



Stack-gas Analysis System ENDA 5000 series

NO_x, 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

MEAS.		JAN/13/2004 15:21		RANGE	
NO _x	128.1 ppm	200	PROTECT		
SO ₂	120.2 ppm	200	PROTECT		
CO	153.2 ppm	200	PROTECT		
CO ₂	4.135 vol%	5	PROTECT		
O ₂	9.34 vol%	10	PROTECT		
MENU COR. CAL.					

offers options for a variety of uses, all based on HORIBA

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



Sample gas probe

- An innovative dehumidifying system minimizes loss of soluble components.
- A mist catcher in the sample flow path removes SO₂ and prevents damage and line blockage.
- Long-lasting, low-temperature (180°C) NO₂ → 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



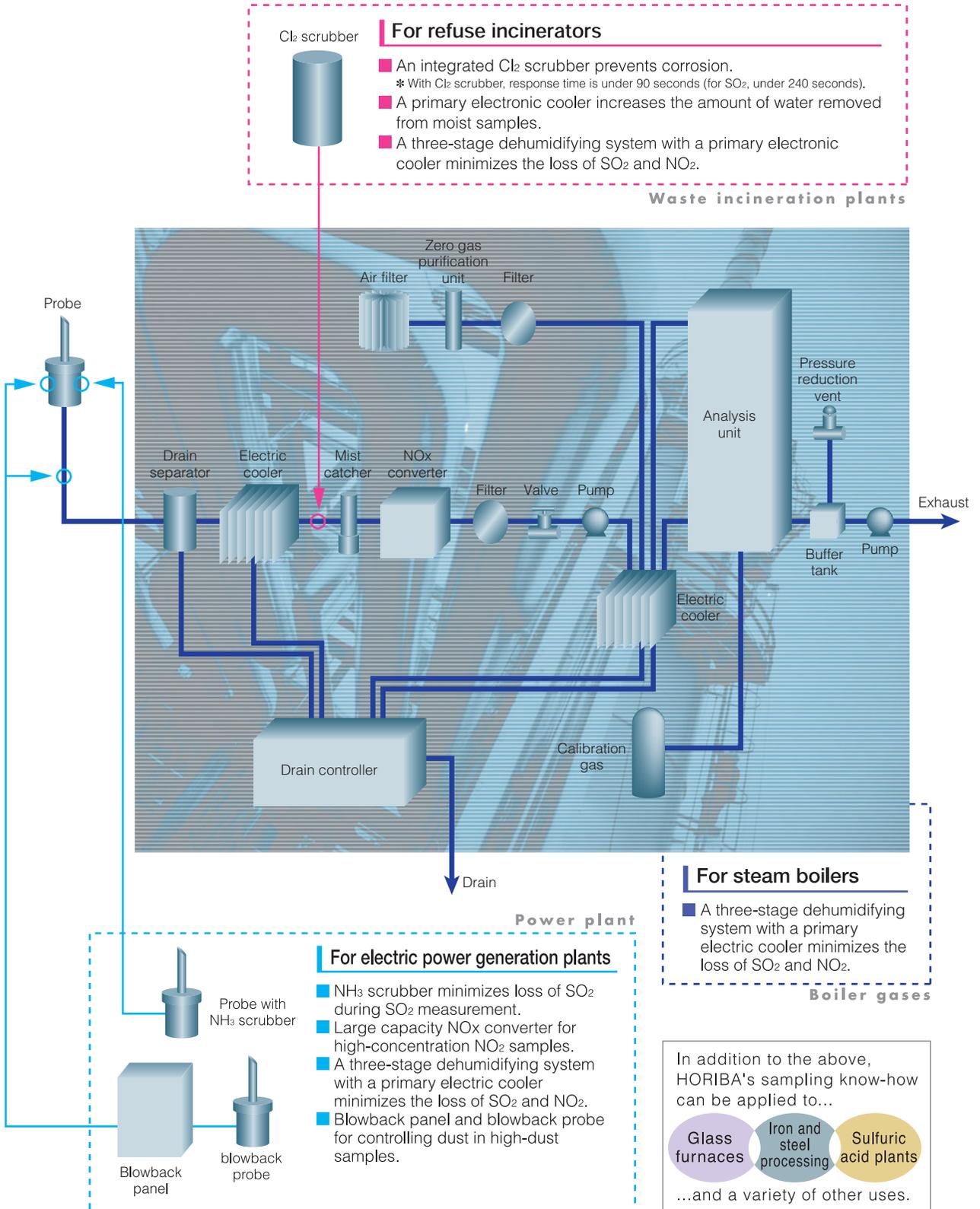
In the past, a large blowback panel was necessary to control dust when measuring high-dust gas samples. HORIBA has used its innovative technology to reduce the size of the blowback panel by almost 25% (to 350 [W] x 550 [H] x 180 [D] mm). The panel is also lighter, and can be mounted on a wall. The new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



Models and components measured

NO _x	SO ₂	CO ₂	CO	O ₂	Model
●					ENDA-5120
	●				ENDA-5130
		●			ENDA-5140
			●		ENDA-5150
				●	ENDA-5160
●				●	ENDA-5220
	●			●	ENDA-5230
		●		●	ENDA-5240
			●	●	ENDA-5250
●	●				ENDA-5300
●		●			ENDA-5310
●			●		ENDA-5320
	●	●			ENDA-5340
	●		●		ENDA-5350
		●	●		ENDA-5370
●	●			●	ENDA-5400
●		●		●	ENDA-5410
●			●	●	ENDA-5420
	●	●		●	ENDA-5440
	●		●	●	ENDA-5450
		●	●	●	ENDA-5470
●	●	●			ENDA-5500
●	●		●		ENDA-5510
●		●	●		ENDA-5520
	●	●	●		ENDA-5530
●	●	●		●	ENDA-5600
●	●		●	●	ENDA-5610
●		●	●	●	ENDA-5620
	●	●	●	●	ENDA-5630
●	●	●	●		ENDA-5700
●	●	●	●	●	ENDA-5800

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 NO₂.

Waste incineration plants

For electric power generation plants

- NH₃ scrubber minimizes loss of SO₂ during SO₂ measurement.
- Large capacity NO_x converter for high-concentration NO₂ samples.
- A three-stage dehumidifying system with a primary electric cooler minimizes the loss of SO₂ and NO₂.
- Blowback panel and blowback probe for controlling dust in high-dust samples.

Power plant

For steam boilers

- A three-stage dehumidifying system with a primary electric cooler minimizes the loss of SO₂ and NO₂.

Boiler gases

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.

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

The ultimate in dependability and reliability

LONG-TERM STABILITY

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 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 each time measurement occurs (once a second), the zero point is extremely stable.

3 Continuous cleaning keeps the cell clean

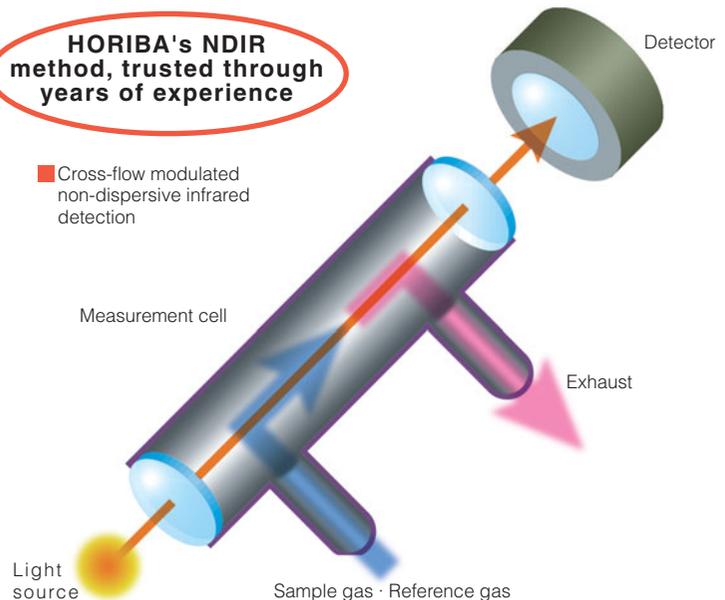
Since cleaning air is fed into the sample cell in between each batch of sample gas, the cell resists contamination and normally remains clean. This reduces span drift and makes the equipment safe and stable for long periods of time.

Other merits

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

HORIBA's NDIR method, trusted through years of experience

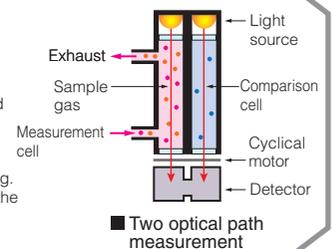
■ Cross-flow modulated non-dispersive infrared detection



(Dual optical path comparison)

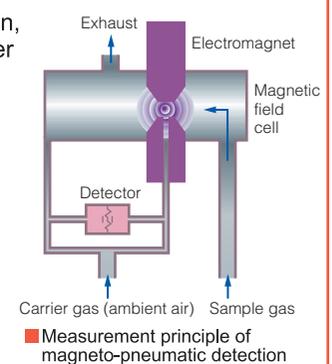
The sample gas and reference gas are each put in a different cell for measurement.

- This method is appropriate for laboratory use and other kinds of batch measurement.
- Differences in the cleanliness of the two optical paths result in signal variation.
- Keeping the cells clean requires periodic cleaning.
- During transport, and inspection, and whenever the unit is subject to vibrations, fine adjustment by a skilled service person is required.



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.



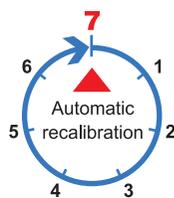
■ Continuous correction is provided by a sensor that is designed to detect CO₂ interference during NO_x measurement.

■ 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 (NO_x, SO₂, CO, CO₂, O₂)
- O₂ calculated output values (NO₂, 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

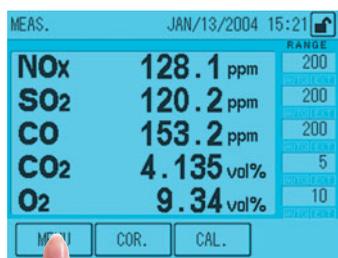
These systems use 25% less electricity (200 VA) than older similar models.

The ENDA-5000 series of stack-gas analysis systems



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

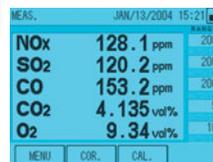
Over 100,000 systems installed and 30 years of quality and experience. That is the base on which HORIBA's new ENDA-5000 series of stack-gas analysis systems is built. These systems have a smaller footprint, and use cross-flow modulated non-dispersive infrared (NDIR) detection with a magnet-pneumatic 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.



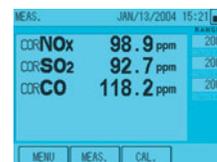
EASY

Features an intuitive touch panel.

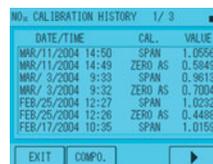
Easy to use



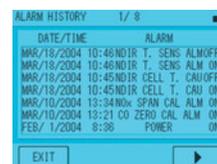
Measured concentration



Converted concentration

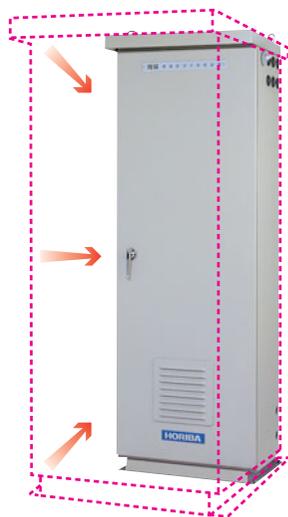


Correction history



Alarm history

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.



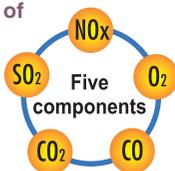
COMPACT

Body yields wider maintenance area
Compact (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.

Continuous simultaneous measurement of up to five components with one system

HORIBA'S innovative optical technology enables ENDA-5000 series measure up to five components which can be arranged any combination.



Correction for interference

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



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



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

Model	ENDA-5000				
Component	NOx	SO ₂	CO *1	CO ₂	O ₂ *2
Measurement methods	NDIR	NDIR	NDIR	NDIR	Magneto-pneumatic detection
Range	Standard 200~5000 ppm	200~5000 ppm	200~5000 ppm	5~25 vol%	10~25 vol%
	Optional 100 ppm~	50 ppm~	100 ppm~	—	—
Range Ratio	Within a factor of 10	Within a factor of 10	Within a factor of 10	Within a factor of 5	Within a factor of 2.5
Repeatability	Within 0.5% of full scale (with optional range, or during O ₂ measurement, ±1.0% of full scale)				
Linearity (indicator error)	± 1.0% of full scale				
Zero drift	± 1.0% of full scale (assuming surrounding temperature is maintained within 5°C) (with optional range, or O ₂ measurement, ± 2.0% of full scale)				
Span drift	± 2.0% of full scale/week (assuming surrounding temperature is maintained within 5°C)				
Response time	Within 60 seconds (Td + T90 from equipment intake area) (sample flow 0.6 L/min.) (within 240 seconds for SO ₂ 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) *3			
	Humidity	90% or less (no condensation)			
	Vibration	100 Hz, 0.3 m/S ² or less			
	Dust	Standard environment or better			
Measuring Gas Condition	Temperature	250°C or lower			
	Dust	0.1 g/Nm ³ or less			
Standard gas composition *4	NO: 500 ppm or less; NO ₂ : 6 ppm or less; SO ₂ : 1000 ppm or less; SO ₃ : 50 ppm or less; CO: 200 ppm or less; CO ₂ : 15 vol% or less; H ₂ O: 40 vol% or less				
Sampling method	Dry sampling using an electric cooler				
Sample gas flow	2.5 L/min~3.0 L/min				
Sample inlet tube	PTFE tubing (ø8/ø6 mm)				
Sample gas pressure	± 4.9 kPa (three points selected) (with no sample gas back pressure)	(1) -1.96 to 4.9 kPa (2) ± 3.43 kPa (3) -4.9 to 1.96 kPa			
Pressure control	Pressure control uses a regulator and cylinder; Reduced pressure sampling; Control pressure: -4.9 kPa				
Output	DC 4 to 20 mA (absolute output) (DC 0 to 16 mA/DC 0 to 1 V/DC 1 to 5V optional) Max. 12 output systems				
External output	Analysis alerts, analysis warnings, range display, corrections, conservation, purging (option) Contact capacity: DC 30 V 1 A, AC 250 V 1 A resistance load				
Correction method	Dry correction, automatic correction (correction cycle: 7 days standard, can be adjusted to between 1 and 99 days), manual correction				
Calibration gas	Zero gas	With measurement method authorization: N ₂ . When there is no measurement method authorization: N ₂ or ambient air			
	O ₂ carrier gas	Ambient air			
	Span gas	Gas cylinder for each component measured (when there is no measurement method authorization: O ₂ or ambient air can be used)			
Probe	Flange: JIS 10K, 40 AFF; Sample probe tube 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				
Power supply	AC 100 V ± 15 V (85 V~115 V)				
Power frequency	50/60 Hz (switchable)				
Power consumption	About 800 VA (heated piping 30m: +1100 VA; heater in tray: +300 VA)				
Exterior dimensions /Mass	600 (W) x 1770 (H) x 300 (D) mm (high pressure gas cylinders, 3.4 L cylinders, maximum of 3 cylinders); About 180 kg (not including cylinders); 600 (W) x 1770 (H) x 500 (D) mm (high pressure gas cylinders, 3.4 L cylinders, maximum of 6 cylinders); About 200 kg (not including cylinders)				
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 Plate thickness: Main unit, doors, top plate, steel plate: 2.3 mm; Channel base: 3.2 mm; Doors: front opening; Interface: right front				
Color/Finish	Semi-gloss Munsell 5Y7/1 on all inner and outer surfaces				

- *1: The analyzer against N₂O interference for CO analyzer applies the standard range of 200 ppm or more (no optional range).
 *2: No carrier gas cylinder is necessary.
 *3: For the temperature range of -15°C to 40°C (cold district) and for the specification of -5°C to 50°C, we will separately discuss the design.
 *4: When the coexisting gas contains NH₃, NH₃ scrubber is prepared for an optional part.
 When CH₄ coexists in the sample gas for SO₂ analyzer, the SO₂ analyzer of CH₄ interference compensation type is prepared.
 When N₂O coexists in the sample gas for CO analyzer, the CO analyzer of N₂O interference compensation type is prepared.

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

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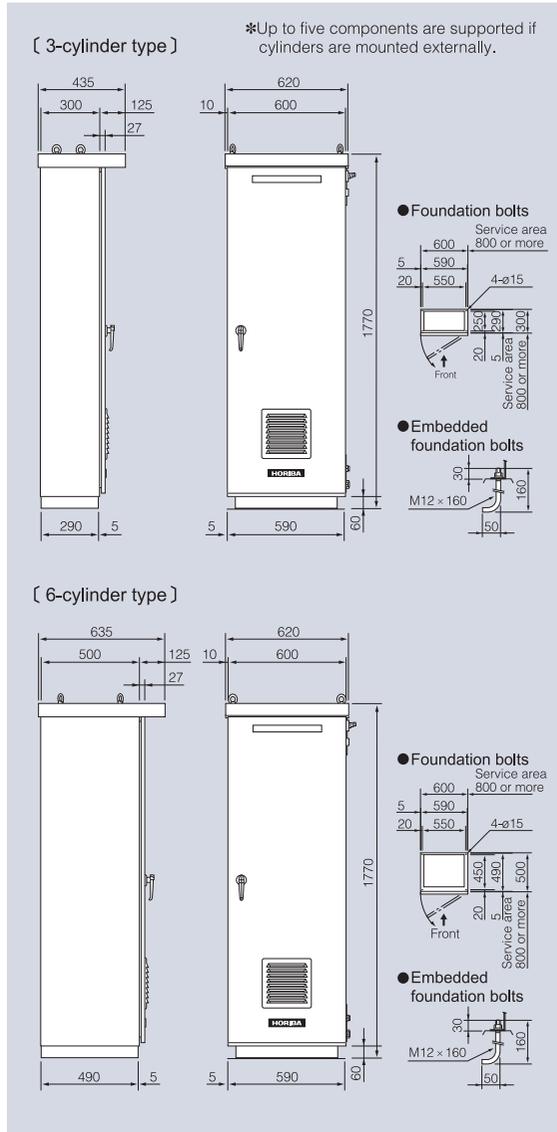
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Bulletin:HRE-2406C

Dimensions (unit: mm)



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 European Standard compliant : EN15267, EN14181
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