

Our Gas Measurement Solutions for Alternative Fuel Combustion

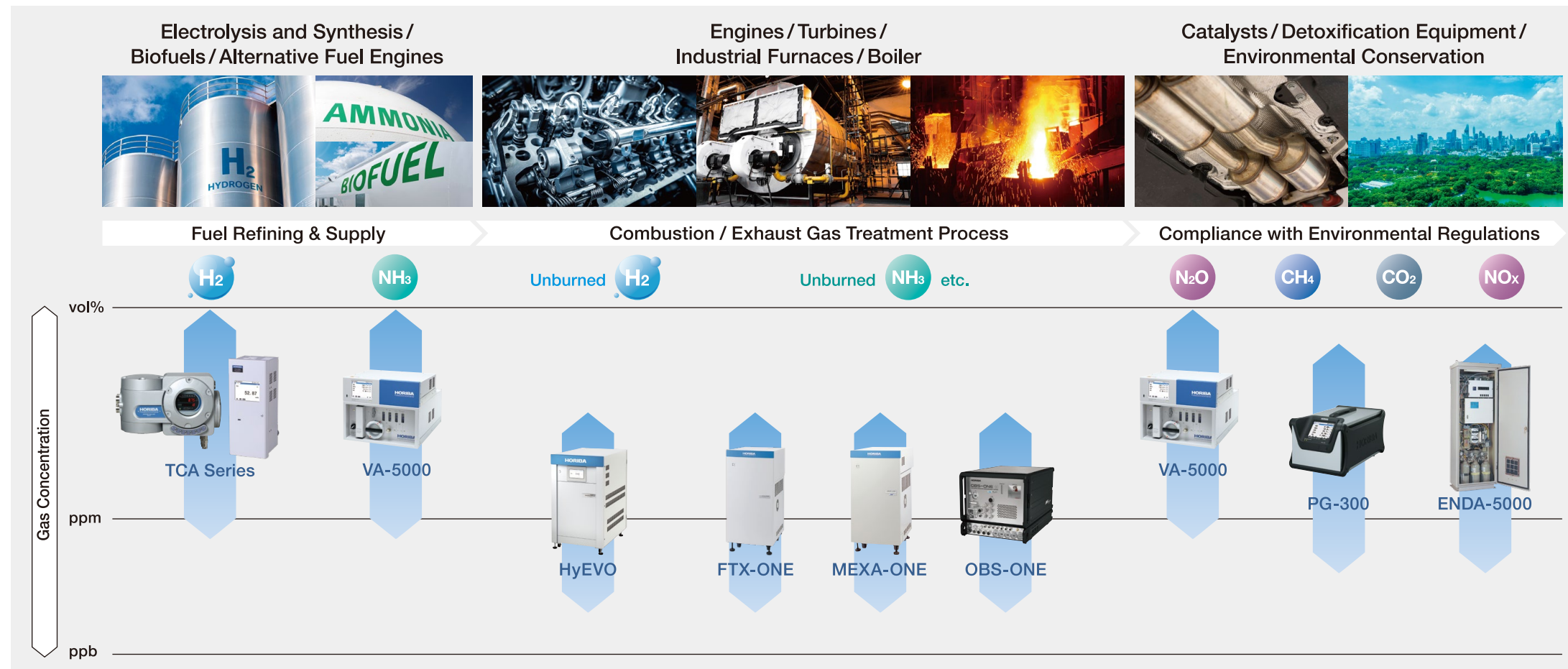
(Mono-fuel combustion, mixed combustion / H₂, NH₃, etc.)

Hydrogen and ammonia are essential energy sources for decarbonization in various fields such as transportation, power generation, and various industries.

Therefore, the implementation of alternative energies is accelerating to achieve carbon neutrality toward 2050.

HORIBA is contributing to the "Carbon Neutrality" effort through our leading-edge measurement solutions.

HORIBA



Highly-sensitive Measurement of Nitrogen Compound Gases

MEXA-ONE IRLAM* Absorption Method Exhaust Gas Measurement System

[WET] [High-Speed Response]

New "IRLAM" technology developed by HORIBA improves robustness, fast response (on the order of msec), and high sensitivity measurement (minimum range: 10 to 20 ppm) for understanding the combustion process.

*IRLAM is the measurement principle of NH₃ and N₂O.

NH₃ NO NO₂ N₂O etc.



Continuous Measurement up to 28 Gases

FTX-ONE-CS/RS FTIR Exhaust Gas Analyzer

[WET] [High-Speed Response]

Continuous and high-speed measurement of concentrations of up to 28 components such as NO, NO₂, N₂O and other nitrogen oxides, NH₃, and H₂O contained in exhaust gas.

NH₃ NO NO₂ N₂O CH₄ CO₂ etc.



FTIR

High-precision, High-resolution Hydrogen Gas Analysis

HyEVO Hydrogen Gas Analyzer

[WET] [Fast Response]

Hydrogen gas analyzer capable of measuring gases containing high humidity with high accuracy and resolution without moisture removal. Response time of less than 1 second is realized, enabling measurement of even transient concentration changes.

H₂



Mass spectrometry

Various Gas Components

VA-5000 Series Multi-component Gas Analyzer

[DRY] [General Purpose]

This gas analyzer meets diverse needs from various types of combustion exhaust gas analysis to support new energy development, and is applicable to various gas component measurement such as NH₃, N₂O, etc.

NH₃ NO_x N₂O CH₄ CO₂ etc.



NDIR

Continuous Measurement

ENDA-5000 Series Stack Gas Analysis System

[DRY] [Continuous Measurement]

Ideal for monitoring of stationary installations for stable measurement of gases after separation and treatment. We also offer the ENDA-C9000 series for power plants which supports continuous monitoring of NH₃.

NO_x N₂O CH₄ CO₂ etc.



NDIR

Hydrogen Gas Measurement in the 100% Range

TCA Series Explosion-proof Gas Analyzer

[Explosion-proof] [DRY]

Continuous measurement of hydrogen gas in various plants with a measurement range up to 100%.

H₂



Explosion-proof type
Various R&D purposes

Thermal conduction method

Lightweight, Portable and Compact

PG-300 Series Portable Gas Analyzer

[DRY] [Continuous Measurement]

Portable gas analyzer capable of measuring each component in combustion exhaust gas with high accuracy, also applicable to N₂O and CH₄ measurement.

NO_x N₂O CH₄ CO₂ etc.



NDIR

Measuring Exhaust Gas during Real Road Driving

OBS-ONE GS/IRLAM Portable Emission Measurement System (PEMS)

[WET] [High-speed Response]

Portable Emission Measurement System (PEMS) for real-driving emissions which measures the gases such as NH₃ and N₂O in the exhaust gas.

NH₃ NO NO₂ N₂O CH₄ CO₂ etc.



IRLAM by HORIBA

For Gas Flow Measurement

EXFM-ONE Ultrasonic Exhaust Flow Meter

Directly measures exhaust gas flow from vehicles and engines using an ultrasonic method. Combined with exhaust gas concentration measurement, the weight of each gas component in the exhaust gas can be calculated in real time.



IRLAM™ (Infrared Laser Absorption Modulation) is a next-generation infrared gas analysis technology originally developed by HORIBA.



<https://www.horiba.com/int/irlam/>

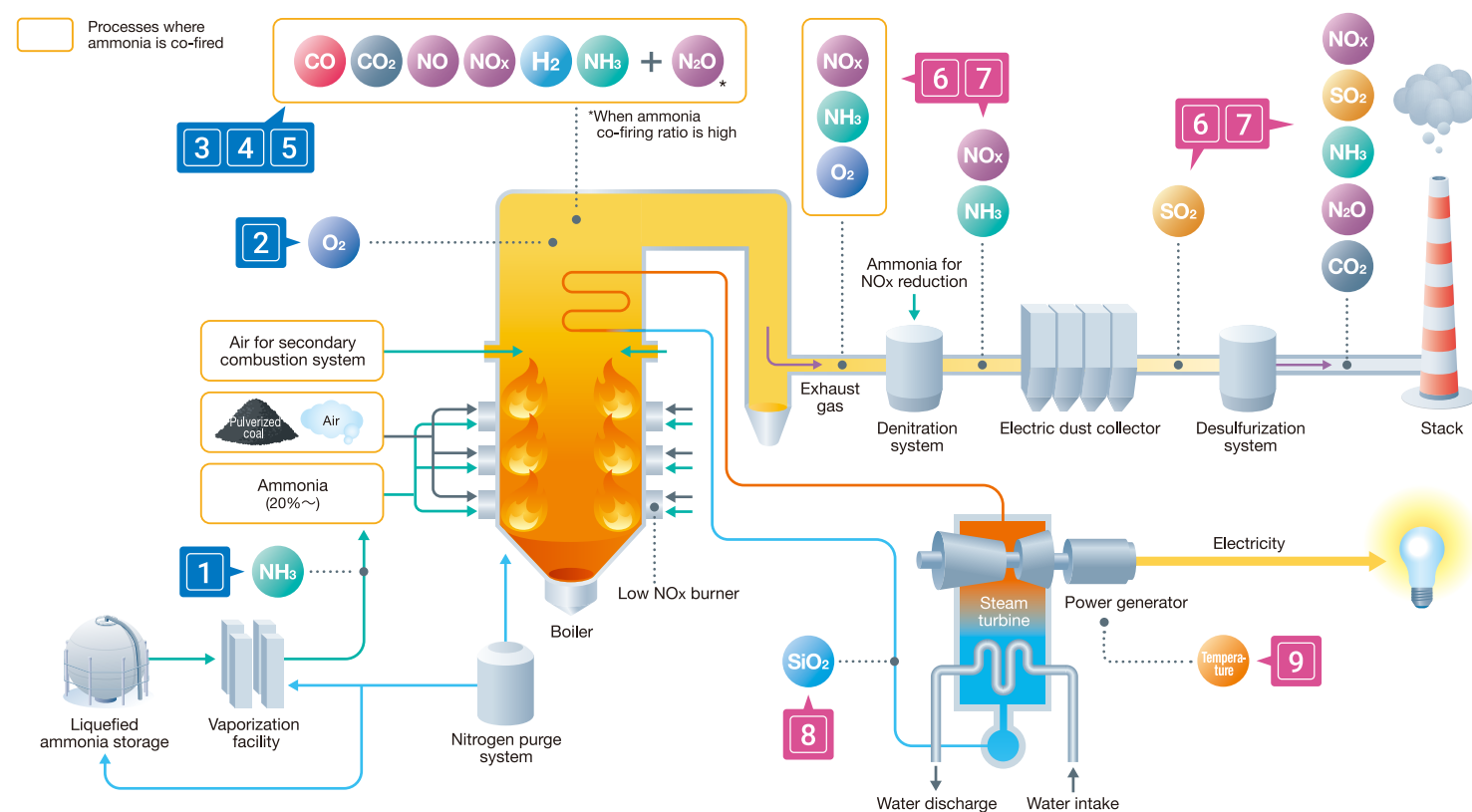
IRLAM is a registered trademark or trademark of HORIBA, Ltd. in Japan and other countries.

Bulletin: HRE-3783C

For R&D / demonstration system

Power generation by ammonia co-firing / 100% firing

R&D of burners for higher rate of ammonia co-firing / 100% ammonia firing in coal-fired power generation facilities is underway, aiming to improve combustion methods and gas treatment facilities' operation methods in order to realize the social implementation of ammonia co-firing/ full-firing systems. Currently, practical tests are ongoing with a 20% ammonia co-firing pulverized coal boiler. Furthermore, endeavors are in progress to elevate the co-firing rate, with the aim of achieving 100% ammonia firing by the 2030s.



Performance Evaluation of Burner / Boiler / Combustion Furnace

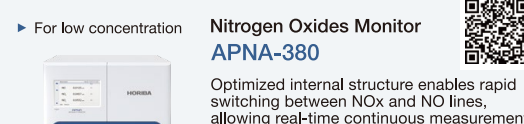
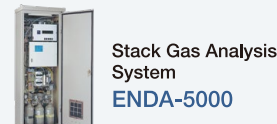
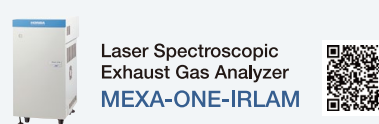
- ### 1 Monitoring the concentration of fuel NH_3 for enhancing combustion efficiency



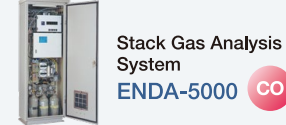
- 2 Monitoring of O₂ concentration for prevention incomplete combustion**



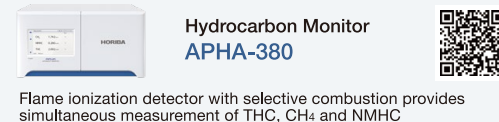
- 3 Monitoring of NH_3 concentration for detection unburned NH_3 and misfires in NH_3 co-firing burners
- 4 Nitrogen oxide emissions and unburned NH_3 monitoring in combustion exhaust gas, when NH_3 co-firing ratio is high



- ### 5 Monitoring the concentration of CO / H₂ for grasping combustion conditions



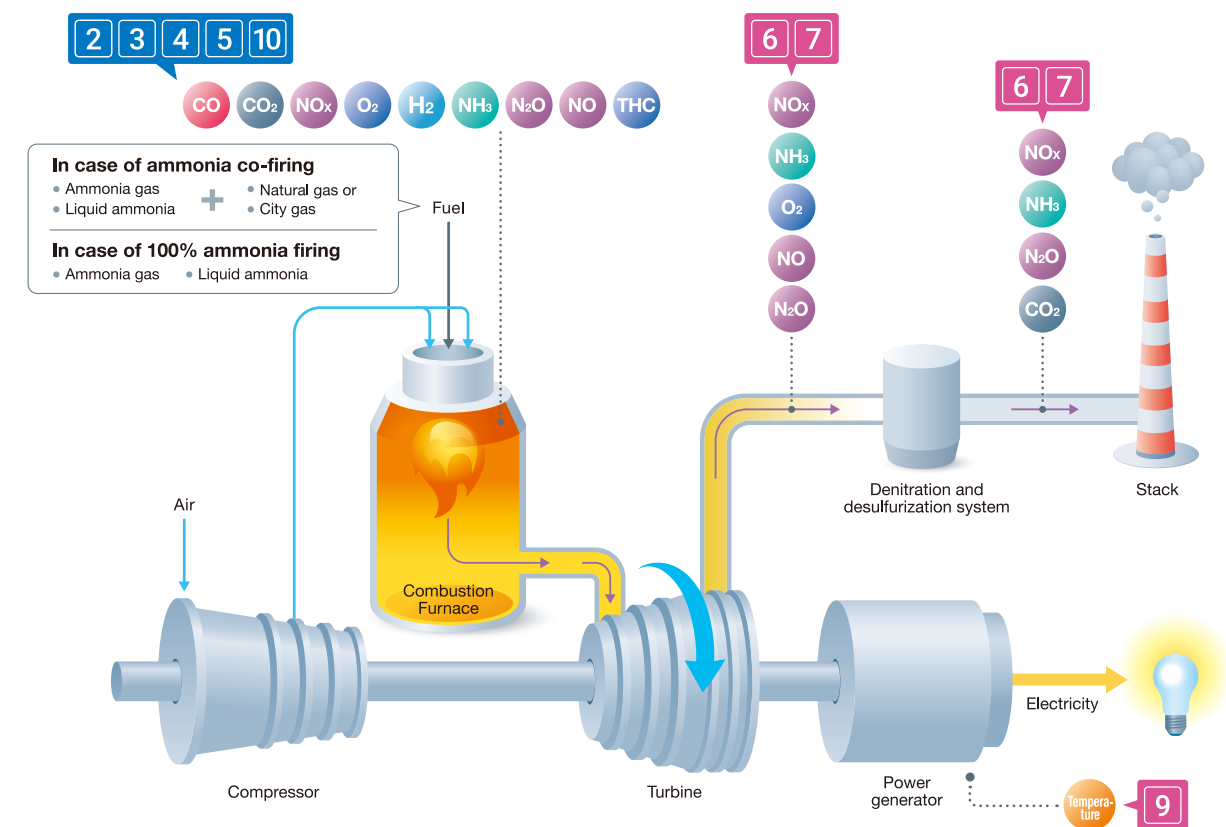
- 10 Monitoring the concentration of THC for fuel combustion efficiency control**



For R&D / demonstration system

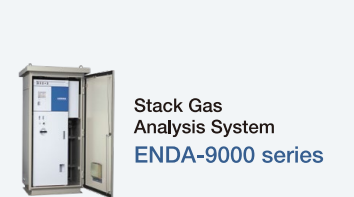
Gas-turbine power generation by liquid ammonia with direct spray method

100% liquid ammonia firing technology to reduce greenhouse gas (GHG) emissions from conventional gas turbine power generation systems is under development. Given that liquid ammonia has lower flammability than gases, it is necessary to stabilize the flame and reduce harmful substances in the exhaust gas. In addition to conventional air pollutants such as NO_x, there is a particular need to measure unburned NH₃ and N₂O.



Environmental Assessment Evaluation / Efficient Facility Management

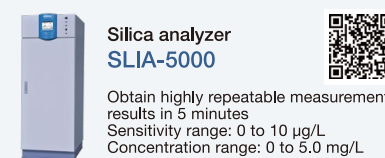
- 6 Monitoring of NO_x and SO₂ concentrations before and after denitration and desulfurization systems** NO NO_x N₂O NH₃ SO₂ CO₂ O₂



- 7 Monitoring whether GHG emissions from the stack comply with environmental regulation thresholds**



- 8 Silica measurement for sludge control** 



- 9 Temperature measurement for condition monitoring of turbines, bearings, etc.**

