Light Scattering
Real Time
Dust Density Monitor System

DDM-fC

High sensitivity
Durable and reliable
Ultra low maintenance
Simple installation

URL: http://www.tanaka-e-lab.com
Contact: office@tanaka-e-lab.com
Tanaka Electric Laboratory DDM-fC high performance real-time dust monitor system is designed for the harsh industrial environment such as high temperature (820°C), high pressure (246 kPa), high humidity, and highly electrically charged exhaust gas. It can measure dust density up to 1 mg/Nm³ as regulated by the Air Pollution Control Law. It is designed both for standalone and for unattended automatic CEMS (continuous emission monitoring). It is easy to be integrated in DCS (Distributed Control System). DDM-fC is an excellent product for a new installation or replacing unstable existing dust monitor system. The DDM-fC is composed with an optical detector, fiber cables, main control system, and purge air system. The detector uses light scattering method to detect the dust density of exhaust gas inside of a stack and has unique design to achieve accurate, reliable, and low maintenance operation. The microprocessor controlled main control box analyzes the data from the detector and dispatches alarm signals to the DCS to control the whole factory or to the dust control system such as bag filters and ESP (Electrostatic Precipitator) to avoid accidental air pollution or to control the system to lower the operational cost. The data can be transmitted to DCS and stored and used for data log and future analysis.

The dust contained in flue gas can cause environmental pollutions and health issues, and reducing the dust emitted from a plant/factory is global demand. In many countries the governments enforce air pollution law. Tanaka Electric Lab. dust monitor system helps to run a plant/factory more cleanly and efficiently and to establish corporative compliance and CSR (Corporate Social Responsibility).

The Tanaka Electric Lab. light scattering detector provides reliable monitoring in the harsh conditions such as highly electrically charged gas, high humidity gas, and variable velocity of gas. Its dust detection area is 3 dimensional and large; it covers large area inside of a stack and the detector has an excellent sensitivity. The light scattering method uses optical sensor and provides excellent noise resistance. Its unique detector design and the integrated purge air system makes the detector almost maintenance free. In addition, the installation of the detector is very simple as well. The electrode method detector is theoretically sensitive, but the output may be noisy and unreliable. Its detection area is very small, and the detection may not be accurate. The sensitivity of the optical penetration method detectors depends on the product. The detection area is long but narrow. The installation and maintenance are difficult.

The electrode detector could not detect the dust DDM detected. The signal from the DDM detector is stable whereas the signal from the electrode detector is noisy. An electrode method detector easily picks up noises, and its sensitivity needs to be set low.

The DDM dust detector detected the dust the electrode method and optical penetration method detectors did not detect.

The DDM detector and optical penetration detector sensitivities are resemble. However, the optical penetration detector’s detection area is smaller and could not detect the dust the DDM detector could.
Simple and Easy Installation

**Detector**
The detector body can be easily installed on stack without any adjustment.

**Purge Air System Box**
It can be installed anywhere and provides oil and humid free clean air to the detector. The purge air keeps the optical sensor always clean.

**Main Control Box**
It can be installed anywhere and can be isolated from high heat and static magnetic field from stack for maximum accuracy and reliability. The dust detector sensors integrated with its control circuit is easy to be installed and may be cheaper, but these sensors can be affected by high heat and static electricity, and may not be reliable and have shorter life time.

Simple and Easy Maintenance

**Calibrator**
The calibrator is simple and portable. It is easy to be carried and used for regular maintenance.

DDM-fC can be calibrated, maintained, or fixed while a plant is running and exhaust gas is still running. It does not scarify productivity. Most of dust monitor systems need a plant to be shut down for maintenance.

Reliable Continuous Monitoring

DDM-fC was installed at the exit duct of a cement mill bag filter, continuously monitored dust, and detected an excess of the dust unable to be visually identified as shown in the right graph. It led to discover a clogged bag filter and a faulty shaking damper, and fix the problem as shown in the left graph.

Benefits

Tanaka Electric Laboratory dust monitor systems do not only help to reduce air pollution and to establish corporative compliance and CSR, but also provide other benefits, such as:

- Improve plant's productivity
- Reduce ESP running cost
- Improve plant equipment life time

In addition, there are more benefits:

- Reduce initial installation time and cost
- Reduce maintenance time and cost

Applications/Usages:

- FGD of coal/oil electric power plant
- Iron works
- Paper mill
- Waste garbage incinerator
- General boiler
- Biomass boiler
- Cement plant
- Sludge incinerator
- Aluminum smelting furnace
Specifications

**CONTROL BOX (Type: DDM-FC)**

1. **Structure**  Wall mount outdoor installation type
2. **Principle**  90 degree back ward light scattering method
3. **Light source**  halogen light
4. **Measurement range**  0 – 500 mg/Nm3 relative density output (range is variable)
5. **External output**  DC 4-20mA Isolated output  RS-232C
6. **Alarm / failure output**  Air flow stop alarm by pump failure
7. **Power supply**  AC100V±10% (50Hz/ 60Hz),  4A  from purge air system box.
8. **Alarm / failure output**  Automatic / manual change selection ; Span adjustment
9. **Power supply**  AC100V±10% (50Hz/ 60Hz),  4A  from purge air system box.
10. **Operating temperature**  -10 °C ~ +50 °C
11. **Dimension**  500 x 670 x 270mm
12. **Weight**  Approx. 45kg
13. **Finish painting color**  Munsel SY7/1 G=40

**OPTICAL FIBER CABLE SET**

1. **Diameter of bundle / Length**  4 Ø x 4m (standard)

**PURGE AIR SYSTEM BOX**

1. **Installation restrictions**
   
   This unit is able to use in case of that process gas pressure is of the same grade as atmospheric pressure or when it is minus pressure
2. **Air flow**  Approx. 1001/min
3. **Alarm / failure output**  Air flow stop alarm by pump failure
4. **Power supply**  AC220V±10% (50Hz/ 60Hz),  Capacity 1KVA
5. **Operating temperature**  -10 °C ~ +50 °C
6. **Dimension**  530 mm x 504 mm x 322mm
7. **Weight**  Approx. 35kg

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**Tanaka Electric Laboratory Co., Ltd.**

30-10 Kyodo

3-Chome, Setagaya-ku

Tokyo, 156-0052

Japan

Tel: +81-3-3425-2381  Fax: +81-3-3425-2373

URL: http://www.tanaka-e-lab.com

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