

STACK-GAS ANALYSIS SYSTEM

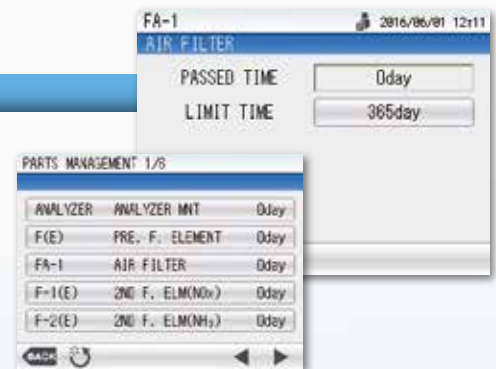
ENDA-C9000



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

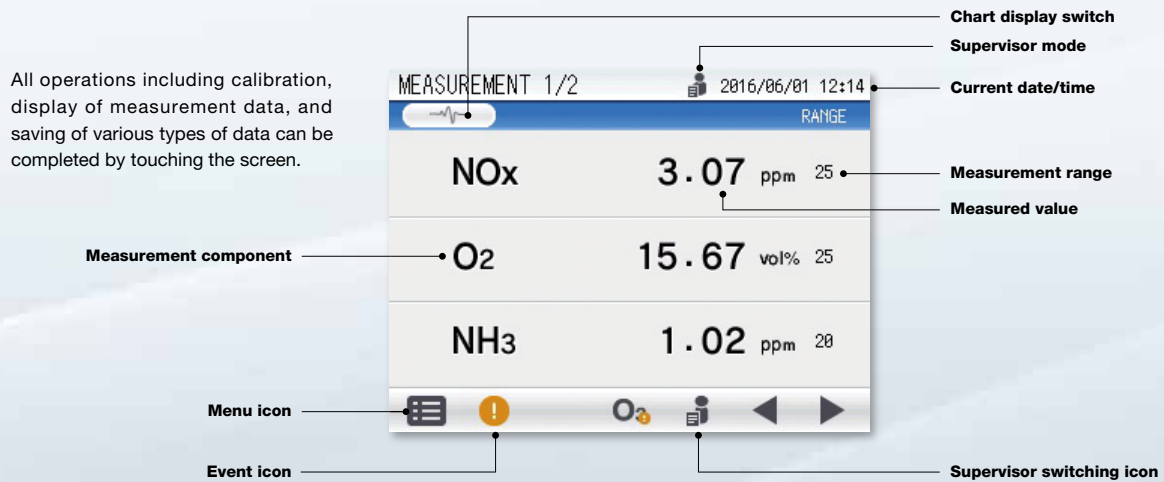
Thanks to the enhanced sampling system, the heating pump no longer requires a cooling section. This enables a direct connection between the heating pump and cabinet, which improves installation work efficiency while preventing pipes from freezing during severely cold weather.

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.

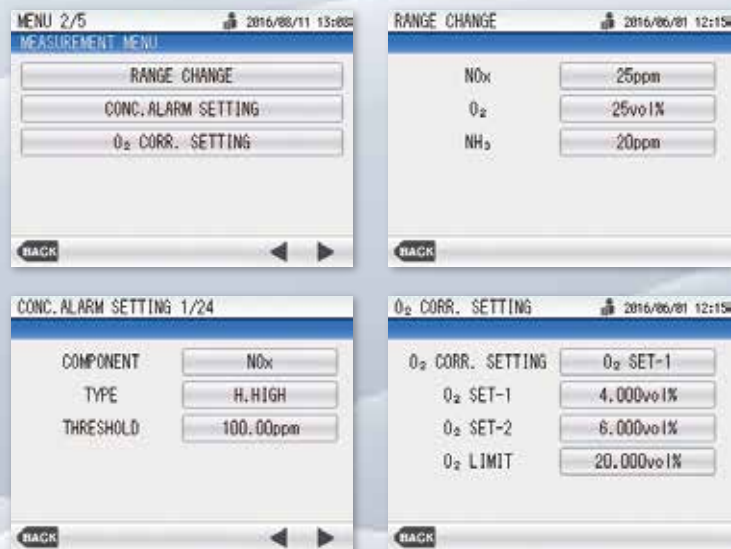


Sample display screens



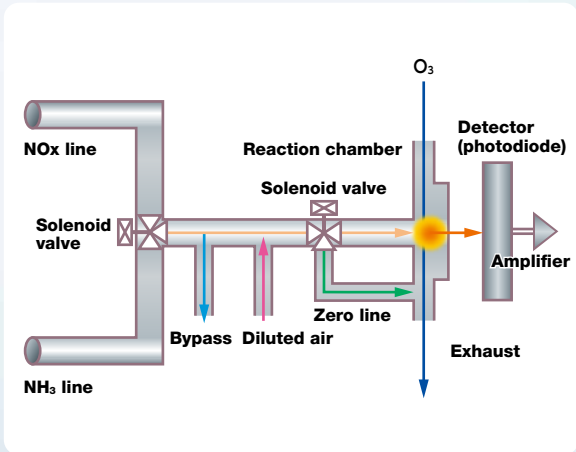
You can see the necessary information at a glance on the 5.7" screen with proper contrast.

Many different menus are accessible by touching the screen.



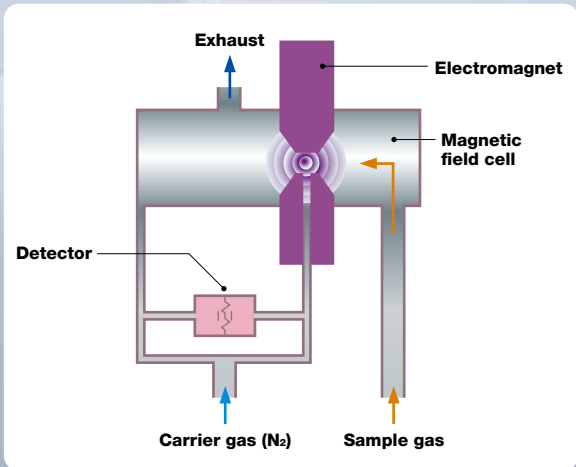
Long-term, Stable Operation

Chemiluminescence method analyzers with zero drift free (NH₃ and NO_x)



- A single analyzer measures and calculates the NO_x concentration that passes through each NO_x line and NH₃ line.
- High-precision measurement of NH₃ and NO_x in the minimum range of 0 to 10 ppm is supported.
- Less interference effect from moisture and CO₂.
- The analyzer can be used even if the concentration of NH₃ exceeds that of NO_x.
 - Reduction catalyst method
 - Oxidation catalyst method (for mono fuel combustion of LNG)

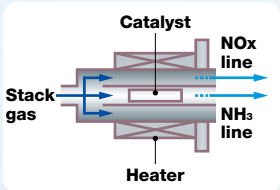
Deterioration-resistant magnetopneumatic O₂ analyzer



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

Reduction catalyst method NH₃ analyzer

The reduction catalyst method employs the principle of the selective catalytic reduction method, which is used to denitrate boilers and turbines. NH₃ 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 NO_x and NH₃. Therefore, this NH₃ analyzer measures the concentration of NO_x in the NH₃ line that passes through the catalyst as well as the concentration of NO_x that does not pass through the catalyst, and then calculates the difference to determine the concentration of NH₃. As shown in the figure, the structure of the pretreatment equipment consists of an NH₃ line filled with the catalyst and an NO_x line not filled with the catalyst.



Oxidation catalyst method NH₃ analyzer (for mono fuel combustion of LNG)

The oxidation catalyst method makes use of conversion of NH₃ in the sample gas to NO. When the gas passes through the catalyst, the increase in concentration is the same for NO_x and NH₃. Therefore, this NH₃ analyzer measures the concentration of NO_x in the NH₃ line that passes through the catalyst as well as the concentration of NO_x that does not pass through the catalyst, and then calculates the difference to determine the concentration of NH₃.

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.

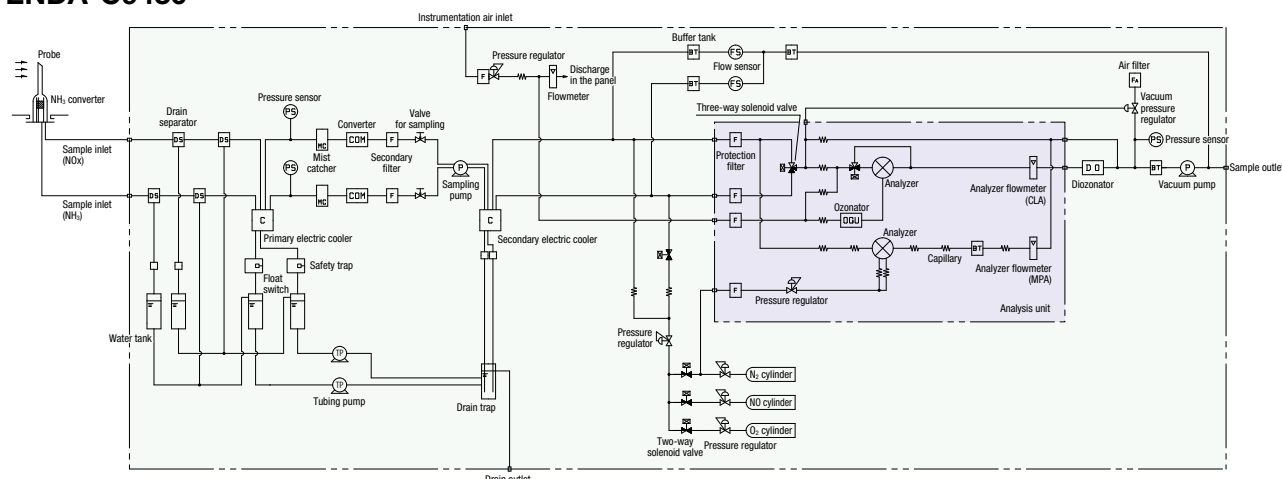
Enhanced sample gas pressure control

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		<table><tr><td></td><td>C9120</td><td>C9170*¹ C9170A*²</td><td>C9220</td><td>C9330*¹ C9330A*²</td><td>C9430*¹ C9430A*²</td></tr><tr><td>NH₃</td><td></td><td>○</td><td></td><td>○</td><td>○</td></tr><tr><td>NOx</td><td>○</td><td></td><td>○</td><td>○</td><td>○</td></tr><tr><td>O₂</td><td></td><td></td><td>○</td><td></td><td>○</td></tr></table> <div>*1 Reduction catalyst method is applied for NH₃ *2 Oxidation catalyst method is applied for NH₃</div>					C9120	C9170* ¹ C9170A* ²	C9220	C9330* ¹ C9330A* ²	C9430* ¹ C9430A* ²	NH ₃		○		○	○	NOx	○		○	○	○	O ₂			○		○
	C9120	C9170* ¹ C9170A* ²	C9220	C9330* ¹ C9330A* ²	C9430* ¹ C9430A* ²																								
NH ₃		○		○	○																								
NOx	○		○	○	○																								
O ₂			○		○																								
Measured components and ranges		<table><tr><td>Component</td><td>Measurement method</td><td>Std. range</td><td>Option range</td><td>Range ratio</td></tr><tr><td>NH₃</td><td rowspan="2">Chemiluminescence</td><td>20 -100ppm</td><td>10ppm</td><td rowspan="2">Max. 10 times</td></tr><tr><td>NOx</td><td>20 -100ppm</td><td>10ppm</td></tr><tr><td>O₂</td><td>Magneto Pneumatic</td><td>5 - 25vol%</td><td>-</td><td>Max. 5 times</td></tr></table>				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						
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NH ₃	Chemiluminescence	20 -100ppm	10ppm	Max. 10 times																									
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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																											
	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																											
	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 (excluding cylinders, depends on specifications)																											
Probe and filter of sampling point		Frang: 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 ₂ O: 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.																											

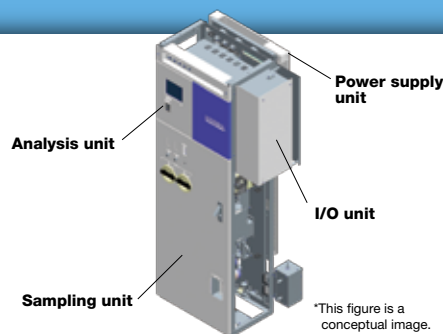
Flow schematic

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.



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.



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