AerodyneResearch

Technology Enhancing Science

TILDAS Compact Single Laser Ammonia Analyzer

Unprecedented NH_3 accuracy, precision, and time response in a compact, rugged package

Features

- <50 ppt 1-s precision.
- <10 ppt long term precision.
- Fast time response (10 Hz).
- Option to correct for water dilution.
- Inertial inlet provides filter-less partical separation.
- Option to improve time response using active passivation

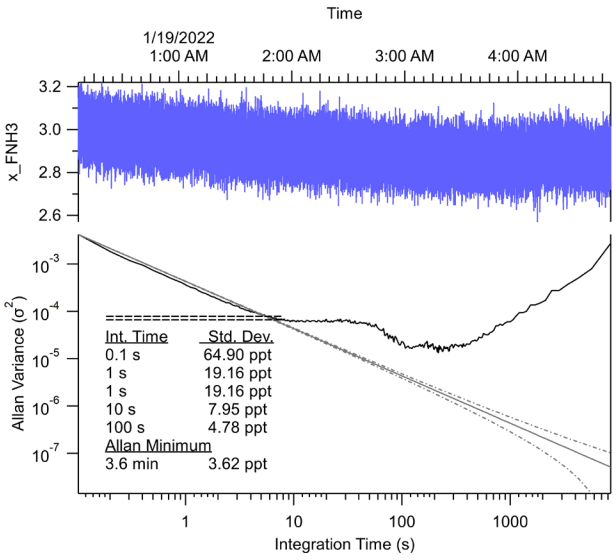
Rugged, field-ready instruments

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 "fingerprint" transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 400 meters. Direct absorption spectroscopy allows for fast (<1 sec) absolute trace gas concentrations without need for elaborate calibration procedures. Moreover, TILDAS instruments are relatively free of measurement interference from other molecular species, enabling extremely specific detection.



Applications

- Determination of atmospheric nitrogen sources, sinks, and transport.
- Agricultural and biosphere exchange.
- Mobile measurements aboard aircraft, marine, and ground-based platforms.
- Long-term unattended operation in remote field sites.
- Eddy covariance flux measurements to quantify nitrogen deposition.

Advantages

- Aerodyne inertial inlet provides particle separation with <1 s time response.
- Improved time response using active passivation.
- 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.

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

TILDAS Compact Single Laser Ammonia Analyzer

Specifications

Precision

1 second	<50 ppt
10 seconds	<15 ppt
100 seconds	<10 ppt

Time response

1-10 Hz data rate

0.5 s minimum Rise/Fall time (1/e)
(using inertial inlet with active passivation)

Drift (peak-to-peak, 24 hrs)

< 0.5 %

Dynamic Range (air)

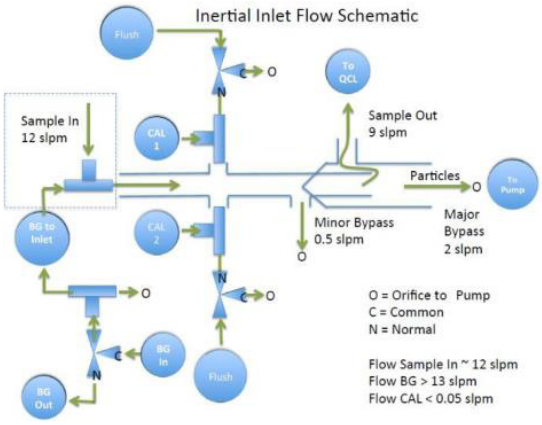
	min	max
NH_3	0 ppb	10 ppm

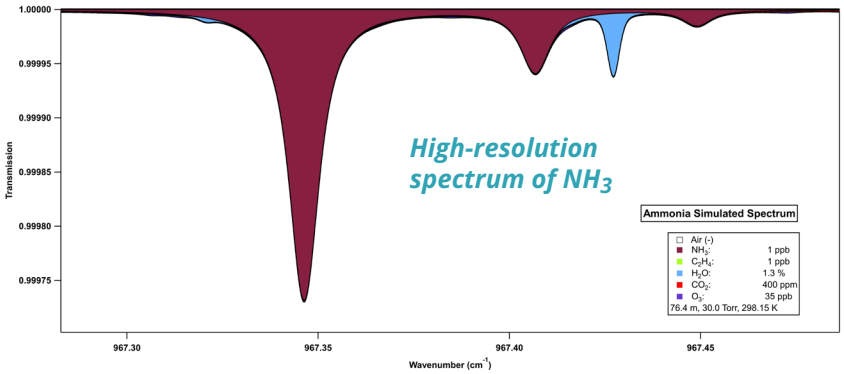
Enhanced Measurement Options

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





Installation

19" rack mountable or benchtop

Sampling Conditions

Sample temperature: -20 to +40 °C
Sample pressure: 1 to 100 Torr
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, ethernet

Size, Weight, Power

Dimensions: 440 mm x 660 mm x 6U (267mm) (W x D x H)

Weight: 35 kg (core instrument) + 15 kg (chiller) + pump weight

Electrical Power: 250 W, 120/240 V, 50/60 Hz (without pump)

REFERENCES

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Herndon, S. C., et al., Characterization of urban pollutant emission fluxes and ambient concentration distributions using a mobile laboratory with rapid response instrumentation, Faraday Discuss., 130, 327-339, 2005

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