

Light Scattering
Real Time
Dust Density Monitor System

DDM-*fc*



High sensitivity
Durable and reliable
Ultra low maintenance
Simple installation



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tanaka
ELECTRIC LABORATORY

Compliance and CSR

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).

DDM-fC Dust Monitor System

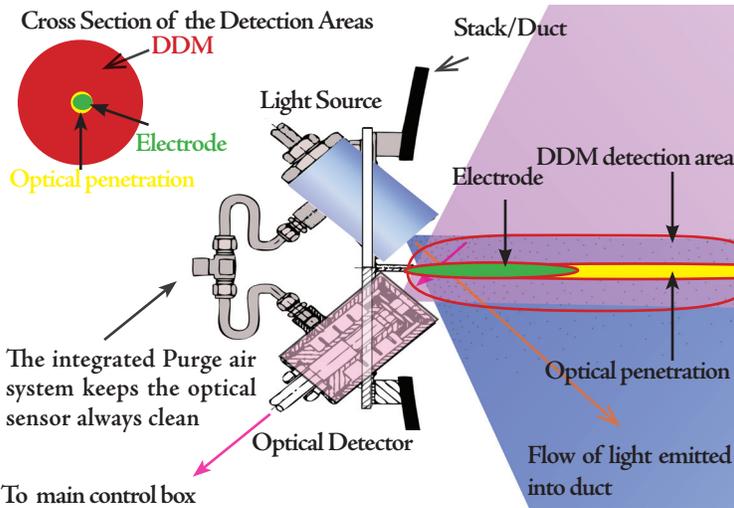
Main Control System



Optical Fiber Cable

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 humid, 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.

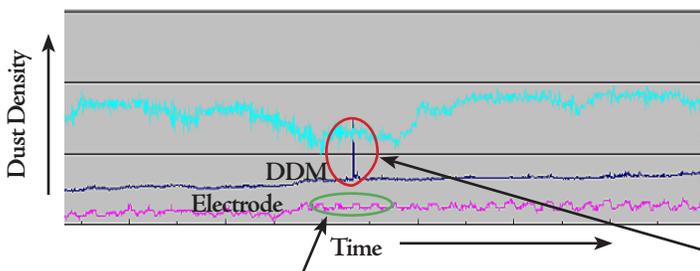
Tanaka Electric Laboratory Light Scattering Detector



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.

Sample Data and Comparison

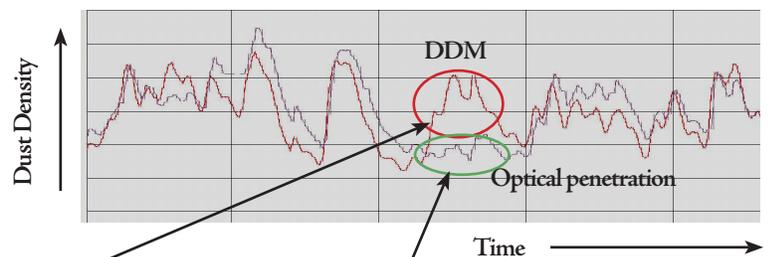
T.E.L. Light Scattering method vs electrode method



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.

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

T.E.L. Light Scattering method vs opacity method



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



Purge Air System Box

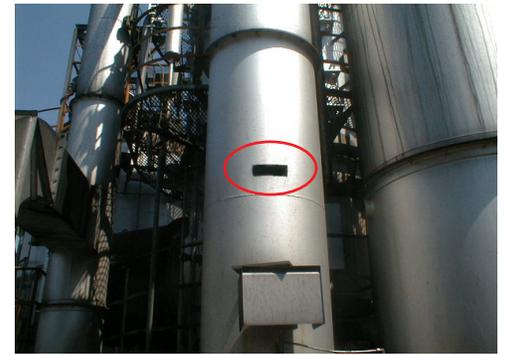
It can be installed anywhere and provides oil and humid free clean air to the detector. The purge air keeps the optical sensor always clean.

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.

Detector

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



The installation of the DDM-fC is simple and costs you less. To install the detector you need just one hall on a stack and minimal work space.

Installing optical penetration dust monitor systems needs another hall on the other side of the stack; it is more difficult; you need more time, work space, efforts, and money to install it.

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 needs a plant to be shut down for maintenance.

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:

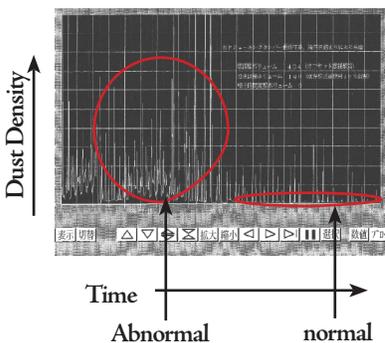
- ◆ Improve plant's productivity
- ◆ Reduce ESP running cost
- ◆ Improve plant equipment life time

In addition, there are more benefits:

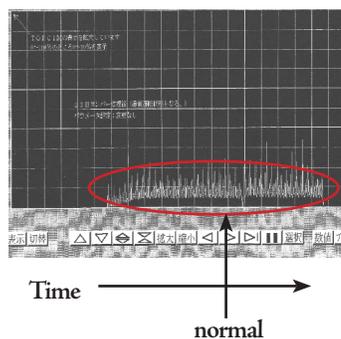
- ◆ Reduce initial installation time and cost
- ◆ Reduce maintenance time and cost

Reliable Continuous Monitoring

Clogged bag filter happened



Clogged bag filter is fixed

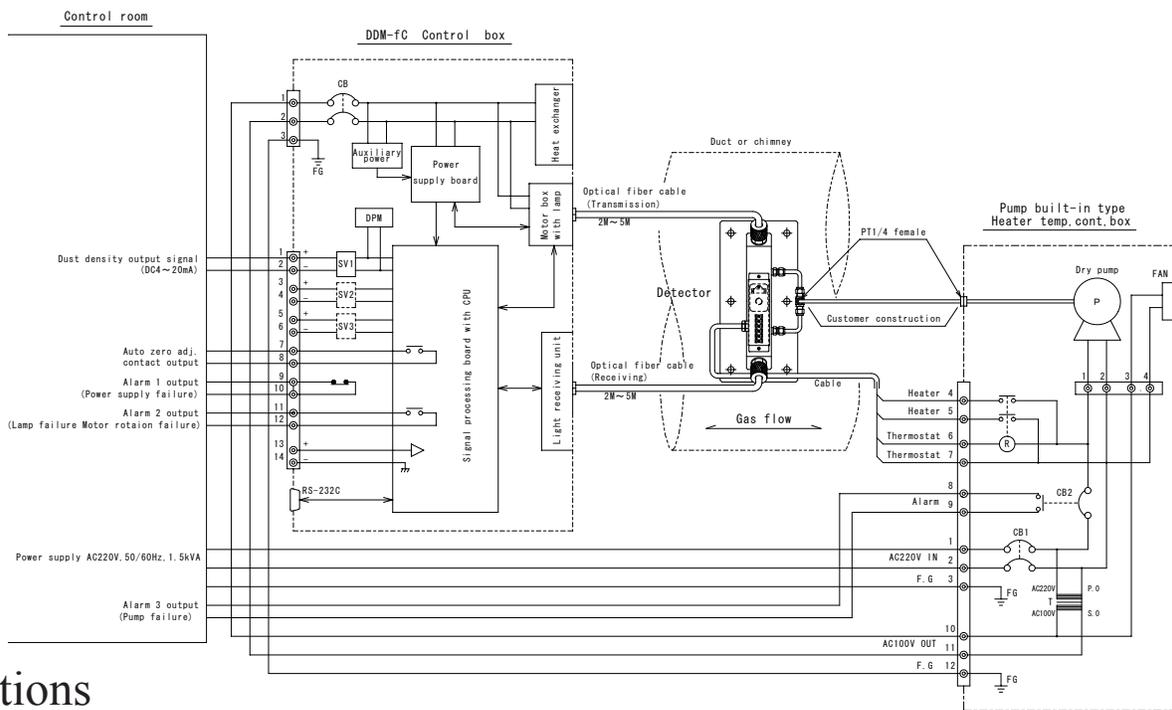


Note:
The right graph is magnified 10x because the signal is too small to be visually examined without magnified.

DDM-fC was installed at 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.

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) Display Digital panel meter of 0 - 100%
- (7) Alarm / failure output
- (8) Calibration: Zero point adjustment , Automatic / manual change selection ; Span adjustment
Optical fiber cables are connected to calibrator. Span adjustment with manual operation.
- (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 5Y7/1 G=40

OPTICAL FIBER CABLE SET

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

DETECTOR

- (1) Dimension 260 x 125 mm
 - (2) Weight Approx. 5kg
 - (3) Material Stainless steel (SUS304)
 - (4) Cartridge heater is equipped in order to prevent that the detector's silica glass becomes cloudy with dew condensation by the moisture in purge air.
 - (5) Attachment 200 mm x 65 mm rectangle hole is opened and attached to the duct.
- Please give the flange of an attachment part as construction side preparation. The packing between flange-detector is standard appending.
- (6) Connection of purge air Female screw of PT 1/4 (cheese union)

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. 100l/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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