

Automatic & Real-Time Suspended Particulate Monitor

AIR QUALITY MONITORING SYSTEMS

DESCRIPTION:

The standard Beta gauge measurement Method **ISO 10473** of the MP101M analyzer allows, when used with the patented optical technology of the CPM module, the continuous and simultaneous measurement of fine dust.

The beta attenuation instrument is compliant with **EN 12341 for PM10** and **EN 14907 for PM2.5** European Standards and is approved as Federal Equivalent Method (FEM) by **US EPA for PM10 and PM2.5** continuous suspended particulate monitoring.

- Precise beta attenuation monitoring of PM10, PM2.5, PM1 or TSP mass concentration ($\mu\text{g}/\text{m}^3$)
- Real time optical indication about PM10, PM2.5, PM1 and TSP mass concentration ($\mu\text{g}/\text{m}^3$) using a single inlet
- Real time particles counting trend & classification by range size



SPECIFIC FEATURES:

- True volumetric air flow control with 3 atmospheric pressure and temperature sensors
- Sampling flow-rate continuously regulated to the atmospheric temperature and pressure: reduces evaporation artefacts of volatile compounds (mandatory for PM2.5 according to EU regulations)
- Automatic calibration of the real time optical module (CPM) to the reference measurement (β gauge)
- Flow calibration possible during the measurement
- Built-in reference gauge for calibration: no need for factory re-calibration
- Automatic Span Calibration checks (option)
- Calibration screen for atmospheric pressure sensors
- Regulated Sampling Tube (RST) compliant with CEN PM10 and US-EPA standard: sample not affected by seasonal or geographical factors and avoids evaporative losses of semi-volatile particles
- Fibreglass tape with 3 years of autonomy of continuous sampling with daily cycles (1200 cycles)
- Low activity C14 sealed flat source with analyzer lifetime duration
- Rugged instrument, not sensitive to vibration, humidity, temperature...
- New: On board web server compatible with any internet browser. ESA Connect™ user interface with on-line help for the display, configuration, maintenance, diagnostics or software updating of the analyser, remotely, from any PC, tablet or smartphone.



Sliding drawer
on the rear panel
for easy access and maintenance



Optical CPM module
for evaluation in real time
of several particulate
size fraction

MAIN APPLICATIONS:

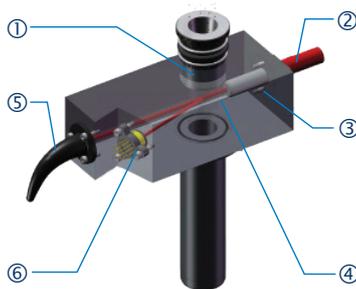
- Ambient air quality monitoring
- Indoor dust monitoring
- Working places

Suspended Particulate Monitor **MP101M** with **CPM** option

PRINCIPLE OF OPERATION:

The **CPM** (Continuous Particulate Measurement) principle is based on the measurement of the light scattered at a small angle, close to forward scattering, where the signal is not sensitive to the particle's nature. The intensity of this signal is continuously analysed, in order to classify the particles into 7 size ranges. Knowing the number and size of detected particles, a powerful algorithm is applied to continuously convert these data into mass concentration.

Combination of both technologies provide a real-time indication of particles for PM10, PM2.5 and PM1 simultaneously.



- ① Sampling tube
- ② Laser diode
- ③ Diaphragm
- ④ Laser beam
- ⑤ Light trap
- ⑥ Photodiode

CPM MODULE SPECIFICATIONS

Technology	Light scattering (*)
Max. number of counted particles	200 000 / cm ³
Optical source	Red visible laser diode
Detector	Photodiode
Temporal resolution	1 second
Dimensions	285 x 131 x 67 mm (WxDxH)

(*) Light scattering technologies applied to particle mass concentration measure can be affected by aerosols chemical composition and atmospheric conditions & should be subject to operator interpretation.

OPTIONS & ACCESSORIES:

- **CPM module** for optical real-time measurement (concentration, counting, classification by size range) of particles (see specific brochure)
- US EPA and EU-CEN compliant sampling inlets
- **Temperature-regulated sampling tube (RST):**
1 m, 1.5 m, 2 m, 2.75 m, compliant with **CEN PM10 Directive**
- Max 2 ESTEL electronic boards with:
 - 4 independent analog inputs / outputs
 - 4 remote control inputs
 - 6 dry contacts outputs
- External pump assembly: diaphragm (9.5kg), rotary vane (7kg)
- Easy to install span calibration module for automatic and programmable calibrations
- Field connection kit for leak and zero test (on RST tube)
- Laboratory connection kit for leak and zero test (on MP101M)
- Bead flowmeter for leak test
- HEPA filter for zero test

TECHNICAL SPECIFICATIONS

Measuring ranges	up to 10 000 µg/m ³ (user-programmable)
Lower detectable limit	0.5 µg/m ³ (24h average)
Measurement cycles	1/2h, 1h, 2h, 3h, 6h, 12h, 24h, user-selectable (up to 96 hours)
Measuring period	10 min, 15 min, 30 min, 1h, 2h, ..., 48h (user-selectable)
Beta Source	Sealed Carbon 14 (1.6MBq±15%)
Detector	High performance Geiger-Müller counter
Sampling flow rate	1 m ³ /h
Standard filter	Fibreglass tape (width 35 mm, length 30 m) Autonomy for 1,200 samples (>3 years of daily measurements)
Power supply	230V/50Hz (115V/60 Hz)
Housing	19" rack / 6U
Dimensions	483 x 324 x 266 mm (W x D x H)
Weight	15 kg (without pump)
Operating temperature	+10 to +40 °C
Serial link	1 RS 232/RS422
Ethernet (RJ45) and USB ports	
On-board web-server with remote ESA Connect™ interface	

SAMPLING INLETS



PM 10 - EN 12341
PM 2.5 - EN 14907



PM10
louvered
US-EPA



PM 2.5 VSCC
adapter
US-EPA



TSP
US-EPA

Other sampling inlets for research or specific applications are available upon request, such as PM1 for Europe and US-EPA



Automatic and programmable
Span Calibration Module



TCP/IP remote
ESA Connect™ interface
with animated diagram
and intuitive navigation

