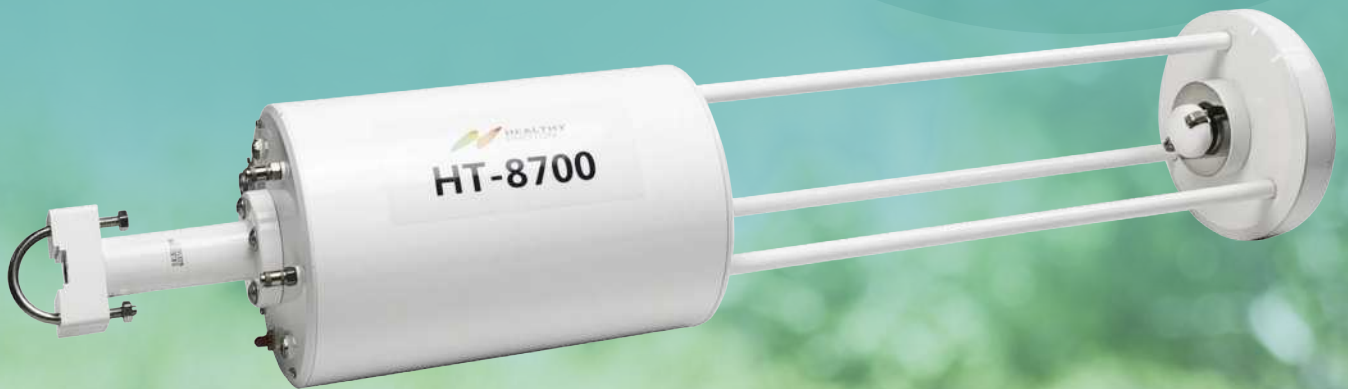




HT8700 Open-path NH_3 Analyzer



HealthyPhoton 

**Advanced QC laser spectroscopy
for atmospheric ammonia analysis**

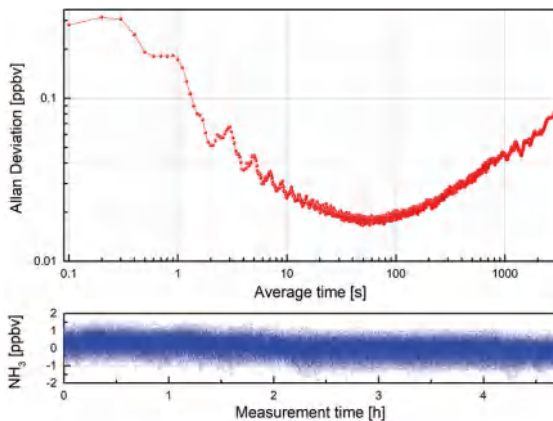
WE SEE THE WORLD WITH LASER PRECISION

HT8700 is an open-path analyzer providing in-situ measurement of atmospheric ammonia (NH_3) concentrations with high speed, low power consumption, and ultra-high sensitivity. The superior performances make it suitable for on-site deployment in various environments, including urban, rural, remote fields, and even mobile monitoring platforms.



+ Revolutionary Open-path Design for Ammonia

NH_3 gas has strong adsorption and viscosity. Conventional closed-path analyzers often suffer great analytical errors due to sample adsorption to the inner surface of the sampling tube. HT8700 has the open-path design that avoids delays due to sample adsorption. The signal response time can be as short as 0.1 second.

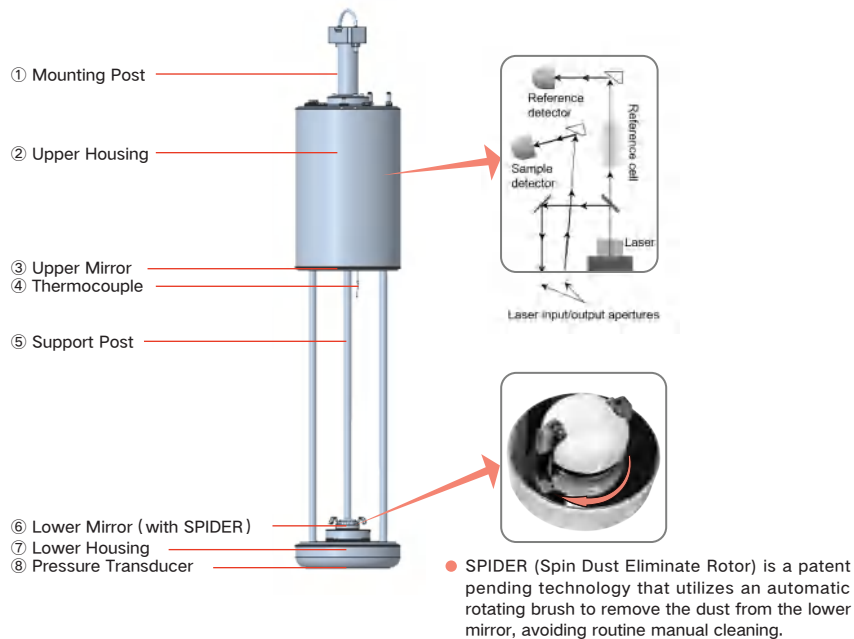
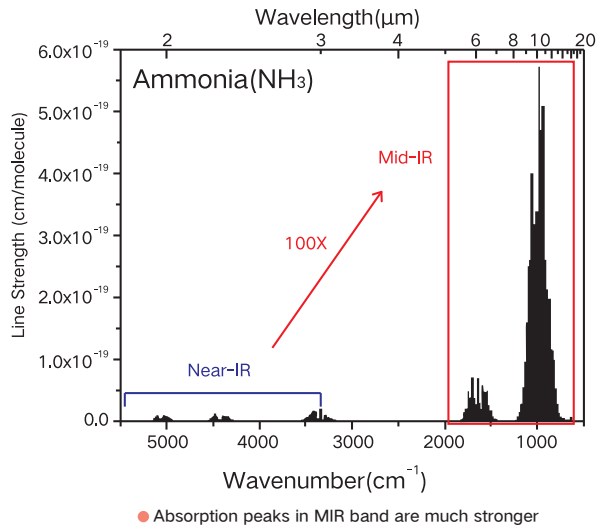


● Allan deviation shows 0.28 ppbv NH_3 detection sensitivity at a 10 Hz sampling rate

Note: Although open-path analyzers have low availability of data under high humidity or rainfall, NH_3 concentration is very low in these cases due to its high adsorption and high solubility. Hence, the error of the overall flux measurement is little.

Mid-infrared Laser Spectroscopy +

HT8700 is based on the state-of-the-art Quantum Cascade Laser Absorption Spectroscopy (QCLAS) technology, which utilizes the strong absorption line of NH_3 in the mid-infrared spectral band. Multiple reflections of the laser beam between two high-reflection mirrors create a long optical path that makes strong signals. The absorption energy at the spectral line is extracted and the gas concentration is retrieved with **sub-ppbv sensitivity**. There is no overlap of absorption peaks with H_2O , CO_2 , and other atmospheric trace gases, which realizes the **anti-interference** measurement.

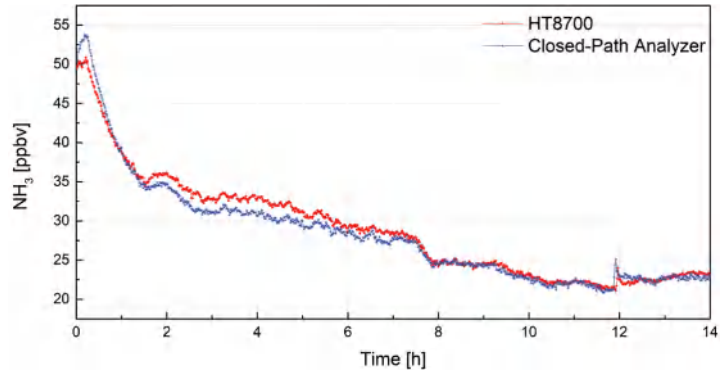


Features +

- Strong mid-infrared absorber --> ultra-high (sub-ppbv) sensitivity
- Distinct absorption lines --> high selectivity
- No consumables and auto cleaning --> unattended continuous monitoring
- Open-path --> fast response and no high frequency loss
- No sampling pump and pretreatment --> low power and small footprint

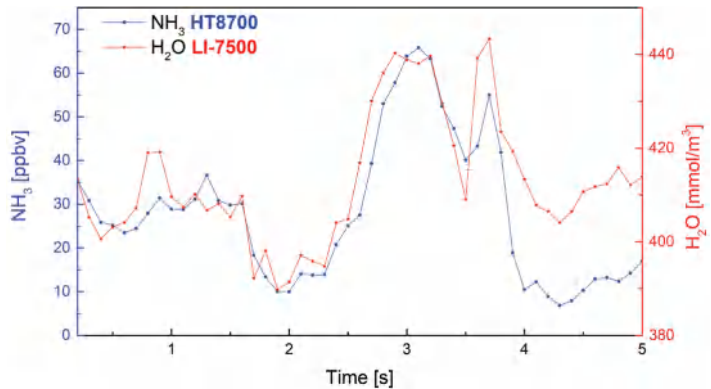
Tested Accuracy +

A test at the Shanghai Academy of Environmental Sciences compared the HT8700 with a closed-path analyzer from a leading brand. The concentration data from the two analyzers showed a high degree of consistency, confirming the accuracy of the HT8700.



Tested Speed +

The field data showed no discernible delay of the NH₃ measurements of the HT8700 compared to H₂O measurements of the LICOR® LI-7500. The test ensured the short response time that is essential for the NH₃ flux measurements.



Mobile Analysis +

A real-time mobile analyzing system based on the HT8700 provides a complete solution for high-speed and accurate NH₃ emission monitoring and tracing.



● NH₃ mobile analyzing system

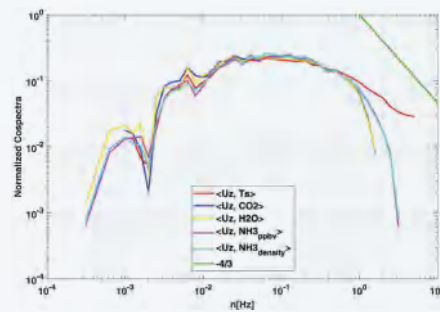
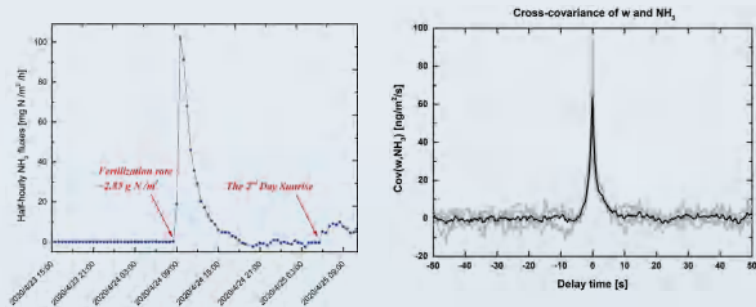


● Map of NH₃ concentration around a livestock farm.

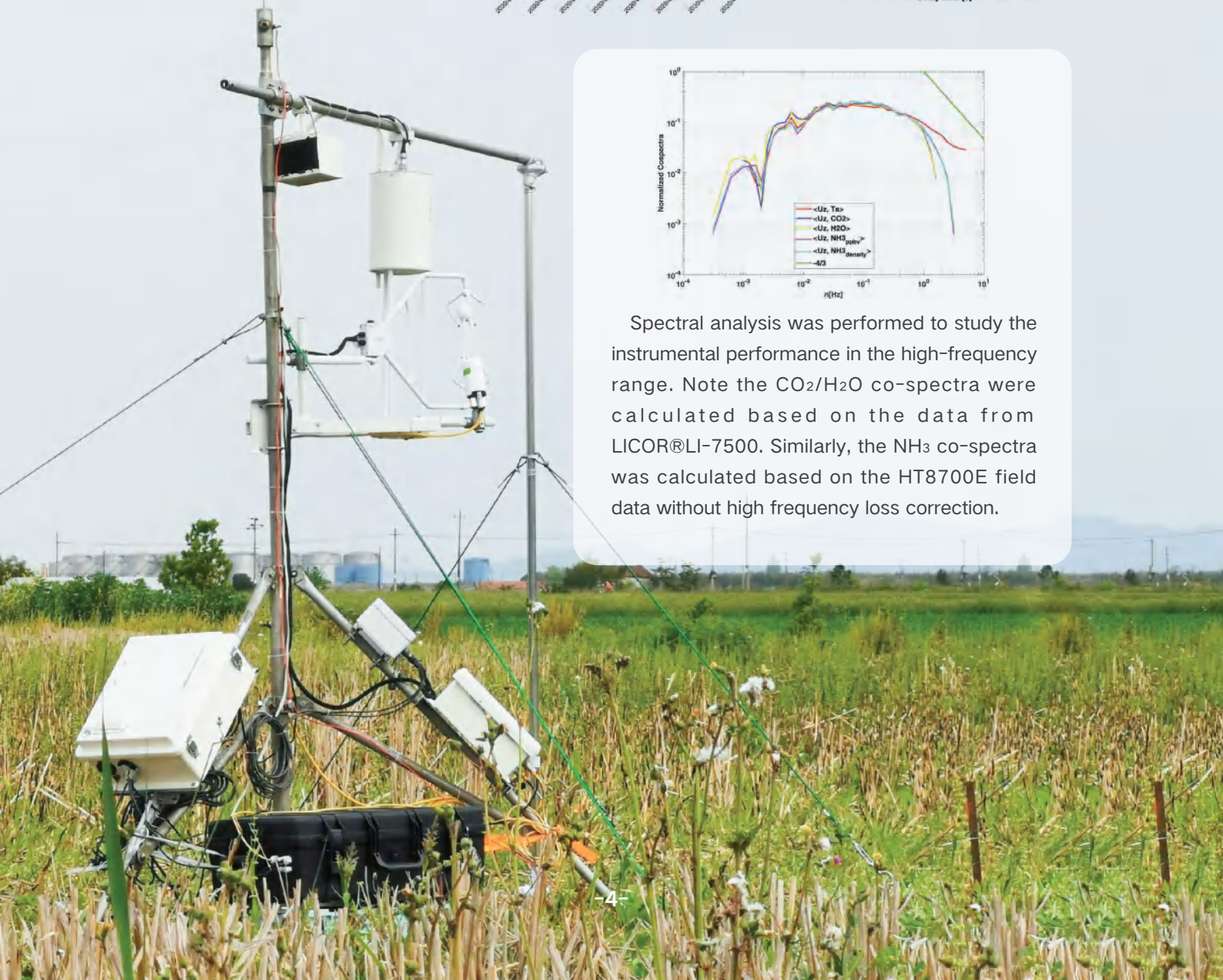
Eddy Covariance Flux Measurement +

Below is an example of NH_3 flux data from a 48-hour continuous measurement during the fallow season at a dry rice paddy in Ningbo, Zhejiang Province, China. The data was acquired with an Eddy covariance system based on the HT8700 and an anemometer. A peak of NH_3 was observed after the application of ammonium bicarbonate in the morning of 2020/4/24.

Clear delay time between NH_3 concentration and vertical wind velocity was observed, which varies between 0.4 s and 0.3 s, particularly following fertilizer application.



Spectral analysis was performed to study the instrumental performance in the high-frequency range. Note the $\text{CO}_2/\text{H}_2\text{O}$ co-spectra were calculated based on the data from LICOR®LI-7500. Similarly, the NH_3 co-spectra was calculated based on the HT8700E field data without high frequency loss correction.






Specifications

Optical Path	0.5 m physical path; 46 m measurement path
Resolution(1σ; 0.1s/1s/10s)	0.3 ppbv/0.1 ppbv/0.03 ppbv
Measurement Range	Operational range 0–2000 ppbv; guaranteed accuracy in the range of 0–600 ppbv
Output Data Rate	10 Hz/1 Hz/0.1 Hz
Operating Pressure	70 - 110 kPa
Operating Temperature	-15 ~ 45 °C
Operating Humidity	0 ~ 100% R.H. Non condensing
Data Communication	RS-232
Power Requirements	20 - 28 VDC
Power Consumption	Nominal 50 W (~100 W at warming up)
Dimensions	834 mm × ø200 mm
Weight	< 10 kg
Environmental Adaptability	IP67

Ordering Information

Item	Part No.	Note
Open-path NH ₃ analyzer (1Hz)	HT-8700	For ambient NH ₃ concentration measurement .The maximum update rate is 1 Hz.
Open-path NH ₃ analyzer (10Hz)	HT-8700E	For ambient NH ₃ concentration and eddy-covariance flux measurement .The maximum update rate is 10 Hz.
Transportable instrument case	HT-8700-001	A precision instrument box for safe, shock-proof storage and transportation of HT-8700 analyzer, cables, and mounting accessories.
Circulating water cooling system	HT-8700-002	An external heat dissipation device with circulating water (or high-efficient antifreeze coolant) tubings used to remove the heat generated from HT-8700 (E) .
Transportable cooling system case	HT-8700-003	A precision instrument box for safe, shock-proof storage and transportation of the cooling system and water tubings.
SPIDER	HT-8700-004	Automatic Spin Dust Eliminate Rotor to avoid manual mirror cleaning.
Mounting kit	HT-8700-005	Structural fixture for fixing HT-8700 (E) on observation platform or carrier.
Power adapter and cables	HT-8700-006	220VAC (110VAC) to 24VDC power adapter and cables.



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