Innovative Technology for Earth and Space

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AirPhoton Automated Filter Sampling Station

Control Box SS4e:
Dimensions: 17" x 12.5" x 9"
Weight: 5.17 kg
Power: < 30W

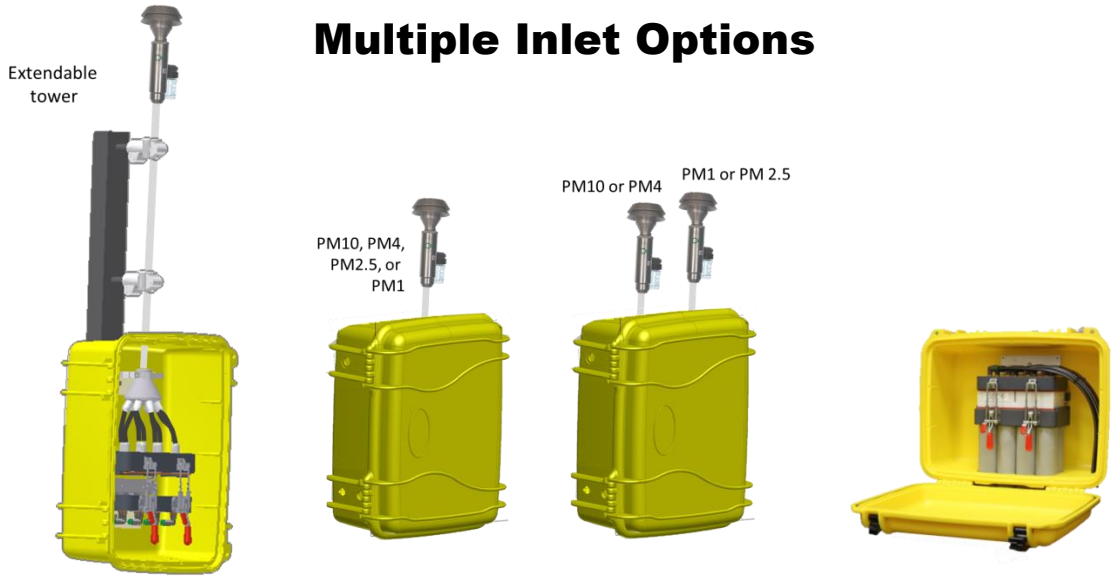
The AirPhoton Automated Filter Sampling Station is a fully programmable system that collects particulate matter on filters for subsequent analysis. Consisting of a Inlet/Filter unit and a Control Box, the station is designed for compatibility with the AirPhoton 8-slot filter cartridge model FC10. The programmable capability allows flexibility when designing sampling cycles, moving collection from filter slot to filter slot or turning collection on and off at specified times. A total of 8-slots are available before the filter cartridge must be changed. Filter cartridges are portable and can be prepared in the lab and mailed to the sampling station site.

The Inlet/Filter unit employs a PM10 inlet designed to run at up to 5 liters per minute in samples in several filter substrates. The flow rate can be adjusted by a manual valve in the front panel of the instrument. The option exists to separate PM2.5 and coarse mode particulates ($2.5 < d < 10\mu m$) using Nuclepore® filter separation. Other inlet combinations with PM10, PM4, PM2.5 and PM1 are also available using impactors and cyclones.

The Control Box offers 4 analog inputs for external devices and 1 digital port for communication with other AirPhoton devices, such as the 3-wavelength nephelometer. Filter measurements and forward/back scattering of the particles can be automatically linked in the same data base. Data is stored in removable memory cards, and automatically backed-up internally.

The Inlet/Filter unit and the Control Box are both enclosed in environmentally isolated cases, ready for outdoor deployment in rugged conditions. ***Power input options include: 110/220 VAC 50/60Hz and nominal 12VDC. The design is also compatible with power supplied by solar panels and batteries.***

Multiple Inlet Options



Inlet/Filter unit SS5i:

Box: 12.5" x 15" x 9"
Single or double external inlets
Flow rate: 5lpm
Options: PM10, PM4, PM2.5, PM1
Cyclone available for sharper cutoff sizes.
Second stage optional through Nuclepore® filter

Inlet/Filter unit SS4i:

Box: 14.5" x 15" x 9"
Multiple Internal Inlet
Flow rate: 4 lpm
Cut off size: PM10
Second stage optional through Nuclepore® filter

AirPhoton 8-slot filter cartridge model FC10

Up to 8 sampling slots
Allows for 2 stages (fine and coarse)
Dimensions: 3" x 6" x 1.25"
Filter diameter: 1”
Weight: ~ 0.6 kg

The AirPhoton 8-slot 1” diameter filter cartridge is a unique design that holds and protects 8 particle sampling filters. This design minimizes the handling of the filters in the field and reduces the frequency of site visits by technicians. Used in conjunction with the AirPhoton Automated Filter Sampling Station, the cartridge can be deployed through 7 sampling cycles and a blank filter (8 sampling cycles are possible upon request) before exchange with a fresh cartridge is necessary. Each of the 8 slots can hold either 1 filter for straightforward measurements of particles of one size, or 2 sequential filters of

different pore sizes for separation of particles by size. Filter cartridges can be shipped easily to sampling sites and for analysis after use.

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AirPhoton 3-wavelength Integrating Nephelometer IN101

Wavelengths: 450, 532, 632nm
Dimensions: 9" x 10" x 24"
Weight: 6.7 Kg
Power requirements: 15W @120VAC
Wavelengths: 450, 532, and 632 nm
Angular range: 7 to 90^o, and 90 to170^o
Data Interfaces: SD card, wireless Bluetooth, RS485

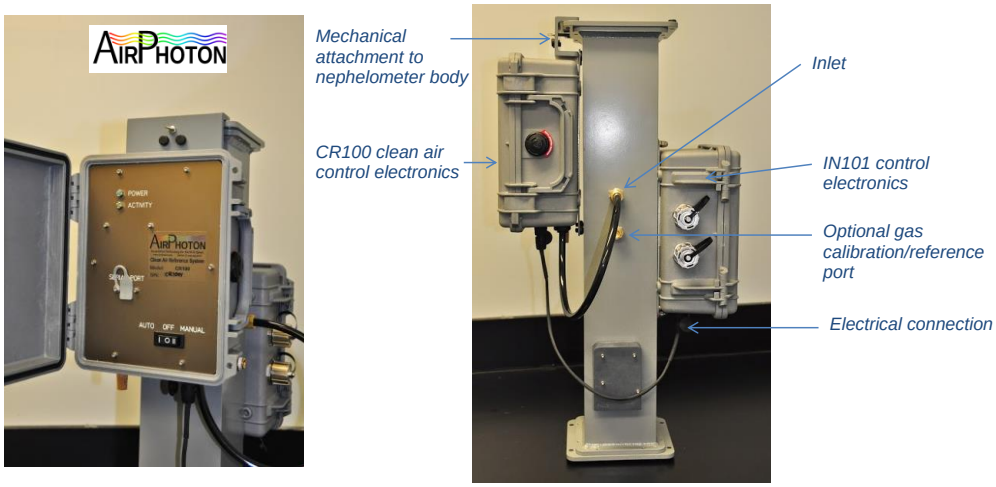
The AirPhoton 3-wavelength Integrating Nephelometer measures the light scattered by particulate matter, over the angular range 7 to 170^o. Employing an innovative design, the forward and backward scattering measurements are made completely independently. LED technology allows the nephelometer to make these measurements at 450 nm, 532 nm and 632 nm, and to a sensitivity < $10^{-7}m^{-1}$. Internal sensors measure and log temperature, relative humidity and pressure.

Small and compact, the 3-wavelength Integrating Nephelometer is enclosed in an environmentally protected case, ready for outdoor deployment in rugged conditions. ***Power requirements are 15W @ 120 VAC and input power options include: 110/220 VAC, 50/60Hz with provided power supply, and regulated 12VDC from sampling station with provided power connector. Other powering options can be made available upon request such as operating from batteries or solar power. Optional heaters are available at the expense of additional power consumption.***

Data from the AirPhoton IN100 Integrating Nephelometer is saved in a removable SD memory card and can be linked to an external computer via RS485 or wirelessly via Bluetooth.

Clean Air Reference System

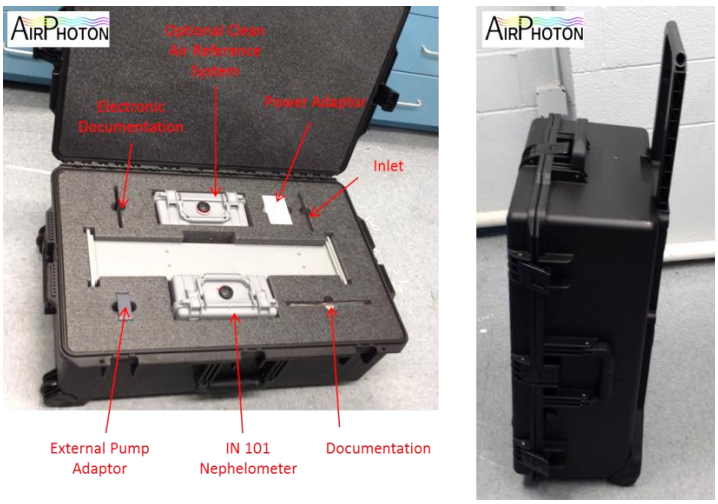
The IN101 integrating Nephelometer is designed for a stable and low noise operation. For more accurate operations a modular clean air reference system is available for separate purchase as an attachment to the Nephelometer. The CR100 clean air reference system is designed to compensate for potential calibration drift of the IN101 nephelometer. The CR100 pumps ambient air through a high quality HEPA filter that removes aerosol particles from the air to a level that the clean air can be used as a Rayleigh scattering reference for the nephelometer. The CR100 can be used as a semi-permanent attachment to the body of the IN101 nephelometer or as a portable bench top reference system. The figure below shows the CR100 system mounted on the body of a IN101 nephelometer.



Picture of the CR100 clean air reference system mounted on the body of the IN101 nephelometer.

Travelling Case

A custom-made carrying case is available for purchase to use with the IN101 nephelometer and its accessories. The case dimensions are: 31.3"x20.4"x12.2" and is outfitted with wheels and a retractable handle for easy transport. Figure 9 shows the CC101 carrying case with a IN101 nephelometer and its accessories including the CR100 clean air system.



CC101 carrying case for the IN101 nephelometer. .