

Compact Real-Time Monitor for Particulate Matter

EcoChem DC2200CE



- ◆ Detects the total surface area ("Fuch's surface) of particles in real-time
- ◆ Lightweight, compact and ruggedized construction
- ◆ Battery powered with onboard data storage
- ◆ Applications related to personal exposure in environments (homes, workplace, automobiles, tunnels etc.)

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Discussion

The instrument works on the principal mechanism of unipolar diffusion charging. Ions are produced in the carrier gas by a corona discharge. The ions attach to the surface of the particles, which are collected in an electrically insulated particle filter. The electric charge is converted to a DC voltage signal in an electrometer amplifier whose resolution is of the order of 10 fA.

Diffusion charging of particles offers several outstanding features. It is a cost economic method that facilitates dynamic measurement with response time in the range of a few seconds. It covers a wide particle size range from a few nm up to more than 10 μm . The charging mechanism is mainly independent of the chemical properties of the particles. Simultaneous measurement with the DC sensor and a photoelectric aerosol sensor (PAS) enables one to distinguish between different particle types because, as opposed to DC, the efficiency of photoelectric charging depends on the chemical properties of bulk and surface (carbonaceous materials.) The combination of PAS and DC is very useful, e.g., for the analysis of combustion aerosols.

Technical Specifications

Display	16 characters with 2 lines LED
Power	115 volts AC / 60 Hz & 220 volts AC / 50 HzMax. Battery 15 volts Lithium Metal Hydride
Range	~ 0 to 1000 $\mu\text{m}^2 / \text{cm}^3$
Sensitivity	$\sim 10 \mu\text{m}^2 / \text{cm}^3$
Lower Threshold	$\sim 10 \mu\text{m}^2 / \text{cm}^3$
Response time	< 10 seconds (adjustable)
Digital Output	RS - 232 (for data download and program upload)
Sample gas	Built-in pump with flowrate controlled at 1 L/min
Operating temp	40 to 104 °F (5 to 40°C)
Dimensions	Height x Width x Depth = 3in x 7in x 5in (68mm x 175mm x 124mm)
Weight	3 lb. (1.5 kg)
Data Storage	8000 Data Points (each data point consisting of: Time, Value)
Data Download	User-friendly PC-compatible graphical software used for downloading the collected data. Flat ASCII file output can also be generated for further analysis (e.g. Microsoft Excel format).

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