HORIBA
Process & Environmental

STACK GAS ANALYZER SYSTEM
ENDA-C2000series

IMS
HORIBA is operating Integrated Management System
ISO9001 JQA-0298
ISO14001 JQA-E-90039
OHSAS18001 JQA-OH0068
ISO13485 JQA-MD0010

NH_3,NO_x,O_2

STACK GAS ANALYZER SYSTEM

ENDA-C2000series

- **Analysis for minimum range of 0 to 10ppm attained for NH_3, NOx**
- **Maintenance free materialized (Employment of longer life parts, self-diagnostics)**

HORIBA has shipped 10,000 units of stack exhaust gas analyzers since its development of SO_2 analyzer in stack exhaust gas in 1964.
Based on HORIBA's field experience for years, the ENDA-C2000 has been developed combined with latest analytical and electronic technologies in compliance with every possible measuring condition with further improved maintenance availability.The analytical and operational functions are integrated to facilitate operation by use of a microcomputer. It is complete of front operation part with displays in Japanese and self-diagostic function to assure the system performance.
Monitoring and control of equipment such as monitoring for denitration catalyst deterioration, control of NH_3 addition, and prevention for ammonium sulfate crystalline formation will provide you with great help in operation.

ENDA-C2000series

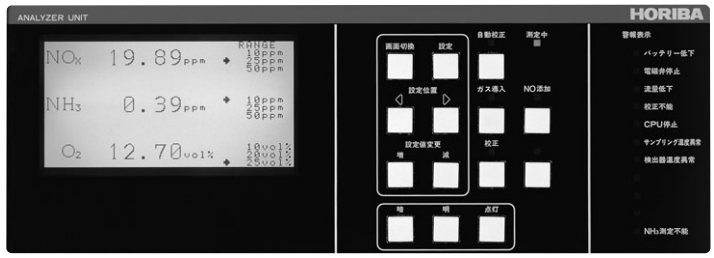
Model	Component
ENDA-C2170	NH_3
ENDA-C2330	NH_3, NOx
ENDA-C2120	NOx
ENDA-C2220	NOx, O_2
ENDA-C2430	NH_3, NOx, O_2

Zero-drift chemiluminescence analyzer (CLA) is installed.

The chemiluminescence analyzer employs our unique cross flow modulation technique which in principle causes no drift. NOx and NOx in NH_3 lines is measured with one analyzer for calculation of NH_3, which further decreases a measuring error due to the drift of analyzer.

- **Analysis for minimum range of 0 to 10ppm attained for NH_3, NOx**

  A conventional detector has further been improved in sensitivity. The use of a semiconductor sensor assures a longer life.



Further improved self-diagnostic functions

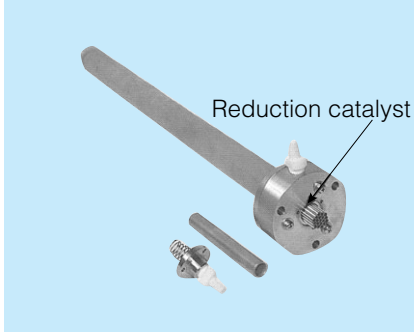
- **Equipped with memory function for error contents**

- **Plentiful self-diagnostic functions**
  - Detector temperature error
  - Sampling temperature error
  - Low flow
  - Solenoid valve stop (for cross flow modulation)
  - Faulty CPU
  - Low memory battery
  - Calibration error (Automatic calibration)
  - NH_3 measurement error
  - Low residual gas for calibration (Optional)

- **Standardization of 3-staged dehumidifier**

  Prevention of drain water condensation and ingress as well as reduction of NO_2 melting loss have been materialized.

NH_3 reduction catalyst tube

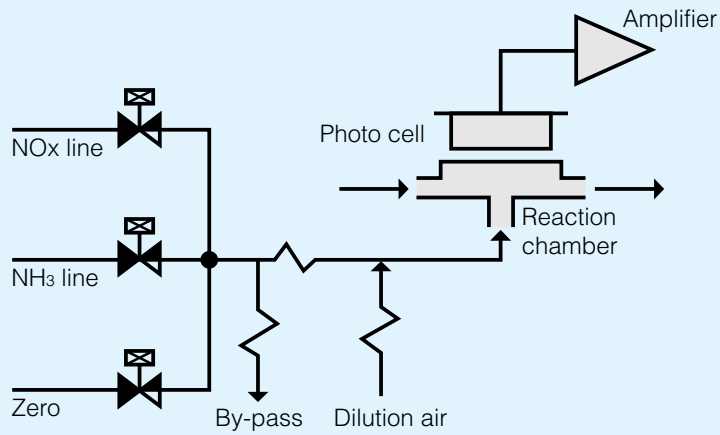


MEASURING PRINCIPLE

Cross flow modulation chemiluminescence analyzer

The chemiluminescence technique utilizes chemiuminescence in the process to generate NO_2 by reacting NO against ozone. The luminous intensity being proportional to NO concentration, the change of NO concentration is continuously monitored by measuring the luminous intensity. The adoption of cross flow modulation system, which introduces sampling gas and comparison gas (zero gas) alternately at a given flow into the measuring cell by means of a solenoid valve continuously changed over at a given period, utilizes the modulation effect generated by the chemiluminescence of the sampling gas itself. Unless NO gas as the measuring element exist in the reaction chamber, primarily no chemiluminescence is generated. When the same gas (for example, zero gas) is supplied into both sampling gas and comparison gas lines, the detector output is zero and no drift is generated in principle. A conventional chemiluminescence system was readily affected by moisture and carbon dioxide as the coherent elements, and it was the cause of measuring errors. This system reduces moisture interference by the electronic cooler. For carbon dioxide interference, the concentration of carbon dioxide in the sampling gas is diluted in the pre-process of reaction chamber. In addition, a plenty flow of ozone is introduced into the reaction chamber for dilution, minimizing the interference and improving the measuring accuracy.

Chart of principle (Philosophy)



MEASURING PRINCIPLE AS NH_3 Analyzer

Reduction catalyst method

The reduction catalyst method utilizes the principle of selective catalytic reduction method currently used in the denitration system for boiler and turbine. In other words, prior to introduction into the analyzer, the following denitration reaction on the catalyst is used:

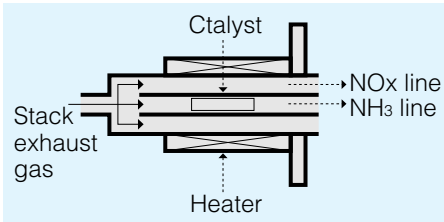
$NO+NH_3+1/4O_2 \rightarrow N_2+3/2H_2O$.....(1)

$NO+NO_2+2NH_3 \rightarrow 2N_2+3H_2O$ .....(2)

Both equations of (1) and (2) show the reaction of NH_3 with NOx at 1:1. This reduces NOx having the same concentration of NH_3.

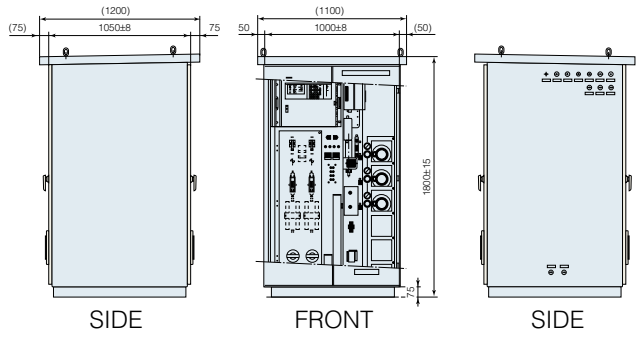
Therefore, NH_3 concentraction is obtained by measuring NOx concentration passing through the catalyst in NH_3 line and NOx concentration not passing through the catalyst and calculating the difference.

The pre-process system is composed of the NH_3 line filled with catalyst and the NOx line not filled with catalyst. The catalytic part is temperature controlled at 350-400°C.



DIMENSIONAL OUTLINES

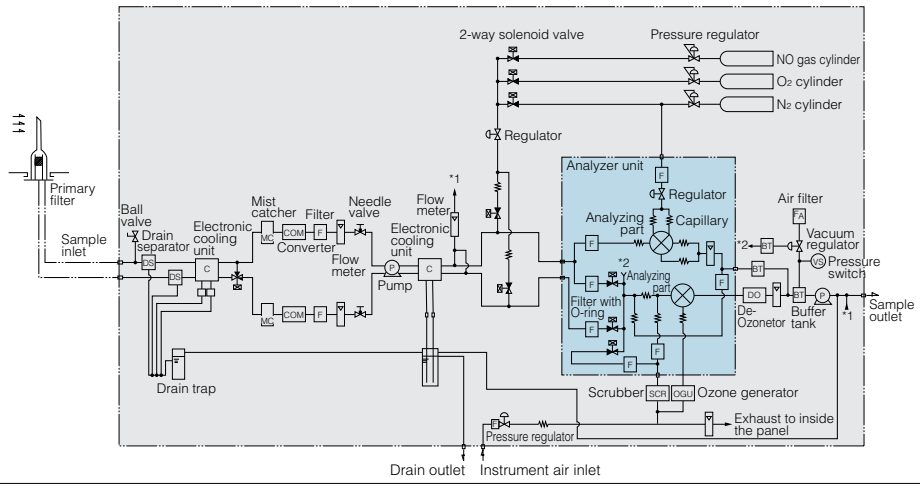
(UNIT : mm)



SPECIFICATION

Component measured & range	Component / Standard Range / Optional Range / Range Ratio NH_3 / 20~100ppm / 10ppm-less than 20ppm / 10 times, Max. NOx / 20~100ppm / 10ppm-less than 20ppm / 10 times, Max. O_2 / 5~25 vol% / / 5 times, Max. Number of ranges: Max. 3 ranges for each component
Ambient temp.	–5˚C-40˚C (Standard) / 40˚C-50˚C
Repeatability	±0.5FS% (±1.0FS% when optional range is included) / ±1.0FS% (±2.0FS% when optional range is included)
Drift (NOx analyzer)	Zero drift :±1.0FS%/week Span drift :±2.0FS%/week Provided the ambient temperature change is ±5˚C / Zero drift :±2.0FS%/week Span drift :±2.0FS%/week Provided the ambient temperature change is ±5˚C
Total interference	±2.0FS% / ±3.0FS%
Response speed	T_d+T_{90} = 90sec. Max. from analyzer inlet T_d+T_{90} = 70 sec. Max. from calibration gas inlet
Supply voltage	AC100V±15% (85V-115V)
Power frequency	47.5Hz-63.0Hz (common frequency)
Sampling method	Dehumidified sampling at 2.5˚C (2 staged electronic cooling unit, depressurized sampling)
Sample gas flow	1.5 L/min for each line
Power consumption	1.9 kVA, Separate 600VA for cold district specification
Analog output	1-3 systems selected in combination of any one of DC4-20mA / 0-16mA / 1-5V and DC0-1V. Isolation type
Status signals	Analyzer error, calibration error, power failure (or NFB tripped), range indication, calibrating, under maintenance, upper/lower limit alam (optional), purging (optional), contact capacity DC125V, 1A, AC250V, 1A resistance load
Outside dimensions	(W)1000×(D)1050×(H)1800
Mass	Approx. 350kg (gas cylinder excluded)

FLOW SCHEMATIC
ENDA-C2430



HORIBA continues contributing to the preservation of the global environment through analysis and measuring technology.

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

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