Stack-gas Analysis System
ENDA 5000 series

**NOx, SO2, CO, CO2, O2**
Continuous simultaneous 5-component analysis

**COMPACT**
Uses half the space of previous models.

**EASY**
Features an intuitive touch panel.

**LONG-TERM STABILITY**
Uses NDIR for better long-term stability and reliability.

Steam boilers
Iron and steel processing
Refuse incinerators
Electric power generation plants
Sulfuric acid plants
Glass furnaces

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<thead>
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<th>MEAS.</th>
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<tbody>
<tr>
<td>NOx</td>
<td>128.1 ppm</td>
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<td>SO2</td>
<td>120.2 ppm</td>
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<td>CO</td>
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<td>CO2</td>
<td>4.135 vol%</td>
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<td>O2</td>
<td>9.34 vol%</td>
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Explore the future
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Sampling sections

The ENDA-5000 series’ sampling sections use cost-effective parts for maintenance, and offer a variety of sample gas conditioning systems, each suitable for a different kind of gas. HORIBA’s know-how has created the best possible system for every type of sample gas measurement.

- Sample gas probe with easy-to-change filter element

- An innovative dehumidifying system minimizes loss of soluble components.
- A mist catcher in the sample flow path removes SOx and prevents damage and line blockage.
- Long-lasting, low-temperature (180°C) NOx → NO converter prevents corrosion.

New pressure control *

The new pressure control method is compatible with Daily start-up and shut-down and other intermittent operations.

* Older models used a water filled pressure trap.

Blowback panel reduced in size

In the past, a large blowback panel was necessary to control dust when measuring high-dust gas samples. HORIBA has used its innovative technology to reduce the size of the blowback panel by almost 25% (to 350 [W] x 550 [H] x 180 [D] mm). The panel is also lighter, and can be mounted on a wall. The new blowback panel can be used even in extremely small spaces.

Models and components measured

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<tr>
<th>NOx</th>
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A's extensive know-how.

For refuse incinerators
- An integrated Cl₂ scrubber prevents corrosion.
- With Cl₂ scrubber, response time is under 90 seconds (for SO₂, under 240 seconds).
- A primary electronic cooler increases the amount of water removed from moist samples.
- A three-stage dehumidifying system with a primary electronic cooler minimizes the loss of SO₂ and NOₓ.

For electric power generation plants
- NH₃ scrubber minimizes loss of SO₂ during SO₂ measurement.
- Large capacity NOₓ converter for high-concentration NOₓ samples.
- A three-stage dehumidifying system with a primary electronic cooler minimizes the loss of SO₂ and NOₓ.
- Blowback panel and blowback probe for controlling dust in high-dust samples.

For steam boilers
- A three-stage dehumidifying system with a primary electronic cooler minimizes the loss of SO₂ and NOₓ.

Systems can be customized for a variety of other applications as well.

In addition to the above, HORIBA's sampling know-how can be applied to:
- Glass furnaces
- Iron and steel processing
- Sulfuric acid plants

...and a variety of other uses.
The ultimate in dependability and reliability

Cross-flow modulated non-dispersive infrared (NDIR) detection is renowned for long-term stability.

**Long-term stability**

1. **No need for optical adjustments**
   
   With cross-flow modulated non-dispersive infrared (NDIR) detection, the sample gas and reference gas are introduced into a single measurement cell alternately to obtain a modulation signal. Therefore, there is no need to adjust two different optical paths so that they are balanced.

2. **A stable zero point**
   
   Since the ENDA-5000 series output the difference between the measured gas and the reference gas with each measurement (once a second), the zero point is extremely stable.

3. **Continuous cleaning keeps the cell clean**
   
   Since cleaning air is fed into the sample cell in between each batch of sample gas, the cell resists contamination and normally remains clean. This reduces span drift and makes the equipment safe and stable for long periods of time.

**Other merits**

- A CO₂ sensor constantly measures and makes corrections to compensate for CO₂ interference in NOx measurements.
- An interference compensation detector compensates for interference from H₂O during NOx and SO₂ measurement.

**HORIBA’s NDIR method, trusted through years of experience**

With magneto-pneumatic detection, there is no need for cylinder carrier gas.

The ENDA-5000 series use magneto-pneumatic detection to measure O₂. Since the sample gas does not come into direct contact with the detector, there is no deterioration due to corrosion, which enables long-term stable operation. What’s more, thanks to HORIBA’s innovative technology, in which ambient air is used as a carrier gas, there is no need for a carrier gas supply, which translates into lower costs.

**Continuous correction is provided by a sensor that is designed to detect CO₂ interference during NOx measurement.**

**The systems feature an automatic recalibration function that calibrates the system every seven days.**

**A variety of types functions (up to 12 kinds of output)**

- Instantaneous output (NOx, SO₂, CO, CO₂, O₂)
- O₂ calculated output values (NOx, SO₂, CO)
- Moving average values (for one to four hours)

**Ambient air is used as the carrier gas, which allows for installation in smaller spaces and lower running costs.**

**Environmentally friendly thanks to lower electrical draw**

These systems use 25% less electricity (200 VA) than older similar models.
The ENDA-5000 series of stack-gas analysis systems

Continuous simultaneous and high-precision measurement of NOx, SO2, CO, CO2, and O2

Over 100,000 systems installed and 30 years of quality and experience. That is the base on which HORIBA's new ENDA-5000 series of stack-gas analysis systems is built. These systems have a smaller footprint, and use cross-flow modulated non-dispersive infrared (NDIR) detection with a magnet-pneumatic detection method that is inherently drift-free. The ENDA-5000 series are superior continuous analysis systems that are perfect in the difficult field of exhaust gas measurement, where measurement errors cannot be tolerated. The series features a new intuitive touch panel that makes every operation available with the touch of a single button. The ENDA-5000 series are also designed for faster, more efficient maintenance. They are ideal for a variety of uses, including monitoring steam boiler, refuse incinerator, and electric power generation plant emissions to assure pollution standards are being met.

Features an intuitive touch panel.

Easy to use

The ENDA-5000 series use a large-format LCD touch panel that can display all five critical components (NOx, SO2, CO, CO2, O2) simultaneously. The touch panel also allows the operator to view the density variations of multiple components at once. The operator can easily switch between the corrected and converted density settings screens or view alert information with the touch of a single button.

Compact

Body yields wider maintenance area

Easy to maintain (all maintenance can be done from the front)

The ENDA-5000 series takes up only half the space of older similar systems (such as 3-cylinder type systems). ENDA-5000 can be installed almost anywhere, with ample room on all sides for easy access and much easier maintenance. The blowback panel has also been reduced by almost one-third (to about 77% of the old size). Downsizing of these equipments help save space even when permanently installed, and free up valuable floor area for other equipment.

Better alerts and extra alerts

In addition to the alert functions available in the past, the ENDA-5000 series feature extra alert functions. A continuous checking process can prevent the unit from stopping due to a failure, reducing the risk of failed measurements and assuring consistent operation. US Patent No. 5,966,676

Correction for interference

The interference correcting sensor uses a unique interference filter to compensate for the influence of interference by other gases.

Dramatically reduced correction time for SO2

Corrections of SO2 measurements using wet base methods of the past took a great deal of time (about 15 minutes), but with the ENDA-5000 series' dry base method, correction takes only three minutes.
Specifications

<table>
<thead>
<tr>
<th>Component</th>
<th>ENDA-5000</th>
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<tbody>
<tr>
<td>NOx</td>
<td>NOx</td>
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<td>SO2</td>
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<td>CO</td>
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<td>CO2</td>
<td>CO2</td>
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</table>

**Measurement methods**

- NDIR
- NDIR
- NDIR
- NDIR
- Magneto-motive detection

**Range**

- Standard: 0–5000 ppm

**Range Ratio**

- Within a factor of 10

**Repeatability**

- Within 0.5% of full scale

**Linearity (indicator error)**

- ±1.0% of full scale

**Zero drift**

- ±1.0% of full scale (assuming surrounding temperature is maintained at 5°C)

**Span drift**

- ±2.0% of full scale/week (assuming surrounding temperature is maintained at 5°C)

**Response time**

- Within 60 seconds (T4 + T6 from entry to rate area) (sample flow 0.6 L/Min) (within 240 seconds for SO2 only)

**Interference**

- ±2.0% of full scale/week (within standard range, with standard gas formation)

**Display**

- Touch panel LCD (backlight) (four usable lines)

**Environment Condition**

- Temperature: -5 to 40°C (away from direct sunlight and radiation heat)

**Humidity**

- 90% or less (no condensation)

**Vibration**

- 100 Hz, 0.3 m/s² or less

**Dust**

- Standard environment or better

**Measuring Gas Condition**

- Temperature: 25°C or lower

**Dust**

- 0.1 g/m³ or less

**Calibration Gas**

- Nitrogen gas

**Span gas**

- Ambient air

**Probe**

- Range: JIS 10K, 40 A; Sample probe length: 1000 mm; Material: SUS-316 stainless steel

**Primary filter**

- Filter element: SUS-304 stainless steel and 2μm-pleated quartz wool; Electric heater: 100 VA, with water droplet proof case

**Reduction Pressure**

- Pressure control uses a regulator and cylinder. Reduced pressure sampling; Control pressure: -4.9 kPa

**Power supply**

- Analysis alerts, analysis warnings, range display, conserving, filtering (optional)

**Contact capacity**

- DC 30 V 1 A, AC 250 V 1 A resistance load

**Color/Finish**

- Semi-gloss Munsell 5Y7/1 on all inner and outer surfaces

**Dimensions (unit: mm)**

- (3-cylinder type)

- (6-cylinder type)

**Weight**

- About 800 VA (heated piping 30m: +1100 VA; heater in tray: +300 VA)

**Materials in contact with sample gas**

- SUS-316 stainless steel, SUS-304 stainless steel, PTFE, polypropylene, polyethylene, fluororubber, PVC, PVDF, and glass

**Enclosure**

- Independent outdoor installation

- Front thickness: Main unit, door: top plate: 2.3 mm; Channel: top plate: 3.0 mm; Door: front opening: Half lock: right front:

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