concentration. The dust concentration from current stack can be obtained through specific transformation of signals from detector.



## Specification

| | | | |
|---|---|---|---|
| Measuring principle | Laser forward scattering | Purging gas | (0.2~1)MPa, no water, oil or dust, consumption 5L/min |
| Measuring range | 0 ~ 10mg/m$^3$, 0 ~ 200mg/m$^3$ (customizable) | Probe length | 1m, 1.5m (customizable) |
| Detection lower limit | 0.05mg/m$^3$ | Weight | 15kg |
| Indication error | ±20% | COMM interface | RS485 (default), RS232 (customizable) |
| | | Analog output | Isolation 4-20mA output, maximum load 500Ω |
| Indication repeatability | 10% | Supply voltage | 24VDC |
| Flue gas temperature | <250℃ (no condensation) | Power | <5W (when calibrating <15W) |
| Ambient temperature | -40℃ ~ +45℃ | Dimension | 185mm* 185mm*1500mm |

## Feature

- Adopt laser forward scattering method to measure dust concentration; the lower detection limit is as low as 0.05mg/m$^3$
- Employ gas curtain purging to protect laser and lens of detector end; purging gas is automatically heated by the temperature of stack inside feeler lever and achieve positive pressure dust prevention inside feeler lever
- High temperature resistance design of probe part
- Automatic zeroing and calibration of double optical path
- Support manual range calibration
- Support automatic range calibration

## Installation

1. Instrument is installed on stack by flange
2. For convenience of instrument installation, the height of flange installation port shall be higher than that of guard bar
3. Power and gas source are connected at back end of monitor

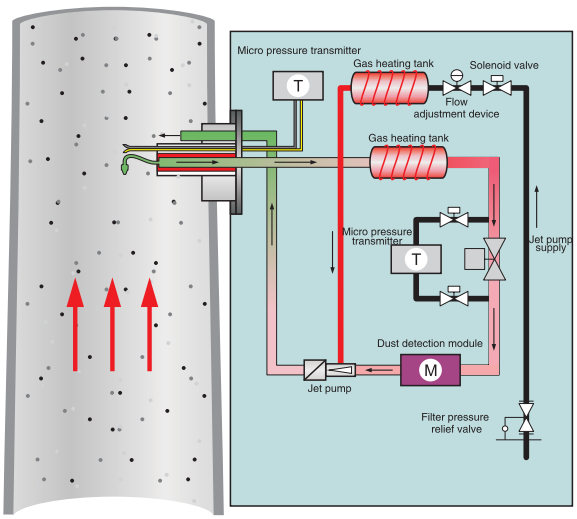
# DMS Series

## For accurate PM content measurement system in different industries

## Overview

DMS-300 dust monitor is a self-developed high-temperature heat tracing extraction dust monitor, based on years of technology research and development for dust detection. Different from conventional in-situ scattering dust monitor, DMS-300 extracts dust from flue (stack) in uniform speed to dust measurement module with full-process high temperature heat tracing for measurement. It owns features of low detection limit (as low as 0.05mg/m3), no interference by moisture, high measurement accuracy, and etc. It applies to low temperature and high humidity dust conditions of super clean emission and after wet desulphurization.

## Principle



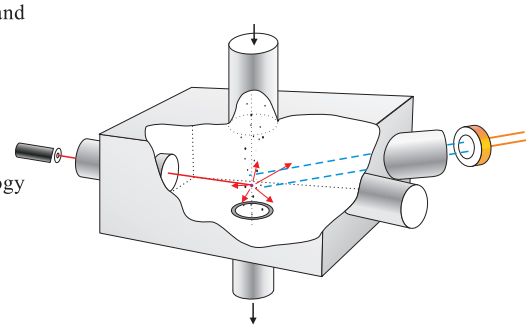

Under negative pressure effect of jet pump, dust in stack enters measurement module after being heated by tracing sampling probe. Heat tracing will be in the whole process of extraction, measurement and emission to eliminate moisture interference and prevent dust from blocking the gas path if encountering condensate water. The dust after being heated enters measurement module, where laser forward scattering principle is used to measure dust concentration. After measurement, the exhaust gas goes into the stack again.

DMS-300 employs magnetic valve and control unit to realize automatic purging of gas path and measurement module. Automatic zeroing shall be performed termly. After maintenance, close laser device and insert calibration module for manual zeroing and calibration.

Micro differential pressure transmitter and pitot tube is used to measure gas velocity in stack and feedback to flow-control device at the same time. It can realize isokinetic sampling and isokinetic flue dust extraction for measurement of pitot tube by changing jet gas flow to control extraction velocity

## Feature

- Adopt laser forward scattering method to detect dust concentration; low detection limit.
- Full-process heat tracing, which heats water vapor to gaseous state to prevent dust from caking and blocking gas path when encountering water. Thus it applies to high humidity occasion.
- Pitot tube isokinetic sampling method meets the technical condition of dust sampling
- Support automatic purging to clean gas path and avoid dust blocking
- Support automatic zeroing technology under high temperature and automatic calibration technology of all optical paths
- Support on−site manual span calibration
- Support automatic double range switching



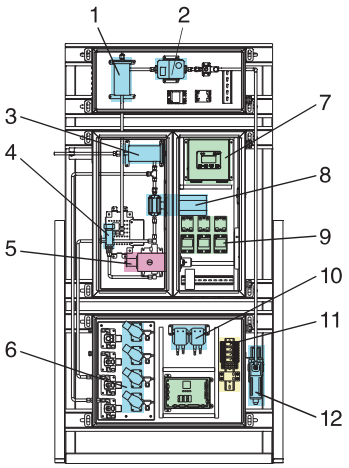
# DMS Series

## Low and medium concentration dust measurement

## Specification

| Technical parameter | DMS–300 Extraction Dust monitor |
|---|---|
| **Measurement Data** | |
| Measuring Principle | Laser forward scattering |
| Concentration Range | 0 ~ 20mg/m$^3$, 0 ~ 50mg/m$^3$ (customizable) |
| Detection Lower Limit | 0.05mg/m$^3$ |
| Indication Error | ±20% |
| Indication Error Repeatability | ±10% |
| Response Time | 2s (optional) |
| Laser Device | 650nm, 20mW |
| **Measurement Condition** | |
| Sampling Head Diameter | 6mm, 8mm, 10mm, 12mm (customize according to working condition) |
| Heat Tracing Temperature | 120℃ ~ 180℃ |
| Medium Temperature | <300℃ |
| Ambient Temperature | –20℃ ~ +50℃ |
| Compressed Air | No water and oil, ⩾0.4MPa, gas consumption 100L/min |
| Purging Time | Purge 3min (concentration data keeps), interval period 4h (adjust according to working condition ) |
| Velocity Range | (2 ~ 40)m/s |
| Preheating Time | 15min |
| **Input, Output and Interface** | |
| Analog Output | 4–20mA, maximum load 500Ω |
| Communication Interface | RS485, RS232 (optional) |
| **General Information** | |
| Weight | 103kg |
| Dimension | 1620mm ( H ) * 850mm ( L ) * 264mm ( D ) |
| Power | 1500W |
| Supply | 220VAC |

## Composition




| | |
|---|---|
| 1 | Jet gas heating tank |
| 2 | Flow controller |
| 3 | Sample gas heating tank |
| 4 | Jet pump |
| 5 | Measurement module |
| 6 | Solenoid valve |
| 7 | Control and display unit |
| 8 | High temperature ball value |
| 9 | Thermostat |
| 10 | Micro differential pressure transmitter |
| 11 | Terminal block |
| 12 | Filter pressure relief valve |

The extraction dust monitor is composed by jet gas control unit (1, 2), measurement unit (3, 4, 5, 8, 9), control & display unit (7), and gas path control unit (6,10, 11, 12). The flue gas inside stack is extracted to measurement unit in constant speed by gas path control unit. Measurement unit is with full–process high temperature tracing to eliminate influence from moisture to dust measurement. Actual concentration signal is processed and displayed by control &display unit. The gas control unit is able to achieve flue gas isokinetic extraction and reflect real dust concentration through velocity measurement inside stack, extraction velocity measurement of gas path, and velocity valve adjustment.

For more details, please visit: http://en.zetian-tech.com

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