



# Aurora™ NE-400 Polar

## Polar Integrating Nephelometer

The Acoem Aurora NE-400 Polar is a three wavelength integrating nephelometer and the flagship of the Aurora NE series.

Measure light scattering in up to 18 user-selectable angular sectors, using varied backscatter shutter positioning to help determine the phase function of aerosols and bring your climate research and modelling projects to life with precision data.

The Aurora NE-400 Polar provides measurements of integrated light scattering between  $7^\circ - 173^\circ$ , with the user able to select multiple backscatter angles between the  $7^\circ$  to  $90^\circ$  starting angle of integration.

The instrument simultaneously measures at 450 nm (blue), 525 nm (green) and 635 nm (red), using the proven LED light source to enable wide and in-depth analysis of the interaction between light and aerosols.

These measurements can contribute to determining the phase function, defined as the amount of light scattered as a function of the scattering angle.

The phase function is a key parameter to accurately model the influence of the aerosol scattering on the Earth's radiative balance.

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## Benefits

- Fully programmable integrated scattering over multiple angular sectors
- New, more powerful microprocessor for improved signal processing, operation speed, reliability & future expandability
- Real-time remote monitoring with on-board data logging provides practically unlimited data collection
- Enhanced connectivity with network TCP/IP port, micro-SD card, USB port & RS232
- 7" full-colour touchscreen display with an intuitive menu system
- Quick access to instrument cell & filters for easier maintenance & service when required
- Seamless integration of internal ball valves ensures sample isolation during calibration
- Internal sample pump & flow sensor for accurate flow control with the option for volumetric flow control
- Improved calibration process with span & zero gas following the same path into the cell as the ambient sample
- High powered multi-wavelength LED light-source increases measurement accuracy
- Higher flow available via the external pump & MFC option
- Access to hundreds of raw measurement parameters for customised data analysis
- Simplified fully automatic & scheduled calibration using internal valves, ideal for remote locations
- Robust instrument for unattended operation
- 24 VDC operation (120 W max with supplied mains power supply)
- Automatic optical reference calibration
- Internal sample heater with temperature or RH control, which you can enable to eliminate the effects of humidity
- Increased light source intensity & reduced truncation angle, lower instrument noise & decreased wall scattering from internal reflections compared to previous generation Aurora 4000
- LED light source is guaranteed not to fail within 3 years & often exceeds 5 years lifetime
- Heat generated by the light source is reduced by using high efficiency LEDs & fans, minimising changes in sample RH

## Benefits (cont.)

- LEDs emit light at a specific wavelength eliminating the need for band pass filters
- LED light source uses the same light path for each wavelength for consistency of measurement, eliminating the need for multiple PMTs & maximising light intensity
- Storage & automatic backup of configuration & calibration files
- Easily integrates into the Acoem Aerosol Conditioning System ACS™ 1000.

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## Applications

- Studies on backscatter & forward scatter
- Scattering enhancement factor
- Scattering Angstrom exponent calculations
- Determination of single scattering albedo
- High-altitude aircraft based campaigns.

## Options

- Ambient Temperature & RH sensor for volumetric flow control
- Roof flange, inlet extensions & rain cap with insect screen
- Gas calibration kit & wall mount bracket
- Annual service kit
- Aerosol dryer
- 20 lpm mass flow control option & external pump.

## Specifications

<b>Measured parameters:</b>	Light scattering coefficient ( $\sigma_{sp}$ ) at (450 nm, 525 nm & 635 nm) over 2 to 18 angular sectors
<b>Ranges:</b>	0.0 to 20,000 Mm <sup>-1</sup>
<b>Lower detectable limit:</b>	< 0.1 Mm <sup>-1</sup> full and back scatter (60 second averaged data)
<b>Secondary measurements:</b>	Sample temperature, pressure & relative humidity (RH) (multiple raw instrument parameters)
<b>Intensity function:</b>	7 - 173°
<b>Angular resolution:</b>	1° increments within 0.3° accuracy
<b>Flow rate:</b>	3 - 9 slpm with internal pump & flow sensor 5 - 17 slpm with external pump & MFC option
<b>Operating temperature:</b>	- 20 to 45 °C
<b>Operating RH:</b>	10 to 95 %
<b>Calibration:</b>	Span gas available for CO <sub>2</sub> , SF <sub>6</sub> , FM-200, R-12, R-22, R-134 or a user-defined gas
<b>Optics:</b>	Reference light source measurement
<b>Light source:</b>	Stable LED light source (US patent 7,671,988)
<b>Wavelength:</b>	450 nm (blue), 525 nm (green), 635 nm (red)
<b>Operating voltage:</b>	24 VDC (incl 110 - 240 VAC 50 / 60 Hz power supply) (120 watts maximum)
<b>Dimensions:</b>	260 x 730 x 240 mm
<b>Weight:</b>	14.2 kg
<b>Altitude:</b>	2000 m (15,000 m with 24 VDC operation).

## Communications & data storage

<b>Outputs:</b>	25 pin external I/O (4 analog inputs, 6 analog outputs, 4 digital inputs & outputs)
<b>Interfaces:</b>	2 x RS232, USB, TCP/IP
<b>Filtering:</b>	Kalman (digital adaptive filter), moving average, rolling average or no filter
<b>Stored parameters:</b>	Date & time, $\sigma_{sp}$ (450, 525 & 635 nm), sample temperature, pressure & RH, over 300 raw instrument parameters
<b>Capacity:</b>	Minimum 32 GB SD card or USB key (> 10 years with 1 minute averaging)
<b>Data collection:</b>	Complimentary Airodis™ demo analysis software provided.

