



No.1 market share in Japan

PM2.5 Monitor

FPM-377



DKK-TOA CORPORATION

Through supply of the ambient environment monitoring instrument including PM2.5, DKK-TOA contributes to social environmental realization to be able to live in safety.

**Available outdoor,
indoor use**

Built-in heater system for relative humidity control

The heater system warms the sampled air to keep the relative humidity in the collection and measurement units constant. This can minimize the impact of the moisture content of the sampled air on the analysis, achieving excellent equivalence with the standard measuring method (Federal Reference Method [FRM]).

Enclosed in a shelter to accommodate all weather conditions

The outdoor enclosure has a dust-proof construction, ensuring there is no interference with the proper operation of the analyzer unit.



LCD touch panel display

The LCD touch panel monitor enables interactive operations. Users can easily display charts showing the progression of data, call history records, etc.

Easy identification of SPM spot date and time

Since the spacing between the hourly collection spot at midnight and the spot on 1 a.m. on the next day can be doubled, the change of date is easily identified on the filter paper. The particle-impregnated filter paper can be used as reference material in the determination of measured data.

- Measured values (one-hour averages) and other data stored in the analyzer, including operating conditions inside the analyzer (temperature, pressure, and flow rate), zero deviation, span coefficient, and alarm and event history information, can be transferred to a compact flash (CF) memory card supplied as standard. Data files are saved in CSV format, allowing you to easily edit data using Microsoft Excel, etc. In addition, since various types of data, such as one-hour averages and alarm & event

information, can be stored in yearly or monthly intervals, you can organize the data without difficulty.

- A high-performance recorder prints out data such as daily reports in digital form on the same chart paper. When the power returns after an outage, the instrument will fast-forward the chart paper to the correct time position.
- By incorporating an optional Ethernet interface, data can be retrieved or remotely controlled through direct connection to an Ethernet network.

■ Principle of PM2.5 Measurement

When a substance is irradiated by low-energy beta rays, the beta ray absorption by that substance is proportional to the mass of the substance. The beta ray attenuation method utilizes this property. The mass of PM2.5 can be determined by irradiating the PM2.5 collected on filter paper and measuring the transmitted beta ray intensity. The relationship between the transmitted beta ray intensity and the mass of PM2.5 can be expressed by the right formula:

$$\ln(I_0/I) = \mu_m \cdot X_m$$

I : Intensity of beta rays transmitted through the filter paper and PM2.5

I₀ : Intensity of beta rays transmitted through the filter paper only

μ_m : Mass absorption coefficient (cm²/g)

X_m : Mass of PM2.5 (g/cm²)

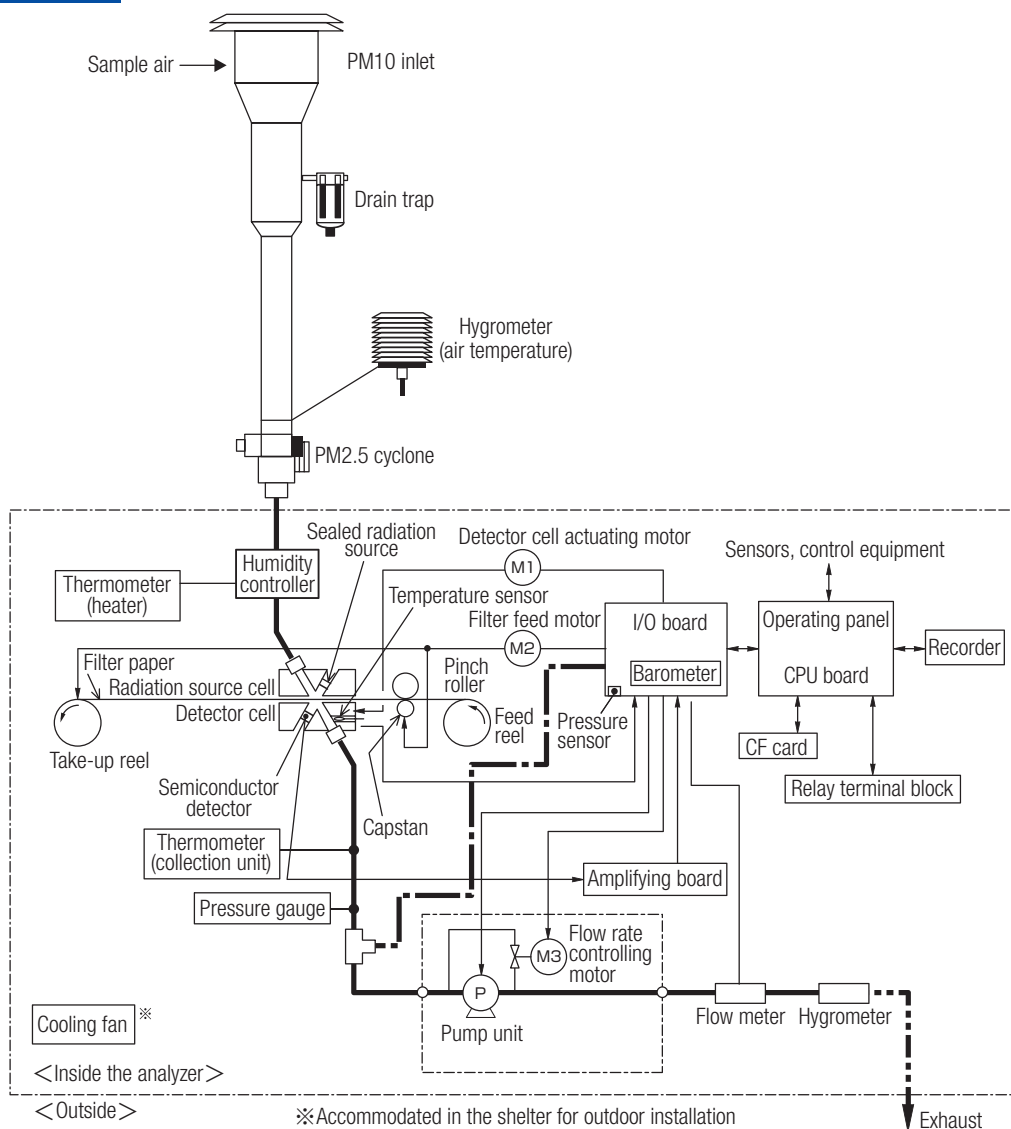
From the above equation: $X_m = \frac{1}{\mu_m} \cdot \ln(I_0/I)$

This automatic monitor introduces the sample air at a constant rate of 16.7 L/min via the cyclone to collect the PM2.5 on the filter paper. After measurement and calculation, the mass concentration output of PM2.5 is continuously provided.

Standard Specifications

Product name	: PM2.5 Monitor	Repeatability	: Zero; within $\pm 2\%$ (of the maximum scale value)
Model	: FPM-377-1 (Outdoor installation model) FPM-377-2 (Indoor installation model)	Span	: within $\pm 2\%$ (of indication for equivalent film)
Measurement object	: Fine particulate matter in the atmosphere (PM2.5)	Accuracy (linearity)	: Within $\pm 3\%$ of indication for equivalent film
Measurement method	: Beta ray attenuation method	Stability	: Zero drift; within $\pm 2\%$ /day of the maximum scale value Span drift; within $\pm 3\%$ /day of indication for equivalent film
Measurement range	: Switching over between 0 – 500 $\mu\text{g}/\text{m}^3$, 0 – 1,000 $\mu\text{g}/\text{m}^3$, and 0 – 5,000 $\mu\text{g}/\text{m}^3$ automatically/manually	Minimum indication unit	: 0.1 $\mu\text{g}/\text{m}^3$
Beta ray source	: Promethium 147 (sealed source of below 3.7 MBq)	Indication for calibration air:	: Within $\pm 10\%$ of indication for the standard measuring method (100 – 200 $\mu\text{g}/\text{m}^3$)
Beta ray detector	: Semiconductor type	Indication for air without particulate matter (blank value):	: $\pm 2\mu\text{g}/\text{m}^3$ or less (average value) (when shipped from the factory)
PM2.5 cyclone	: VSCC (standard)	Data saved in the CF card (supplied as standard):	: 1 hour averages, total flow, temperature, humidity, atmospheric pressure, and other data; the data of more than 1 year can be stored.
Sample humidity control	: Relative humidity control by warm sampled air	Warm-up time	: Approx. three hours
Recording method	: Saw-tooth outputs by high-performance dotting-type recorder	Ambient conditions	: FPM-377-1; $-10 - 45^\circ\text{C}$, 85% RH or less (no condensation) FPM-377-2; 0 - 40°C , 85% RH or less (no condensation)
Recording paper	: Fan-fold type, strip chart paper	Power requirements	: 100VAC $\pm 10\%$, 50/60 Hz
Effective scale width	: 180mm (CH-5154)	Power consumption	: FPM-377-1; approx. 450VA max, approx. 300W on average FPM-377-2; approx. 400VA max, approx. 250W on average
Chart speed	: 25 mm/hour	Weight	: FPM-377-1; approx. 100kg FPM-377-2; approx. 100kg (Analyzer unit; 16 kg, pump unit; 12 kg)
Filter paper	: 4-fluorinated ethylene resin filters (paper roll lasts for 33 days)		
Sampling efficiency	: 99.9% or more (for DOP particles of 0.3 μm)		
Sample flow rate	: 16.7 L/minute $\pm 2\%$		
Flow rate control	: Actual quantity control		
Sampling duration	: 59 minutes (for hourly batch analysis)		
Averaging time	: 1 hour and 24 hours		
Transmission output	: 0 – 1VDC (internal resistance 500 Ω or less, load resistance 100 k Ω or more), saw-tooth outputs, isolated		

Measurement Flow Sheet



Related Analyzer

Nitrogen Oxides Analyzer

GLN-354

This instrument provides continuous and reliable measurement of Nitrogen Oxides in ambient air. Measurement is based on the principle of chemiluminescence as specified in ISO-7996 (Ambient air - Determination of the mass concentration of nitrogen oxides - Chemiluminescence method). The instrument is designed for long term, continuous measurement, logging and data output.

Measurement Method	: Chemiluminescence method.
Measurement Ranges	: 0 – 0.1, 0 – 0.2, 0 – 0.5, 0 – 1.0, 0 – 2.0ppm.
Measurement Cycle	: Continuous
Output signal	: 0 – 1VDC (isolated)
Communication System	: RS232C (standard)
Power Requirements	: 100VAC±10%, 50/60Hz.
Power Consumption	: max 250VA, average 170W
External Dimensions	: 399(W)×540(D)×962(H)mm
Weight	: approx. 36kg (except diluter)



Sulfur Dioxide Analyzer

GFS-352

This instrument provides continuous and reliable measurement of Sulfur Dioxide in ambient air. Measurement is based on the principle of UV fluorescence method specified in ISO-10498 (Ambient air - Determination of sulfur dioxide - Ultraviolet fluorescence). The instrument is designed for long term, continuous measurement, logging and data output.

Measurement Method	: UV fluorescence method.
Measurement Ranges	: 0 – 0.05, 0 – 0.1, 0 – 0.2, 0 – 0.5, 0 – 1.0ppm.
Output signal	: 0 – 1VDC (isolated)
Ambient Conditions	: Temperature; 0 – 40°C, Humidity; 85%RH or less.
Communication System	: RS232C (standard)
Power Requirements	: 100VAC±10%, 50/60Hz.
Power Consumption	: max 120VA, average 70W
External Dimensions	: 399(W)×540(D)×962(H)mm
Weight	: approx. 36kg (except diluter)



Ozone Analyzer

GUX-353R

This instrument provides continuous and reliable measurement of Ozone in ambient air. Measurement is based on the UV photometric method as specified in ISO-13964 (Air quality - Determination of ozone in ambient air - Ultraviolet photometric method). The instrument is designed for long term, continuous measurement, logging and data output.

Measurement Method	: UV photometric method.
Measurement Ranges	: 0 – 0.1, 0 – 0.2, 0 – 0.5, 0 – 1.0ppm.
Output signal	: 0 – 1VDC (isolated)
Ambient Conditions	: Temperature; 0 – 40°C, Humidity; 85%RH or less.
Communication System	: RS232C (standard)
Power Requirements	: 100VAC±10%, 50/60Hz.
Power Consumption	: max 150VA, average 60W
External Dimensions	: 399(W)×540(D)×962(H)mm
Weight	: approx. 32kg



Carbon Monoxide Analyzer

GFC-351

This instrument provides continuous and reliable measurement of Carbon Monoxide in ambient air. Measurement is based on the principle of gas filter correlation, as specified in ISO-4224 (Ambient air - Determination of carbon monoxide - Non - dispersive infrared spectrometric method). The instrument is designed for long term, continuous measurement, logging and data output.

Measurement Method	: Gas filter correlation method.
Measurement Ranges	: 0 – 5, 0 – 10, 0 – 20, 0 – 50, 0 – 100ppm.
Output signal	: 0 – 1VDC (isolated)
Ambient Conditions	: Temperature; 0 – 40°C, Humidity; 85%RH or less.
Communication System	: RS232C (standard)
Power Requirements	: 100VAC±10%, 50/60Hz.
Power Consumption	: max 250VA, average 110W
External Dimensions	: 399(W)×540(D)×962(H)mm
Weight	: approx. 37kg



DKK-TOA CORPORATION

International Operations:
DKK-TOA Corporation
29-10, 1-Chome, Takadanobaba, Shinjuku-ku, Tokyo 169-8648 Japan
Tel : +81-3-3202-0225 Fax : +81-3-3202-5685



CAUTION

Do not operate products before consulting instruction manual.

<http://www.toadkk.co.jp/english>

Information and specifications are for a typical system and are subject to change without notice.