

MODEL GRIMM #180

AUTOMATIC DUST MONITOR (PM10, PM2.5, PM1)



Advantages - Characteristics

- Simultaneous measurement of PM₁₀, PM_{2.5} & PM₁ in $\mu\text{g}/\text{m}^3$
- Optional measurement of 31 particle sizes
- No sample heating, thus volatile fraction is not lost
- Temperature, Relative Humidity and Pressure sensors are included (other sensors optionally)
- All data is stored in internal memory (or optional removable PCMCIA memory card)
- No moving parts, long lived system with very low maintenance
- Possibility of remote access
- Data management software package
- Integrated Datalogger
- Possibility of installing sensor PAH 130
- Can be installed in 19" rack, alongside other similar environmental equipment
- For outdoor applications, model 365 offers a system installed in a stainless steel, climate controlled chamber from -20 to + 40 °C

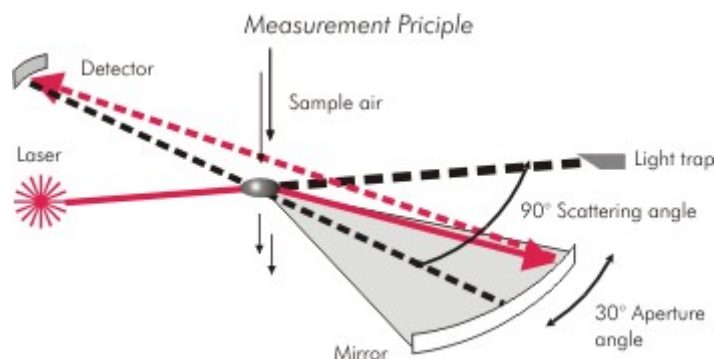
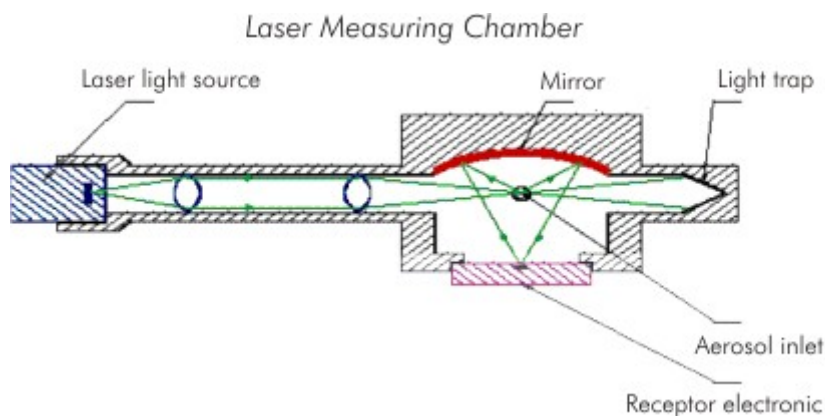


Theory of Operation

Models 180 and 190 have been designed for their use in stationary applications (installation in 19" rack in pollution monitoring stations). They have been developed specifically for the simultaneous and continuous measurement of fine particles PM₁₀, PM_{2.5} and PM₁ (according to Norm NE12341). The system shows the mass of the particles in $\mu\text{g}/\text{m}^3$. The resolution of the mass calculations is of $\mu\text{g}/\text{m}^3$ at a flow of 72 l/h.

The system also includes: measurement of the sample ambient conditions such as Temperature, Relative Humidity and Atmospheric Pressure, internal Datalogger and removable memory card for data. Optionally, the data collected can be transmitted to a remote location.

The system takes a continuous air sample with a flow controlled pump. The particles are measured by the physical principle of orthogonal light scattering. Here particles are illuminated by a laser light and the scattered signal from the particle passing through the laser beam is collected at approximately 90° by a mirror and transferred to a recipient diode. Each signal of the diode is fed, after a corresponding reinforcement, to a pulse height analyser then classified by size and transmitted in each size channel. These counts are converted each minute to a mass distribution from which the different PM values are derived. Results of the measurement are shown on the display. Over the RS232 interface and the included software program it is possible to display the data as mass distribution in $\mu\text{g}/\text{m}^3$: PM₁₀, PM_{2.5} and PM₁.



Specifications

MODEL 180

- **Measurement Principle:** Laser Light Dispersion (90°) [Spectrometer 187]
- **Measurement Range:** 0.25 to >32 µm in 31 size channels
- **Size Channels:** 0.25 - 32 µm (0.25-0.28-0.3-0.35-0.4-0.45-0.5-0.58-0.65-0.7-0.8-1.0-1.3-1.6-2.0-2.5-3.0-3.5-4.0-5.0-6.5-7.5-8.5-10-12.5-15-17.5-20-25-30-32 µm)
- **Particle Count:** 1 a 2.000.000 particles/litre
- **Mass:** 0.1 to >1500 µg/m³
- **Sample Flow:** 72 l/h volume controlled
- **Reproducibility:** 3% at maximum range
- **Temperature Range:** -20°C a +40°C. (*in model 107 GF*)
- **Power Supply:** 230/110 VAC, 50 Hz. (optional 110 VAC)
- **Size:** 19" (6u. + 2u. height)
- **Weight:** 15 Kg
- **Sample Probe:** Stainless steel 1.5m, includes dynamic sample drying element, Temperature and Humidity sensors (optional 3m)
- **Standard Data Output:** *In the display:* PM₁₀, PM_{2.5} and PM₁ in µg/m³ and sensor values
RS 232: PM₁₀, PM_{2.5} and PM₁ in µg/m³ and sensor values (via Windows)
- **Vacuum Pump:** Great capacity, integrated in system

MODEL 190:

[31 different size channels] -or- [PM₁₀, PM_{2.5} y PM₁ in µg/m³]

Model 190, of the same structure as model 180, permits the measurement in real time of individual particles in **31 different size channels**. Particles detected are classified according to size and the number of counts is expressed each minute in a size distribution. From the result of these counts it is possible to calculate the values for **PM₁₀, PM_{2.5} and PM₁ (µg/m³)**.

Recent epidemiological studies show that the impact on health of aerosols is more related to the size of particles than to their mass. It is easy for small particles to reach and deposit on the alveoli of the lung, causing different impacts on human health. The contribution (in mass) of small particles is inferior but they are also present in higher quantities. Therefore it is necessary not only to determine the mass (PM₁₀/PM_{2.5}) but also the size.

Model 190 adds the following specifications to those of Model 180:

- **Size Resolution:** 31 different channels
- **Concentración Range:** 1 a 2.000.000 Particles/litre
- **Size Range:** 0.25 - 32 µm (0.25-0.28-0.3-0.35-0.4-0.45-0.5-0.58-0.65-0.7-0.8-1.0-1.3-1.6-2.0-2.5-3.0-3.5-4.0-5.0-6.5-7.5-8.5-10-12.5-15-17.5-20-25-30-32 µm)
- **Resolution Time:** 6 seconds to 1 hour, with selectable average value



SIR, S.A.
Avd. de la Industria, 3
28760 Tres Cantos, Madrid
Tel. 91 803 66 02
Fax. 91 803 64 33
sirsa@sirsa.es
www.sirsa.es

