HORIBA
Process & Environmental

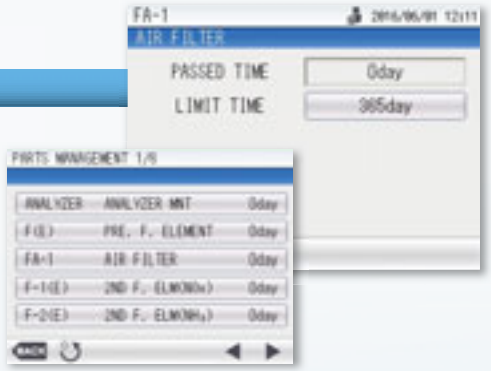
STACK-GAS ANALYSIS SYSTEM

ENDA-C9000

Enhanced functions for maintenance

Simple maintenance function

The built-in hour meter allows you to check the operating times of many different sampling parts. You can also optionally specify the operating limit to monitor parts' lifespans. As parts that are approaching the ends of their lifespans are listed, anyone can easily monitor the operating status of diverse parts and perform scheduled maintenance.



Data logging

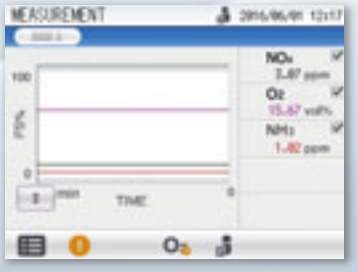
You can easily analyze past data as needed because the product saves data from the previous seven days. It includes not only measured concentration values but also a variety of measurement data.

Major saved items

- Concentration values
- Internal/external analog input values
- Input status at external contact
- Sample gas pressure
- Suction pressure
- Bypass flow rate
- Electric cooler temperature
- Inner cabinet temperature

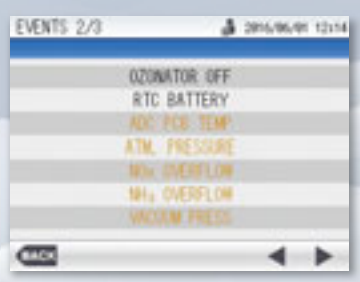
Trend charts

You can visually check the changes in indication during measurement of sample gas or introduction of calibration gas. Measurement data per component for the previous 30 minutes is displayed at once in chart form. You can specify intervals of 3, 15, or 30 minutes and monitor the situation so that not even minute fluctuations are overlooked.



Self-diagnostic function

- Calibration alert
- Flow rate alert
- Pressure alert
- Temperature alert
- Solenoid valve error
- Caution function
- Detector temperature alert
- Concentration upper/lower limit alert
- Rise in water level
- Power cutoff
- Drop in cylinder pressure (option)



Improved work efficiency by simplifying piping configurations

Thanks to the enhanced sampling system, the heating pump no longer requires a cooling section. This enables a direct connection between the heating pump and cabinet, which improves installation work efficiency while preventing pipes from freezing during severely cold weather.

Stress-Free Operability

Adoption of a color touch panel

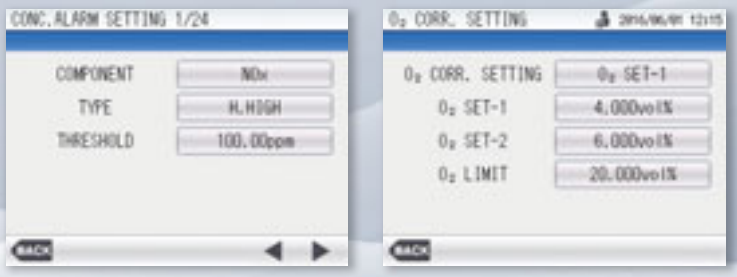
The LCD screen offers better visibility by clearly displaying text and enabling charts to be displayed.
Also, a variety of operation screens are provided in color and can be recognized at a glance. Experience smooth usability by directly touching the screen without the need to perform complicated operations.

All operations including calibration, display of measurement data, and saving of various types of data can be completed by touching the screen.

Chart display switch
Supervisor mode
Current date/time
Measurement range
Measured value
Measurement component
Menu icon
Event icon
Supervisor switching icon

You can see the necessary information at a glance on the 5.7" screen with proper contrast.

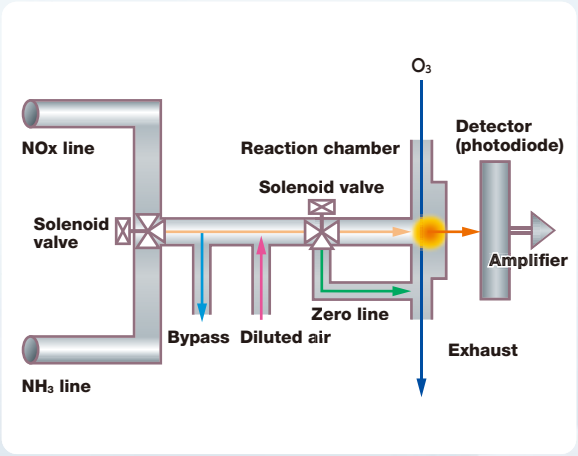
● Sample display screens



Many different menus are accessible by touching the screen.

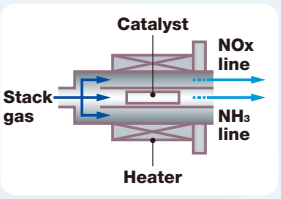
Long-term, Stable Operation

Chemiluminescence method analyzers with zero drift free (NH_3 and NOx)



- A single analyzer measures and calculates the NOx concentration that passes through each NOx line and NH_3 line.
- High-precision measurement of NH_3 and NOx in the minimum range of 0 to 10 ppm is supported.
- Less interference effect from moisture and CO_2.
- The analyzer can be used even if the concentration of NH_3 exceeds that of NOx.
  - Reduction catalyst method
  - Oxidation catalyst method (for mono fuel combustion of LNG)

Reduction catalyst method NH_3 analyzer

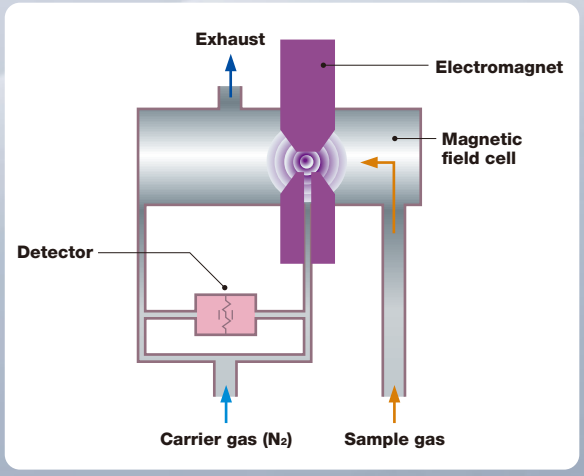


The reduction catalyst method employs the principle of the selective catalytic reduction method, which is used to denitrate boilers and turbines. NH_3 reacts with NO at a 1:1 ratio during the denitration reaction on the catalyst. In other words, the decrease in concentration is the same for NOx and NH_3. Therefore, this NH_3 analyzer measures the concentration of NOx in the NH_3 line that passes through the catalyst as well as the concentration of NOx that does not pass through the catalyst, and then calculates the difference to determine the concentration of NH_3. As shown in the figure, the structure of the pretreatment equipment consists of an NH_3 line filled with the catalyst and an NOx line not filled with the catalyst.

Oxidation catalyst method NH_3 analyzer
(for mono fuel combustion of LNG)

The oxidation catalyst method makes use of conversion of NH_3 in the sample gas to NO. When the gas passes through the catalyst, the increase in concentration is the same for NOx and NH_3. Therefore, this NH_3 analyzer measures the concentration of NOx in the NH_3 line that passes through the catalyst as well as the concentration of NOx that does not pass through the catalyst, and then calculates the difference to determine the concentration of NH_3.

Deterioration-resistant magnetopneumatic O_2 analyzer



- Zero drift free
- The detector has a long lifespan because sample gas does not come into contact with it.

Secured sampling control

Improvement of sampling parts

The quality of the electric cooler, double-head pump, diozonator, and other parts has been improved. Better basic performance enables these parts to improve measurement stability.

Monitoring of sample gas pressure

The sample gas pressure has been newly adopted as a monitored item for detecting pipe clogging before it occurs.

Enhanced sample gas pressure control

In the ENDA-C9000 Series, the drain treatment method has been changed from the water sealing method to the tubing pump method, which offers resistance to fluctuations in sample gas pressure. This doubles the range of sample gas pressure to ± 10 kPa compared to our previous model. As a result, you can now perform measurement under a wider range of sample gas pressure conditions.

Specification

ENDA-C9000 series

	C9120	C9170*1 / C9170A*2	C9220	C9330*1 / C9330A*2	C9430*1 / C9430A*2
NH_3		○		○	○
NOx	○		○	○	○
O_2			○		○

*1 Reduction catalyst method is applied for NH_3
*2 Oxidation catalyst method is applied for NH_3

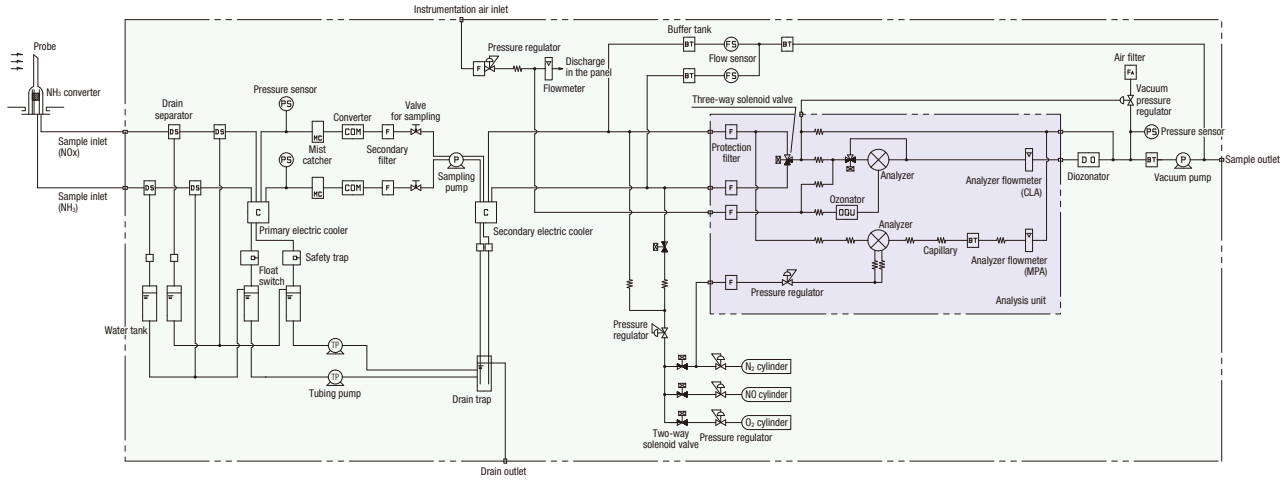
Measured components and ranges

Component	Measurement method	Std. range	Option range	Range ratio
NH_3	Chemiluminescence	20 -100ppm	10ppm	Max. 10 times
NOx		20 -100ppm	10ppm	
O_2	Magneto Pneumatic	5 - 25vol%	-	Max. 5 times

Number of range	Max. 3 ranges per component	
Number of measured components	Max. 3 components including O_2 analyzer	
	Ambient temperature -5 to 40 °C	Ambient temperature 40 to 50 °C
Repeatability	±0.5 % of full scale	±1.0 % of full scale
Drift (±5 °C ambient temperature changes)	Zero drift standard: ±1.0% of full scale per week Zero option: ±2.0% of full scale per week	Zero drift standard: ±2.0% of full scale per week Zero option: ±2.0% of full scale per week
	Span standard: ±2.0% of full scale per week	
Response time	< NOx only or NOx/O_2 > Td+T_{90} = 70 s max. from analyzer inlet, Td+T_{90} = 40 s max. from calibration inlet < With NH_3 > Td+T_{90} = 90 s max. from analyzer inlet, Td+T_{90} = 70 s max. from calibration inlet	
Linearity	±1.0 % of full scale	
Calibration gas	Automatic calibration (interval: 1 to 99 days) Zero gas: N_2 gas cylinder O_2 reference gas: N_2 gas cylinder Span gas: measurement component gas cylinder (For NO gas use NH_3 analyser)	(The calibration gas can be stored in the cabinet. However, the storage is not possible if the temperature inside the cabinet will exceed 40°C)
Materials exposed to gas	SUS-304, SUS-316, PTFE, Polypropylene, Polyethylene, Fluoro-rubber, PVC, PVDF, and glass	
Withstand voltage	AC 2000 V / 1 minute	
Display	Screen switching using touch panel	
Sampling method	Dehumidified sampling at dew point of 2.5°C (2 electronic coolers and depressurized sampling)	
Flow rate and pressure of sample gas	Flow rate: < when NOx only or NOx/O_2 > 2.0L/min, <when NH_3 also included> 1.5L/min for both NOx and NH_3 line Pressure: ±10 kPa Back pressure: ±0.98 kPa	
Pressure control method	Depressurized sampling method using pressure regulator	
Power voltage	AC 100 V ±15%, 50/60 Hz ±5%	
Analog input and output — Input	Standard max. 4ch, 4 to 20 mA or 0 to 1 V	
Analog input and output — Output	Standard max. 6ch Selection of 1 to 3 lines from combination of one of these; 4 to 20 mA DC, 0 to 16 mA DC, and 1 to 5 V DC and 0 to 1 V DC Insulation of connection board: 1500 V (400 V lightning arrester of 400 V) Maximum load resistance at the current output: 750 Ω Output impedance when voltage output: 50 Ω (0 to 1 V), 250 Ω (1 to 5 V)	
External contact input and output — Input	Standard max. 14 ch (AIC start, switch O_2 conversion correction, analog output hold, blowback start, each range L/H) Contact input: 24 V / 10 mA (including the error, 9 to 13 mA) Max. load resistance: 50 Ω	
External contact input and output — Output	Standard max. 10 ch (in-calibration, in-maintenance, analyzer alarm, analyzer caution each range L/H) Contact capacity DC voltage drive Max. voltage: 125 V, Max. current: 1A, Max. switching capacity: 25 VA, AC voltage drive Max. voltage: 250 V, Max. current: 1A, Max. switching capacity: 250 VA, Insulation of connection board: 1500 V (400 V lightning arrester is installed for the contact input circuit)	
Cabinet	Standalone type for outdoor installation Plate thickness: 3.2 mm for steel plates of main unit, door, and top plate Door: Front and back, Connections: right side or left side	
Color	Munsell 5Y 7/1 semi-gloss for both inner and outer surfaces	
Sample inlet tube	PTFE tube (ϕ 8/6)	
External dimensions (mm)	800 (W) × 800 (D) × 1800 (H) (excluding protrusions)	
Mass	450 kg (exclusing cylinders, depends on specifications)	
Probe and filter of sampling point	Frange: JIS 10 K, 125 AFF Probe tube length: 1000 mm, Material: SUS-304 Element: SUS-304 + sintered wire mesh 10μm in thickness Electric heating: 800 VA (reduction catalyst method) and 1200 VA (oxidation catalyst method) with drip-proof case Catalyst reaction efficiency: more thank 95% (catalyst reaction method), more than 90% (oxidation catalyst method)	
Installation requirements	Ambient temperature: -5 to 40 °C (without exposure to direct sunlight and radiant heat) -15 to 50 °C specification is an option Ambient humidity: 90 % or less Dust: less than environmental standard Vibration: 0.29 m/s^2 or less at 100 Hz	
Sample conditions	Temperature: 300 - 400 °C Dust: 0.1g/Nm^3 or less (reduction catalyst method), 0.01g/Nm^3 or less (oxidation catalyst method) NO: 500 ppm or less NO_2: 15 ppm or less SO_2: 200 ppm or less (reduction catalyst method), 15 ppm or less (oxidation catalyst method) SO_3: 10 ppm or less (reduction catalyst method), 1/10 of SO_2 (oxidation catalyst method) CO: 500 ppm or less CO_2: 15 vol% or less H_2O: 4 to 20 vol% or less O_2: 2 vol% or more For reduction catalyst method, NH_3 concentration should be less than NOx concentration. Corrosive gases such as HF, HCl, and CL2 as well as reactive gases should not be included.	

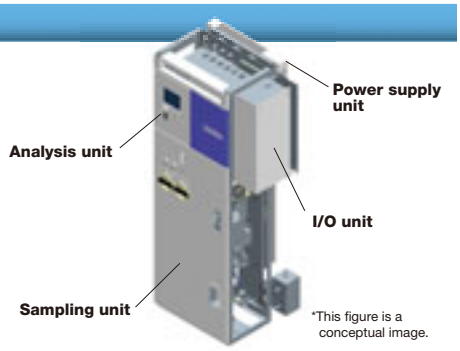
Flow schematic

ENDA-C9430



System composition

The inner structure of the cabinet is a combination of the analysis section, I/O section, power supply section, and sampling section. Such a structure simplifies work through per-unit maintenance as well as replacement of the unit itself, and the structure was designed in consideration of customers' workloads. If you would prefer to update only the internal components while keeping the cabinet of the gas analyzer that you currently own, we also can provide a unit layout arranged to support your current cabinet.



*This figure is a conceptual image.

IMS

The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001.
We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.

Please read the operation manual before using this product to assure safe and proper handling of the product.

- The specifications, appearance or other aspects of products in this catalog are subject to change without notice.
- Please contact us with enquiries concerning further details on the products in this catalog.
- The color of the actual products may differ from the color pictured in this catalog due to printing limitations.
- It is strictly forbidden to copy the content of this catalog in part or in full.
- The screen displays shown on products in this catalog have been inserted into the photographs through compositing.
- All brand names, product names and service names in this catalog are trademarks or registered trademarks of their respective companies.

http://www.horiba.com e-mail: info@horiba.co.jp

HORIBA, Ltd. — Japan
Head Office
2 Miyanohigashi, Kisshoin, Minami-ku, Kyoto, Japan
Phone: 81 (75) 313-8121 Fax: 81 (75) 321-5725

HORIBA (China) Trading Co., Ltd. — China
Shanghai
Unit D, 1F, Building A, Synnex International Park, 1068 West Tianshan Road, Shanghai, 200335, China
Phone: 86 (21) 6289-6060 Fax: 86 (21) 6289-5553
Beijing
12F, Metropolis Tower, No.2, Haidian Dong 3 Street, Beijing, 100080, China
Phone: 86 (10) 8567-9966 Fax: 86 (10) 8567-9066

HORIBA Korea Ltd. — Korea
10, Dogok-Ro, 6-Gil, Gangnam-Gu, Seoul-Si, 06259, Korea
Phone: 82 (2) 753-7911 Fax: 82 (2) 756-4972

HORIBA Instruments (Singapore) Pte Ltd. — Singapore
3 Changi Business Park Vista #01-01 Akzonobel House, Singapore 486051
Phone: 65 (6) 745-8300 Fax: 65 (6) 745-8155

HORIBA Vietnam Co., Ltd. — Vietnam
Unit 6, 10 Floor, CMC Tower, Duy Tan Street, Dich Vong Hau Ward, Cau Giay District, Hanoi, Vietnam
Phone: 84 (4) 3795-8552 Fax: 84 (4) 3795-8553

HORIBA (Thailand) Ltd. — Thailand
East Office
850 / 7 Soi Lat Krabang 30 / 5, Lat Krabang Road, Lat Krabang, Bangkok 10520, Thailand
Phone: 66 (0) 2734 4434 Fax: 66 (0) 2734 4438

PT HORIBA Indonesia — Indonesia
Jl. Jalur Sutera Blok 20A, No.16-17, Kel. Kunciran, Kec. Pinang Tangerang-15144, Indonesia
Phone: 62 (21) 3044-8525 Fax: 62 (21) 3044-8521

HORIBA India Private Limited — India
Delhi
246, Okhla Industrial Estate, Phase 3 New Delhi-110020, India
Phone: 91 (11) 4646-5000 Fax: 91 (11) 4646-5020
Technical Center
D-255, Chakan MIDC Phase-II, Bhamboli Village, Pune-410501, India
Phone: 91 (21) 3567-6000
Bangalore
No.55, 12th Main, Behind BDA Complex, 6th sector, HSR Layout, Bangalore South, Bangalore-560102, India
Phone: 91 (80) 4127-3637

HORIBA Instruments Inc. — USA
Head Office
9755 Research Drive, Irvine, CA 92618, U.S.A.
Phone: 1 (949) 250-4811 Fax: 1 (949) 250-0924
Alvin, TX
5318 W.FM517 Rd, Alvin, TX 77511, U.S.A
Phone: 1 (281) 482- 4334 Fax: 1 (281) 614-0303

HORIBA Instruments Brazil, Ltda. — Brazil
Head Office
Rua:Presbitero Plinio Alves de Souza, 645, Loteamento Polo Multivias Barirro Medeiros-Jundiai Sao Paulo
CEP 13.212-181 Brazil
Phone: 55 (11) 2923-5400 Fax: 55 (11) 2923-5490

HORIBA France SAS — France
Les Ulis
12. Av des Tropiques Hightec Sud, F-91955 Les Ulis, France
Phone: 33 (1) 69-29-96-23 Fax: 33 (1) 69-29-95-77

HORIBA UK Limited — UK
Northampton
Kyoto Close Moulton Park, Northampton NN3 6FL, UK
Phone: 44 (1604) 542-500 Fax: 44 (1604) 542-699

HORIBA Europe GmbH — Germany
Head Office
Hans-Mess-Str.6 D-61440 Oberursel Germany
Phone: 49 (6172) 1396-0 Fax: 49 (6172) 1373-85
Leichlingen
Julius-kronenberg Str.9 D-42799 Leichlingen Germany
Phone: 49 (2175) 8978-0 Fax: 49 (2175) 8978-50

HORIBA Czech — Czech
Prumyslova 1306 / 7, CZ-10200, Praha 10, Czech Republic
Phone: 420 (2) 460-392-65

HORIBA (Austria) GmbH — Austria
Kaplanstrasse 5 A-3430 Tulln, Austria
Phone: 43 (2272) 65225 Fax: 43 (2272) 65230

Bulletin:HRE-2343A

Printed in Japan 1702SK52