

The Approved Environmental Dust Monitor EDM180 Stationary 19" Rack Unit For Measurement Networks



This is the ultimate solution for any measurement container to measure simultaneously and in real-time PM10, PM2.5, PM1 and the TC (Total counts) with one unit. This fully approved unit (<http://www.grimm-aerosol.com/unternehmen/approvals-and-certificates/index.php>) can even measure the particle size distribution in 31 size channels simultaneous to the PM values.

This is the first and only optical Mass monitor which is fully approved (US-EPA, MCERTS, CMA and EN) and now worldwide in use for years. The EDM 180 can also supply the complete meteorological information; next to the standard of temperature and humidity it can optionally provide wind direction and speed, pressure and precipitation.

Grimm has worldwide over 30 field calibration stations, but the EDM 180 fine dust monitoring system can also on site be validated via our field test kit and SDS (System Diagnosis Software) for proper sizing, proper flow and even proper service. Naturally the data can be exported via RS-232 or even via Ethernet. Thanks to their outstanding advantages, these devices are now used successfully all around the world.

Customer's benefits

- Officially approved according to the standards EN12341, EN14907, US-EPA, CMA and GOST-R
- Simultaneous readout of measurement data as dust mass fractions PM10, PM2.5, PM1, TC (Total Counts), and particle counts in 31 channels
- No loss of semi-volatile compounds due to Nafion dryer
- Readout of measurement results in real-time every 6 seconds
- Self-test for checking the readiness for use at each start-up
- Automatic cleaning of the optical measuring cell
- No radioactive source, insensitive to vibrations (can also be used in mobiles)
- Very low maintenance and no consumables

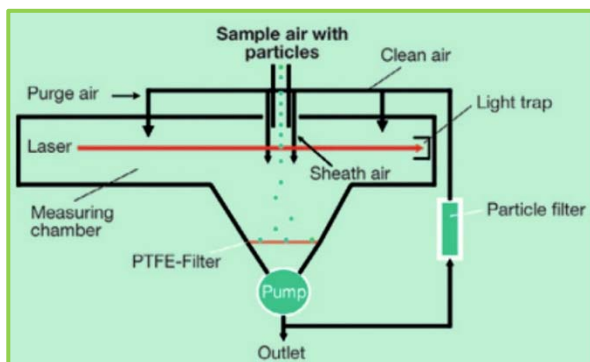
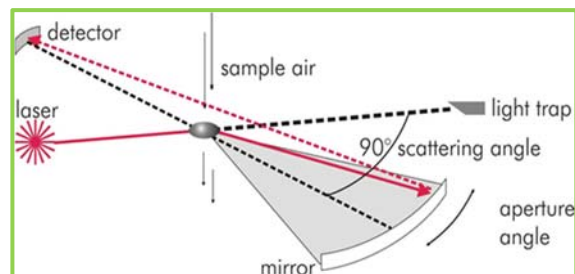
The EDM 180 uses – other than different instruments on the market – no heat for drying the humidity of the sample air but the so-called Nafion dryer. Nafion is a semi-permeable membrane which lets the water molecules permeate through the wall when applying a low-pressure outside this membrane. The low-pressure is sensor-controlled according to the ambient conditions. By this method of isotherm humidity extraction no particles, like semi-volatile compounds, get lost due to heating.

Unique features

Grimm's EDM 180 is certified according to European Regulations for PM₁₀ and PM_{2.5}. Furthermore, it has the US-EPA certification for PM_{2.5}. The device does not need any consumables, possible errors and the next necessary maintenance are displayed automatically, and therefore reliability is greatly enhanced! No other device allows you to read out the particle size distribution in 31 size channels (optional). The readout of the environmental measurement data is effected in GESYTEC MODE, but Grimm's high performance readout software 1178 can also be used.

Instrument operation

GRIMM's more than 30 years of experience in manufacturing of aerosol spectrometers are reflected in the **patented scattered light** measurement cell and its electronic signal output for every particle size. This know-how combined with high-quality material ensures precision and high data quality.

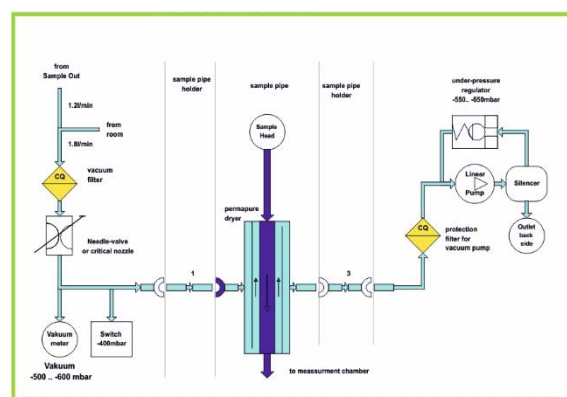


Device concept

The pneumatic scheme shown on the left demonstrates that the sample air enters the measuring chamber from the top in such a way, so that **only one particle at a time** is measured (this is the difference to any Nephelometer method). The outlet after the pump is closed prior each start, so that there is only internal filtered air circulation and therefore the count is "zero" (self-test).

Nafion Concept

The meteorological sensor controls the operation of the low-pressure by activating or deactivating the vacuum pump. The low-pressure is applied in the space between the sample pipe and its inside Nafion hose and thus has no influence on the particle flow inside the Nafion membrane, only on the humidity.



For fine dust analysis in highest precision this top of the line device is unique and has no equal!

Additional extensibility of measurement modes:

EDM 180-C PM₁₀ and PM_{2.5}

EDM 180-D: PM₁₀, PM_{2.5}, PM₁ and TC

EDM 180-MC: PM₁₀, PM_{2.5}, PM₁, TC, and simultaneously 31 size channels from 0.25 - 32 µm

Specification EDM180

Measurement Data

PM Values:	PM10, PM2.5, PM1, simultaneous
Size channels:	31 channels as basis 0.25/0.28/0.3/0.35/0.4/0.45/0.5/0.58/0.65/0.7/0.8/1.0/ 1.3/1.6/2/2.5/3/3.5/4/5/6.5/7.5/8.5/10/12.5/15/17.5/20/25/30/32[μm]
Count range:	1 to 3,000,000 particles/liter
Particle mass:	From 0.1 to 10,000 $\mu\text{g}/\text{m}^3$
Environmental data:	Through extrapolation and concentration adaption. The mass calculation is optimized with the gravimetrical reference method to PM10 and PM2.5 (EN12341, EN14907, US-EPA, MCERTS, CMA)
Optional information:	Particle counts in all size channels

Instrument Data

Sample Air Humidity:	Isotherm humidity extraction via Nafion membrane, sensor-controlled, without the loss of SVC (semo-volatile compounds)
Reproducibility:	± 3 % over the total measuring range
Sample flow:	Measurement volume of 1.2 l/min ± 5 % automatically regulated
Rinsing flow:	0.3 l/min, self-controlled, automatically, with optical cleaning on start-up and in the stand-by mode
Laser wavelength:	660 nm
Power:	Pmax = 80 mW
Operation:	Via foil-keyboard or PC (Software or HyperTerminal)
LCD-display:	2 x 16 alphanumerical characters
Self-test:	Automatically after each start-up
Measurement intervals:	From 6 seconds upwards to one hour averages
Storage intervals:	Adjustable: from 6 seconds to 1 hour in preset intervals
Data storage:	Internal 80 kB standard, optional on PCMCIA card
Communication:	Via PC and RS-232-interface
Data output:	LCD-display: PM10, PM2.5, PM1, mean value and collected dust weight, date and time, sensor values
Analog input:	3 (0-10 V) signals, resolution 10 bits (ca. 10 mV) for meteorological sensor
Dimensions:	266 x 483 x 364 mm (19 inch rack, 4 HU, extra 2 HU for rack adapter)
Weight and color:	18 kg
Max. operation altitude:	Up to 2,000 m without adjustment
Operating temperature:	+4 to +40 °Celsius (39 to 104 °F), RH < 95 % (non-condensing), non-corrosive or explosive gases
Storage and transport:	-20 to +50 °Celsius (-4 to 122 °F), RH < 95 % (non-condensing)
Sample air pressure range:	1013 hPa +/- 120 hPa If measuring in areas with high or very low over a low air pressure over a longer period of time, the sample volume needs to be adjusted via flow meter and PC.

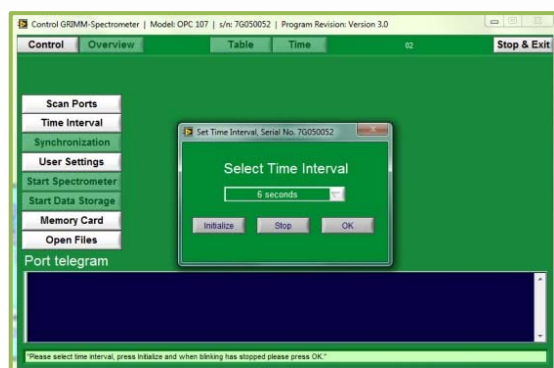
Software

Version 1.178, LabView® for Windows XP upwards (*see next page*)

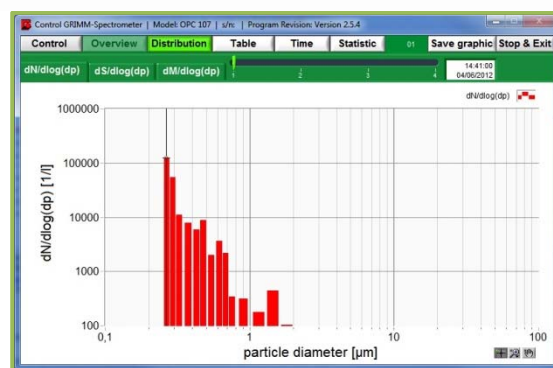
LabView® Software 1.178

With the new **software 1.178** GRIMM programmed an excellent, user-friendly application software based on LabView®, which is compatible to all 32-/64-bit Windows operating systems from XP and upwards. PM10, PM2.5 and PM1 values as well as optionally the particle count information in 31 size channels are displayed numerically or graphically. Additionally, values of external climatic sensors and service data can be displayed.

The display and output of measuring data takes place in real-time (every 6 seconds) and is therefore suitable not only for data recording and data evaluation, but also for data presentation.



Page to select the measurement interval



Particle size distribution by number



PM values over time

date & time	PM10	PM2.5	PM1
18/09/2013 13:42:58	21.6	5.5	3.2
18/09/2013 13:43:02	14.1	5.1	3.3
18/09/2013 13:43:06	8.6	4.8	3.4
18/09/2013 13:43:14	16.6	5.7	3.1
18/09/2013 13:43:20	18.3	4.7	3.4
18/09/2013 13:43:26	18.5	6.8	3.6
18/09/2013 13:43:32	16.9	6.1	3.7
18/09/2013 13:43:38	15.3	4.6	3.1
18/09/2013 13:43:44	13.4	4.0	3.1
18/09/2013 13:43:50	11.9	4.5	3.3
18/09/2013 13:43:56	3.2	3.2	3.0
18/09/2013 13:44:02	22.8	5.0	3.4
18/09/2013 13:44:08	12.9	6.8	3.4
18/09/2013 13:44:14	13.8	6.2	3.6
18/09/2013 13:44:20	15.0	5.1	3.4
18/09/2013 13:44:26	13.4	5.9	3.0
18/09/2013 13:44:32	15.6	5.2	3.4
18/09/2013 13:44:38	15.6	5.1	3.3
18/09/2013 13:44:44	12.9	4.9	3.3

PM values as table

Accessories

- 157L Sensor for humidity, temperature, and pressure
- 158L Sensor for humidity, temperature, pressure, wind direction, wind speed (needs the data logger 1142.M5)
- 159L Sensor for humidity, temperature, pressure, wind direction, wind speed, precipitation (needs the data logger 1142.M5)
- 199 Air-conditioned IP54 mini shelter
- 1142.M5 Data logger for storage and transfer of measurement and GPS data onto the Grimm Live Measurement Center for the worldwide access via internet



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