HORIBA
Process & Environmental

NEW

Multi-Component Gas Analyzer

VA-5000 Series

Sample Gas Conditioning System

VS-5000 Series

Simple, Flexible, and Reliable!
Multi-Component Gas Analyzer VA-5000

Flexibility for a Various of Applications

- Wide selection of measurement range from ppm to percent.
- Capability to simultaneously measure up to four gas components
  (e.g. NDIR, NDIR, CLA, and Galvanic cell. In case of four gas components, one should be Galvanic cell.).
- Internal automated correction of measurements such as O_2 corrected value.
  It is no need to use additional external PLC.
- Thermostat for optical unit allows us to use for tougher sample gas condition.

Measurement

User Friendly Display

- Real time analysis by the color trend graph on 5.7-inch LCD touch screen.
  It makes easier to recognize when the measurement value becomes stable.
- Compact size: 430mm(W) x 380mm(D) x 132mm(H)
  with 3 height units (HU) fits to 19" rack and can be easily used for replacement and installation in places with tight space.
- Standard Modbus™ TCP communication with optional analog and digital I/O.
- Internal data storage for up to 15 days of data accessible by USB (1GB).

Measurement

Plug & Play Functions

- Modular design allows flexible upgrade of analyzer starting from one component.
- Modular design minimizes break down time by quick replacement of required parameter.
- Just connect the line and upload setting data via USB.
  No need of any special and time consuming adjustments at site.

Trend Graph

Series

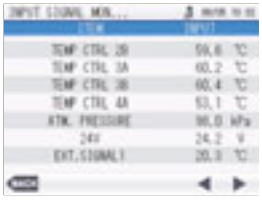
Other Features

- Availability of auto calibration function in combination with sampling unit VS-5000 or by controlling external solenoid valves.
- Blowback control function enables measurement of sample gas with high dust concentration. Our system can control blowback via digital output with internal sequencer.
  *Please consult us for the details.
- Ability to have multiple analog outputs even for same parameter within max. 8 channels.
  *Please consult us for the details. It needs adjustment at factory.
- Self-diagnosis function enables high/low concentration alarms, calibration error alarm, etc.
- Ability to show the internal signal data such as "Internal temperature control data", "Detector voltage signal", etc. for quick system diagnosis. This data can be logged through Modbus™ TCP to your data logger.


Concentration Alarm Setting


Auto Calbration Setting


Blowback Setting


Indication of Internal Signals

Sample Gas Conditioning System VS-5000 Series

- Compact 19-inch rack mount size for easy installation.
- All sample conditioning components (pumps, coolers, filters, flow controls, NO_x converter, etc,) are integrated into a single case.
- Capability to support two VA-5000 analyzers with a single VS-5000 depending on application.
  *Please consult us for the detail.

Application examples

- The VA-5000 Series provides a wide range of measurements enabling the analyzers to be used in R&D settings, Quality control and also as Continuos Emission Monitoring System (CEMS) in industry.
  - CEMS (Continuous Emission Monitoring System)
  - Emission monitoring of N_2O for sludge waste incinerator
  - Research of SCR catalyst
  - Research of fuel cell
  - Research of green house gas
  - Research of metabolism for animal farming
  - Quality check of calibration gas
  - Quality check of combustion appliances
  - Combustion efficiency control in small boilers
  - Monitoring of biogas and fermentation
  - Process control on the steel production plant such as direct reduced iron manufacturing.
  - Process control of O_2 in aeration tank of water treatment plant
  - Process control in shape memorize shirts production
  - Process control of combustion furnace in ceramic production (porcelain, sanitary, advanced materials etc.)

The free combination of modules and sampling units can satisfy diverse measurement needs.

		NDIR1	NDIR2	NDIR3	CLA	MPA	Galvanic	Zirconia	PMA	Sampling Unit			
Module	Analysis unit	CO・CO_2・CH_4・N_2O・NO・SO_2・NH_3			NO_X	O_2				VS-5001	VS-5002	VS-5003	VS-5004
1	VA-5001	•								•			
	VA-5002				•							•	
	VA-5003					•					•		
	VA-5004						•			•			
	VA-5005							•		•			
	VA-5006								•	•			
2	VA-5011	•	•							•			
	VA-5012	•			•							•	
	VA-5013	•				•					•		
	VA-5014	•					•			•			
	VA-5015	•						•		•			
	VA-5016	•							•	•			
	VA-5023				•	•							•
	VA-5024				•		•					•	
	VA-5025				•			•				•	
	VA-5026				•				•			•	
3	VA-5111	•	•	•						•			
	VA-5112	•	•		•							•	
	VA-5113	•	•			•					•		
	VA-5114	•	•				•			•			
	VA-5115	•	•					•		•			
	VA-5116	•	•						•	•			
	VA-5123	•			•	•							•
	VA-5124	•			•		•					•	
	VA-5125	•			•			•				•	
	VA-5126	•			•				•			•	
4	VA-5111G	•	•	•			•			•			
	VA-5112G	•	•		•		•					•	

*Please consult us for detailed combinations.

Wide measurement ranges are provided for each module

Measurement method	Component	Option range	Standard range		Zero drift		Span drift*1		Repeatability
		High Sensitive Min. range	Min. range	Max. range	Standard range	High Sensitive	Standard range	High Sensitive	
NDIR	CO	0-50 ppm	0-200 ppm	0-100 vol%	±2.0%/week of F.S.	±2.0%/day (CO : 0-50~99 ppm range, CO_2: 0-50~99 ppm range, SO_2: 0-100~199 ppm range) ±1.0%/day (CO : 0-100~199 ppm range, CH_4: 0-100~199 ppm range)	±2.0%/week of F.S.	±2.0%/day (CO : 0-50~99 ppm range, CO_2: 0-50~99 ppm range, SO_2: 0-100~199 ppm range) ±1.0%/day (CO : 0-100~199 ppm range, CH_4: 0-100~199 ppm range)	±0.5% of F.S.
	CO_2	0-50 ppm	0-100 ppm	0-100 vol%					
	CH_4	0-100 ppm	0-200 ppm	0-100 vol%					
	N_2O	NA	0-100 ppm	0-5000 ppm					
	NO	NA	0-500 ppm	0-1 vol%					
	SO_2	0-100 ppm	0-200 ppm	0-10 vol%					
	NH_3	NA	0-100 ppm	0-1000 ppm					
CLA	NO/NO_X	NA	0-20 ppm	0-5000 ppm	±2.0%/week of F.S.				±0.5% of F.S.
MPA	O_2	NA	0-5 vol%	0-100 vol%	±2.0%/week of F.S.		±2.0%/week of F.S.		±0.5% of F.S.
Galvanic		NA	0-5 vol%	0-25 vol%	±1.0% /day of F.S.		±1.0% /day of F.S.		±0.5% of F.S.
Zirconia		NA	0-5 vol%	0-25 vol%	±1.0%/week of F.S.		±2.0%/week of F.S.		±0.5% of F.S.
PMA		NA	0-5 vol%	0-100 vol%	±2.0%/week of F.S.		±2.0%/week of F.S.		±0.5% of F.S.

Note 1: Select the lowest range and maximum range ratio within the above concentration ranges according to the following conditions.
[NDIR] 5 ranges with a maximum ratio between the lowest and highest range (range ratio) of 10x (or 20x as an option, although this may be limited by the cell length).
[CLA] 8 ranges with a maximum range ratio of 100x (if the maximum range exceeds 2000ppm, the minimum range should be 50ppm or more).
[MPA] 5 ranges with a maximum range ratio of 10x; [Galvanic] 5 ranges with a maximum range ratio of 5x; [Zirconia] 5 ranges with a maximum range ratio of 5x.
[PMA] 3 ranges with a maximum range ratio of 10x.
Note 2: Contact us if you require measurement of special gases such as NH_3.
*1% of span drift is achievable with special adjustment at factory. Please contact us for the details.

Various combinations of sensor modules furnish excellent flexibility

The free combination of measurement modules utilizing different technologies to measure different gases makes the VA-5000 Series truly applicable to the divers needs of gas analysis for process control, environmental monitoring or R&D testing, etc. The sensors lineup includes the NDIR method to measure 9 different gases in a wide ranges, the CLA method which allows the measurement of NO_X in low concentrations, and four types of O_2 detectors to be selected as per your measurement requirements.

SO_2, CO, CO_2, CH_4, N_2O, NO, NH_3

NDIR

Dual-beam Non-Dispersive Infrared Absorption Method

As sample gas flow through the measurement cell, a beam of infrared energy (at a wavelength appropriate for the gas being measured) travels though the sample gas and strikes the infrared detector. The gas being measured absorbs infrared energy and reduces the energy reaching the IR detector. As a result, the pressure of the gas in the first chamber of the detector is reduced causing gas to flow from this chamber to the other. This gas flow passes over the precise temperature sensor between the chambers and reduces the resistance value of the sensor element. Since the resistance value was previously calibrated relative to a specific gas concentration, the measured resistance value can be displayed as a gas concentration reading for the sample gas. HORIBA's MEMS (Micro Electro Mechanical Systems) technology allows HORIBA to manufacture IR temperature sensor that is very small yet very sensitive, highly reliable, and vibration-resistant.

*When using the NDIR carbon dioxide (CO_2) analyzer, assure that the background concentration of CO_2 in the operating environment is stable.
*CO interference for N_2O measurement is eliminated by improved NDIR detector.

NO/NO_X

CLA

Chemiluminescence method

The NOx analysis module uses the sensitive chemiluminescence method (CLA) which permits NOx measurements in the range as low as 0-20 ppm. The chemiluminescence analyzer has virtually zero interference. HORIBA special technology and experience has virtually eliminated CO_2 quenching and water vapor interferennce; operates at atmospheric pressure.

O_2

Choose from four analysis methods for the oxygen analyzer module.
Select the sensor module based on your specific requirements and sample gas conditions.

MPA

Magnetopneumatic

Highly accurate and stable measurement unaffected by coexisting gases or external vibration.

Zirconia

Zirconia

Stable measurement unaffected by environmental conditions

Galvanic Cell

Galvanic cell

Stable measurement with a compact and lightweight sensor

PMA

Paramagnetic

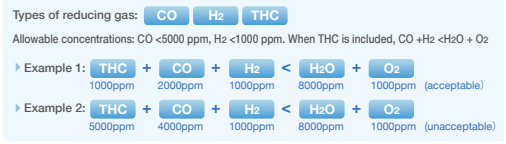
High accuracy, fast response time and absolute linearity provide advantage in the measurement.

Characteristics of O_2 analyzers

		MPA	Zirconia	Galvanic	PMA
Performance	Stability of design	◉	◉		◉
	Warm-up start up performance		◉	◉	
Sample gas condition	Flammable gas is present	◉			
	High-concentration acidic gas is present	◉			
	Alkaline gas is present				
	Sample flow rate should be minimized	◉			◉
Installation environment	Carrier gas is not available		◉	◉	◉
	VS-5000 sampling system not used		◉	◉	◉
	Installation environmental is vibrating		◉	◉	
Cost and other points	Operation costs should be minimized		◉		◉
	Maintenance should be minimized	◉	◉		◉

*When using the zirconia oxygen (O_2) analyzer and the sample gas contains reducing gases (carbon monoxide (CO), total hydrocarbons (THC), and/or hydrogen (H_2), to prevent rapid deterioration of the zirconia sensor, the coexisting oxygen and water vapor concentrations must exceed the total concentration of the reducing gases.
The sample gas must meet this requirement: Reducing gas + H_2 < H_2O + O_2

Types of reducing gas: CO, H_2, and THC
Allowable concentrations: CO < 5000 ppm,
H_2 < 1000ppm, when THC is included, CO + H_2 < H_2O + O_2



Specifications

VA-5000 Analysis unit

Measurement principle			NDIR	CLA	Magnetopneumatic	Galvanic cell	Zirconia	Paramagnetic
Performance	Linearity	Standard	±1.0% F.S.					
		Option	±2.0% F.S.(range ratio 1:20)	–	–	–	–	–
	Response time*1		30 sec (T_{90}), 40 sec (Td+T_{90}); single component					45 sec (Td+T_{90})
	Warm-up time		60 min (90 min for SO_2)	60 min	60 min	40 min	20 min	120 min
Flow rate	Standard		0.5L/min	0.3L/min	0.3L/min	0.5L/min	0.5L/min	0.5L/min
	Option		1.0L/min*2	–				1.0L/min
Communication			Ethernet (Modbus™/TCP)					
Data storage	Option		USB memory					
Input/Output (option)	Analog	Input	Maximum 4ch, 0-16 mA / 4-20 mA / 0-20 mA or 0-1 V isolated					
		Output	Maximum 8ch, 0-16 mA / 4-20 mA / 0-20 mA or 0-1 V isolated, Current output: load resistance < 750Ω, Voltage output: input impedance > 100k Ω					
	Digital	Input	Maximum 16ch, isolated, Open voltage: 24 V, Short-circuit current 10mA Maximum load resistance < 50 Ω, Minimum pulse width: 0.5 sec					
		Output	Maximum 16ch isolated, Maximum voltage DC 30 V, Maximum current 1A Minimum voltage DC 0.1 V, Minimum current 0.1 A					
Sample condition			Ambient temperature, dust free, H_2O less than 5°C saturation, Pressure 0 to 5kPa					
Gas connections			Inlet and outlet - 6 mm/4 mm PTFE: a single gas inlet is provided standard; the gas flows sequentially from one module to the next; as an option separate gas inlets can be provided for each module.					
Gas tubing			PTFE; stainless steel optional					
Joint			Sample Inlet: Rc 1/8(ϕ6/ϕ4mm PTFE joint), Exhaust: ϕ6/ϕ4mm PTFE joint Air Inlet: Rc 1/8(ϕ6/ϕ4mm PTFE joint); installed CLA. CLA: Exhaust: ϕ6/ϕ4mm PTFE joint; installed CLA, MPA Outlet: ϕ6/ϕ4mm PTFE joint; installed MPA, Zero gas Outlet: ϕ6/ϕ4mm PTFE joint; installed MPA					
Installation			Temperature 0-45°C, Humidity 90% (No condensation), Altitude Max 3000m (combination with only NDIR), (combination with Zirconia, Galvani, MPA, and CLA: max 2000m), No fluctuation of backpressure					
Power			100-240 V AC (±10%, maximum voltage 250 VAC), 50/60 Hz (±1.0%), Consumption: 100 to 350 VA					
Display			5.7-inch touch screen					
Case			19-inch panel mount					
Exterior dimensions			Analyzer: 430 (W) x 380 (D) x 132 (H) mm / Approx. 17 (W) x 15 (D) x 5.2 (H) in Deozonator unit for CLA: 111 (W) x 95 (D) x 100 (H) mm / Approx. 4.4 (W) x 3.7 (D) x 3.9 (H) in (protrusions excluded)					
Mass			7 -18 kg / Approx. 15 - 40lb					

*1 Flow rate: 0.5L/min, Faster response time (T90) such as 7sec is achievable as special option
*2 Selectable when all components are NDIR and PMA

VS-5000 Sampling Unit

Model	VS-5001	VS-5002	VS-5003	VS-5004
Applicable principles	NDIR, Zirconia, Galvanic cell, MPA, PMA	NDIR, Zirconia, Galvanic cell, MPA, PMA	NDIR, Zirconia, Galvanic cell, MPA, CLA, PMA	NDIR, Zircoia, Galvanic cell, MPA, CLA, PMA
Form	19 inch panel mount			
Sampling method	5°C dry sampling			
Materials	SUS, PP, PVC, PVDF, PTFE, FKM, CR, Glass			
Flow rate	1.5～5.0 L/min			
Sample supply	0.5 L/min x 2 systems*1		0.3L/min x 1system	
Power	100～240 V AC (±10%, maximum voltage 250V AC), 50/60 Hz (±1%)			
Power consumption	150 VA		200 VA	
Joint	Sample inlet: ϕ8/ϕ6 mm PTFE joint, Sample outlet: ϕ6/ϕ4 mm PTFE joint Air outlet: ϕ6/ϕ4 mm PTFE joint, MPA inlet: ϕ6/ϕ4 mm PTFE joint Regulator: ϕ6/ϕ4 mm PTFE joint, Calibration inlet: RC1/8(ϕ6/ϕ4mm PTFE joint) Bypass outlet/Exhaust/Drain outlet: ϕ8mm hose end			
Sample gas	Ambient temperature, Dust: less than 0.1mg/m³, H_2O: less than 60°C saturation with drain pot (Approx. 25% H_2O), Pressure: ±980 Pa, SO_3: less than 50ppm, NO_2: less than 6ppm*2, (Corrosive gas, flammable gas and explosive gas are not included)			
Dimension	430 (W) x 550 (D) x 221 (H) mm / Approx. 17 (W) x 22 (D) x 8.7 (H) in (protrusions excluded)			
Mass	14kg / 31lb	16kg / 35lb	19kg / 42lb	20kg / 44lb

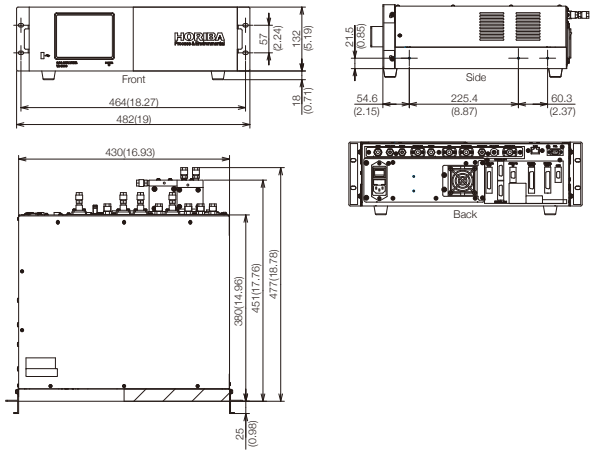
*1 Environmental temperature needs to be less than 35°C. If it's over 35°C, please consult us.
*2 When the sample gas includes more than 6ppm NO_2, it needs to use optional NOx converter.

Dimensional Outlines

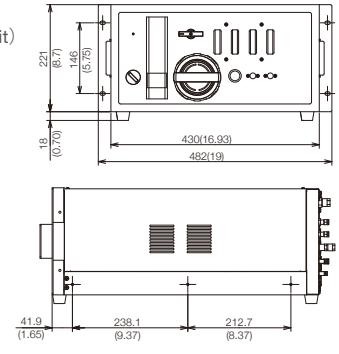
Rubber feet, deozonator unit and mounting brackets (e.g.,slide rails, rack mounting plates) are optional.

Unit: mm(in)

VA-5000
(Analyzer Unit)

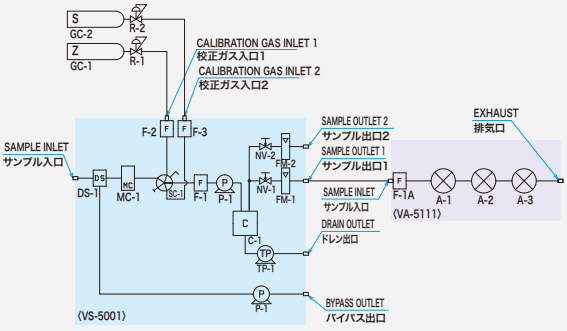


VS-5000
(Sampling Unit)

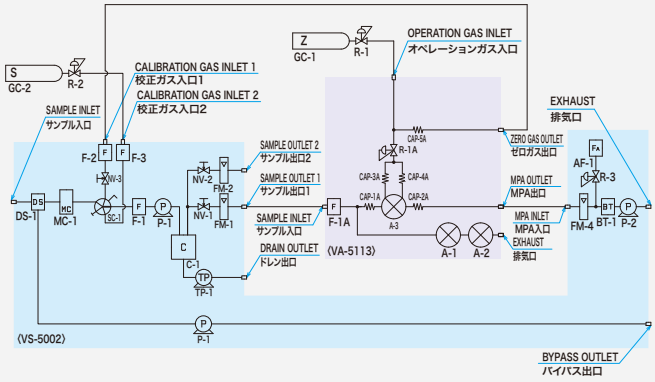


Flow sheet

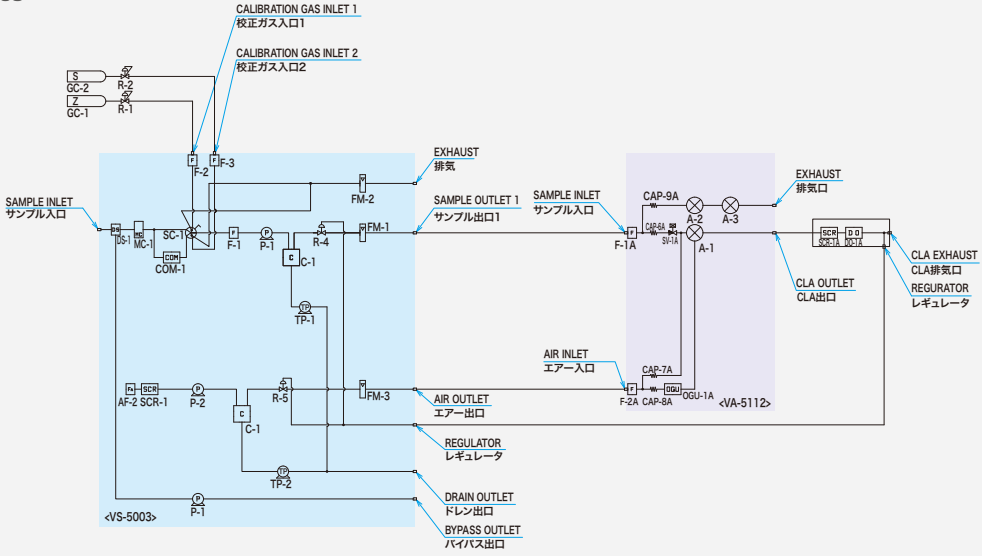
VA-5111+VS-5001



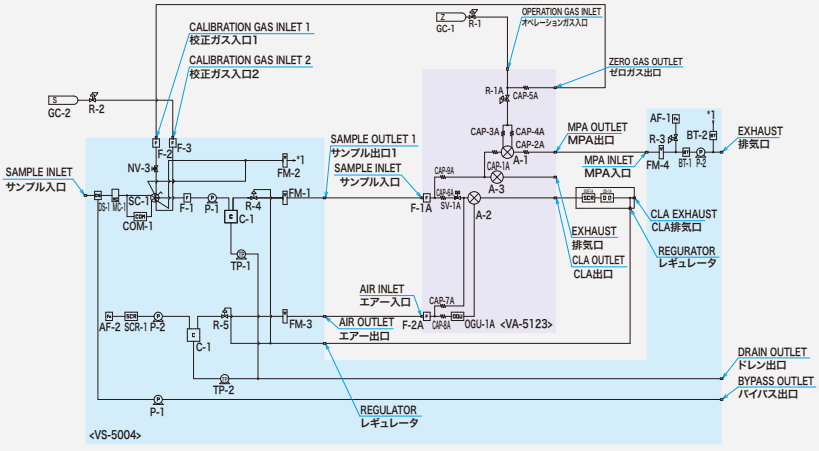
VA-5113+VS-5002



VA-5112+VS-5003



VA-5123+VS-5004



Wide range of solutions for various fields and applications by combination with VA/VS-5000 series.

HORIBA is the expert of gas analysis. We line up analyzers for wide range of gases. By combination of existing analyzers with brand new VA/VS-5000 series, we could provide diverse tailor-made system solutions and answer every customer's field needs.

Portable Gas Analyzer
PG-300 Series

Measurement of max. 5 different components by single portable, lightweight and robust unit.
Used for emission monitoring, R&D (fuel cell), stack cross check.

NO_X SO_2 CO CO_2 O_2 CH_4

Air Quality Analyzer
AP-370 Series

Monitoring of ambient air pollutants: harmful oxides and particulate.
Used for ambient air, clean room, indoor air and trace gas monitoring.

Fit in a standard 19-inch rack

O_3 SO_2 NO_X CO CO_2 NH_3 H_2S THC NMHC CH_4 SPM PM2.5 PM_{10} PM_1 PM_4 SPM

Stack Gas Analyzer
GI-700 Series

Designed for continuous measurement of up to 6 combustion gases simultaneously. The integral sample conditioning system insures accurate measurement.

Fit in a standard 19-inch rack

NO_X CO_2 CO SO_2 NH_3 O_2

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.

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