



Aerodyne Mini-TILDAS Nitric Acid Monitor

*Fast, accurate HNO_3
measurements in a compact,
field-deployable package*



Features:

- <150 ppt 1-s precision
- <40 ppt long term precision
- Fast time response (3 Hz)
- Option to correct for water dilution
- Inertial inlet provides filter-less particle separation
- Built-in valving functions for calibrations and zeroing

Rugged, field-ready instruments

Direct absorption spectroscopy allows for highly specific and accurate gas detection

Mid-IR detection enables maximum measurement sensitivity

TILDAS Technology

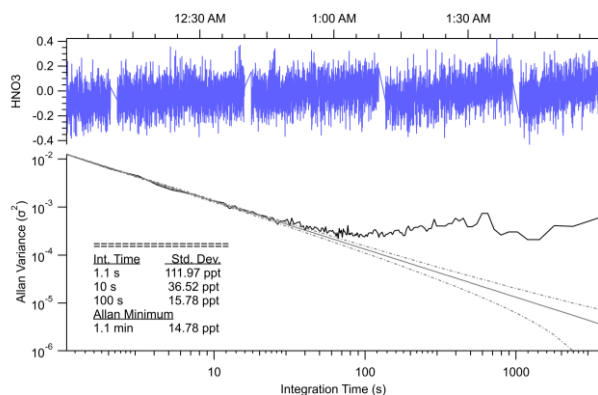
Aerodyne instruments use tunable infrared laser direct absorption spectroscopy (TILDAS) at mid-IR wavelengths to probe molecules at their strongest “finger-print” transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 76 m. Direct absorption spectroscopy allows for fast (<1 sec) absolute trace gas concentrations without need for elaborate calibration procedures. Moreover, TILDAS instruments are free of measurement interference from other molecular species, enabling extremely specific detection.

Applications

- Determination of ambient atmospheric nitric acid sources, sinks, and transport
- Correlating with particulate loadings for particle formation/growth estimates
- Measurements aboard aircraft, marine, and ground-based platforms
- Long-term unattended operation in remote field sites.
- Eddy covariance flux measurements for understanding atmospheric deposition

Aerodyne Nitric Acid Advantages

- Aerodyne inertial inlet provides particle separation with <1 s time response.
- Powerful TDLWintel software provides flexible instrument control and real-time data analysis.
- Valve control capable of complex scheduling and automatic background and calibrations.
- 19” rack mountable for easy installation aboard aerial and mobile platforms
- Active passivation enables fast eddy covariance methods
- **Can be combined with HONO, N_2O , or other trace gases in dual-laser TILDAS**



Performance Specifications:

Precision

Time	HNO ₃ noise
1 seconds	<150 ppt
10 seconds	<100 ppt
100 seconds	<40 ppt

Time response

1-10 Hz data rate
 0.5 s minimum Rise/Fall time (1/e)
 (using inertial inlet with active passivation)

Dynamic Range (air)

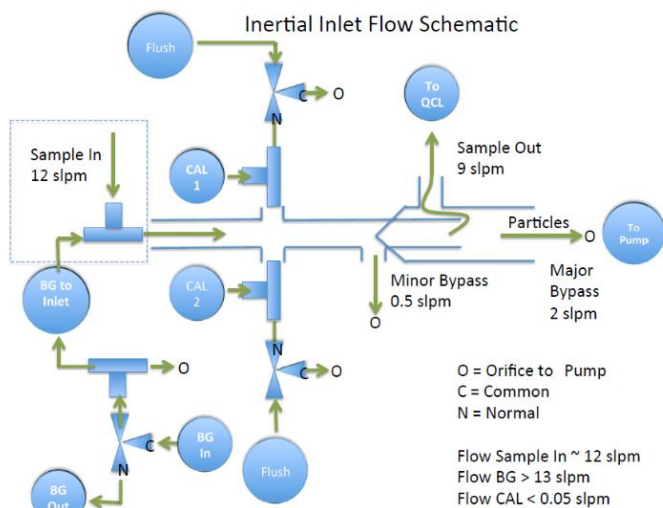
	min	max
HNO ₃	0 ppb	50 ppm

Enhanced Measurement Options

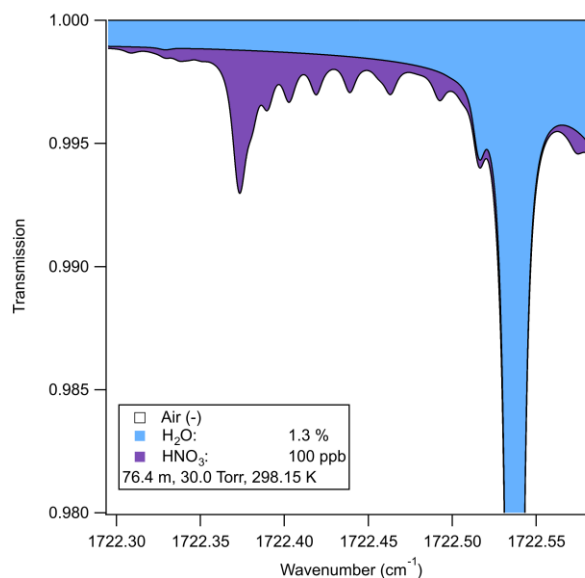
Inertial inlet for particle separation with fast time response (see below)

Multiple valve control for calibration/zeroing at inertial inlet

Active passivation to improve time response to <1 s



High-resolution spectrum of nitric acid



Installation

19" rack mountable or benchtop

Instrument Operating Conditions

Operating temperature: 10 to 35 °C
 Sample flow rate: 0 to 20 slpm

Instrument components

- Core instrument
- Thermoelectric chiller
- Keyboard, mouse, and monitor
- Vacuum pump (customer specified)
- Inlet sampling system (customizable)

Data Outputs

RS-232, USB drive, ethernet

Size, Weight, Power

Dimensions: 430mm x 660mm x 270mm
 Weight: 35 kg (core instrument) + 15 kg (chiller) + pump weight
 Max power: 125 W, 120/240 V, 50/60 Hz (core instrument)
 + 300 W (chiller) + pump power

Aerodyne specializes in collaboration and custom design. Please contact us if you would like to discuss additional measurement options and applications.

REFERENCES:

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