

DUST DENSITY METER (DDM-2001)



Specifications

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1.Outline

This dust density meter (DDM-2001) is equipment which displays and automatic-measures dust density continuously as relative density by the light scattering method, and has the following features.

1-1 Merit

- (1) A detector is directly attached to chimney. This is the high sensitivity system which measures the amount of optical dispersion reflected in the dust particle, even when there is little dust density.
- (2) Since the detector is one unit, there are the following advantages compared with the thing of an optical penetration type.
 - 1) Since the two-place construction by the side of transmission and receiving is unnecessary, a cost of construction ends at a low price.
 - 2) A detector does not have worries about "a gap" of light axis by heat distortion.
 - 3) Piping of purge air requires only one place.
- (3) Since it is separated from this dust density meter control box and the detector, there are the following advantages.
 - 1) It is setting up the length of an optical fiber in 2 - 5m, and the control box installation to the place which is easy to maintain using the existing handrail and a scaffold is possible.
 - 2) A detector can be installed in hot chimney because of the composition of only mechanism parts. An electronic circuit is protected from heat by detaching a control box in that case.
- (4) Since the synchronous detection system which used the light of fixed cycles is taken, it is not influent from other light sources. For this reason, measurement near the air opening part is also possible
- (5) Since the detector is purged by the special method, it has almost no adhesion of dust. Moreover, use under high temperature and high pressure can be performed according to peculiar structure. (Patent Now Showing)
- (6) Since a halogen lamp, a motor, etc. which are articles of consumption are using the general-purpose article, availability is good and comparatively simple also for the exchange work.
- (7) Range change, zero, and span adjustment can be performed also in operation. Moreover, zero adjustment can be performed to a constant cycle by being automatic. (Just before value is held during zero adjustment)

- (8) Various alarm points of contact, and state surveillance is made.
- (9) As an option, O₂ conversion output and the moving average output are prepared.

1-2 Business Way

(1) Tendency management

Dust in the exhaust gas discharged from all combustion equipment is measured by relative density that carrying out continuation measurement For example, when got blocked and tear occur in a bag filter, since a dust density meter can measure at an early stage, it can prevent dust emitting to the atmosphere beforehand.

(2) The present dust density can be known on real time

By creating the correlation diagram of the amount of dust measurement between the output signal and the uniform drawing-in method (the JIS method) , we can know the present dust density on real time. Thereby, operation management of EP and bag filter which observes dust density can be performed.

2. Specification

2-1 Control box (Type : DDM- 2001)

- (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 - 1000mg/Nm³ relative density output (range is variable)
- (5) External output DC 4-20mA Isolated output (load resistance less than 750Ω)
RS-232C I/F output (a port is prepared)
- (6) Display Digital panel meter of 0 - 100%
- (7) Alarm / failure output
 - ① set-value alarm : It outputs in setting value over.
 - ② power supply shutdown alarm
 - ③ failure of motor, lamp, internal power supply voltage,
automatic zero adjustment

(Dry “a” contact output : contact capacity : AC / DC 200 V, 0.1A)

(8) Calibration

- ①Zero point adjustment . Automatic / manual change selection

The execution cycle at the time of automatic selection is 7days or 30days

- ②Span adjustment . Optical fiber cables are connected to calibration box.

Span adjustment with manual operation.

2-4 Calibration box

- (1) Size 30 x 30 x 130mm
- (2) Structure It has the fixed amount of penetrations by small holed diaphragm and polarizing filter.
Small holed diaphragm and polarizing filter are set up at the time of real operation.

2-5 Purge air temperature control box

- (1) Size 530 x 500 x 220 mm
- (2) Weight Approx. 26kg
- (3) Finish painting color Munsel 5Y7/1 G=40
- (4) Installation restrictions Please supply instrumentation air or pure compressor air.
- (5) Structure Purge air from compressor in site is breathed out from detector head. . In order to prevent that the detector's silica glass becomes cloudy with dew condensation by the moisture in purge air, this air is pressurized and heated at a built-in air pressure heater.
And oil-mist in purge air is simultaneously removing by ceramic filter.
- (6) Required air flow 120 l/min (it can do few according to the adhesion state of dust.)
- (7) Air pressure More than +50KPa (0.5 kg/cm²) process gas pressure
- (8)Purge air temperature 80 °C
- (9) Power supply AC200V Capacity 1kVA

2-6 Pump built-in type purge air temperature control box (Option)

- (1) Size 600 x 500 x 300 mm
- (2) Weight Approx. 45kg
- (3) Finish painting color Munsel 5Y7/1 G=40
- (4) Purpose It is used when purge air cannot prepare in the site.
- (5) 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
- (6) Structure Purge air exhausted from dry pump is breathed out from detector head. . In order to prevent that the detector's silica glass becomes cloudy with dew condensation by the moisture in purge air, this air is pressurized and heated at a built-in air pressure heater.
And mist in purge air is simultaneously removing by ceramic filter.
- (7) Air flow Approx. 120 l/min

- (8) Purge air temperature 80 °C
- (9) Power supply AC200V Capacity 1.2Kva

3.Composition

Please refer to the composition figure of the following page.

(1) Control box (Type : DDM- 2001)

It consists of power supply circuit, light source equipment, light receiving circuit, signal processing circuit of CPU. The heat exchanger is built in as a measure against temperature by outdoor installation.

(2) Detector

It is attached to the duct or chimney in order to measure dust density.

The optical fiber cables from control box are connected.

Since this detector has the structure of dividing inside and outside of duct with silica glass (3mm of board thickness), span calibration is possible under high temperature and high pressure exhaust gas by removing optical fiber cables safely.

(3) Transmitting optical fiber cable

The light (halogen light) of fixed cycle made with the light source equipment in control box is sent to detector through this optical fiber.

(4) Receiving optical fiber cable

The scattering light by dust is sent to the light receiving circuit in control box through this optical fiber

(5) Calibration box

Remove optical fiber cables from detector and connect to this calibration box.

And decide Span adjustment value.

(This calibration box is set up during real operation there)

(6) Purge air temperature control box

In order to prevent that the detector's silica glass becomes cloudy with dew condensation by the moisture in purge air, this air is pressurized and heated at a built-in air pressure heater.

And oil-mist in purge air is simultaneously removing by ceramic filter.