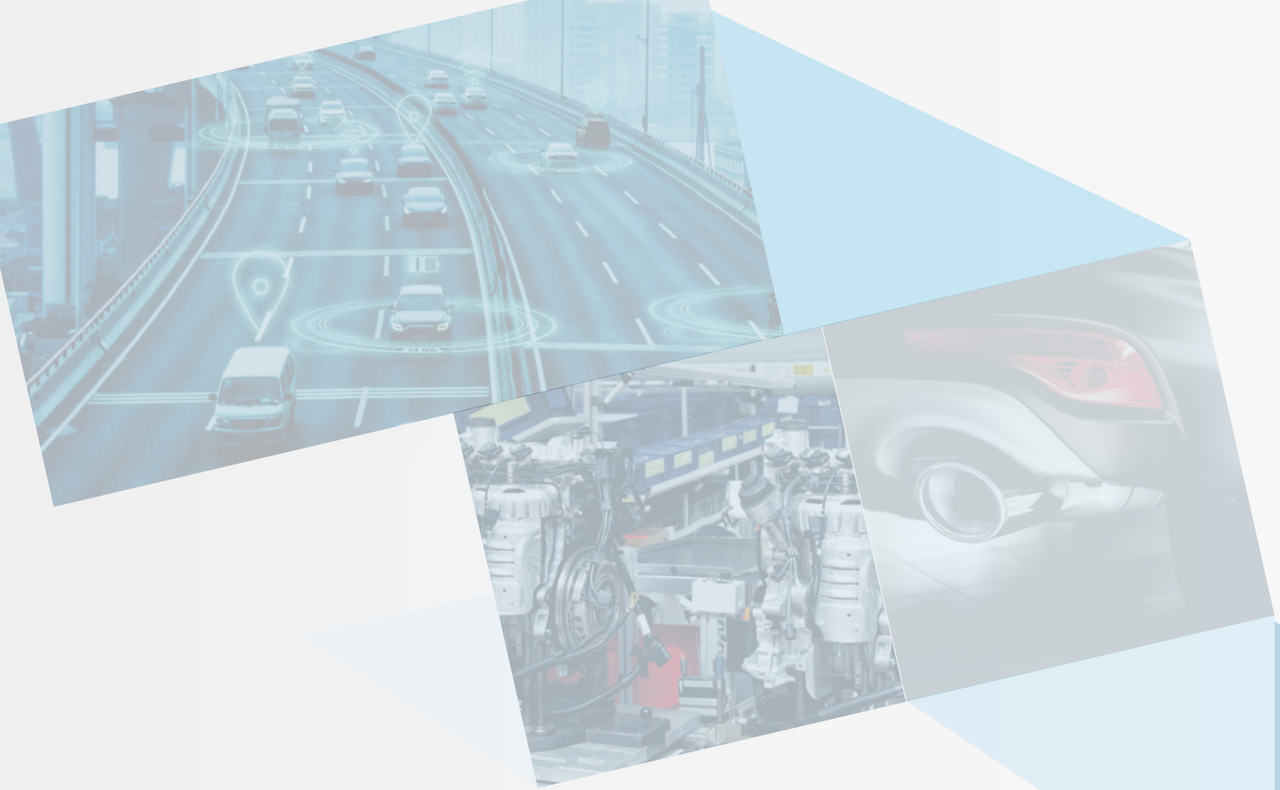

CUBIC
INSTRUMENTS

Automobile Emission Gas Monitoring Technologies and Solutions

- Automobile Emission Gas Analyzer
- Opacity Meter
- Portable Particle Counter
- Vehicle Headlight Tester
- Engine Tachometer based on Vibration
- Portable Emission Measurement System
- Engine Exhaust Measurement System
- Constant Volume Sampling (CVS) System
- Emission Gas Flowmeter

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Tel: +86-27-81628831

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E-mail: sales@gasanalyzer.com.cn

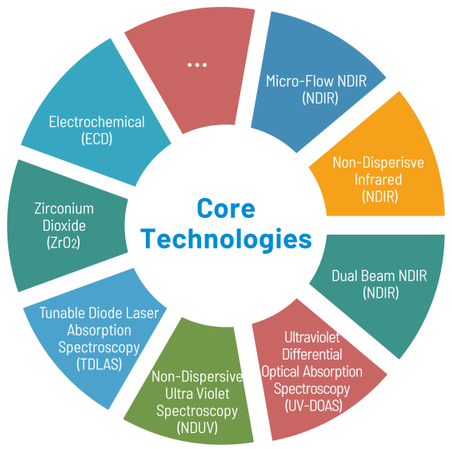
CUBIC INSTRUMENTS PROFILE

Cubic Instruments (Wuhan) Ltd. (hereinafter referred to as "Cubic Instruments") is a wholly-owned subsidiary of Cubic Sensor and Instrument Co., Ltd.(stock code 688665.SH). Established in 2010, Cubic Instruments is a high-tech enterprise specializing in providing gas composition and gas flow measurement solutions in the fields of environmental monitoring, process gas monitoring and smart metering.

Based on the advantages of Cubic core gas sensing technology platform, Cubic Instruments has developed a series of gas analyzers that utilize advanced technical principles such as non-dispersive infrared (NDIR) technology, ultraviolet differential absorption spectroscopy (UV-DOAS) technology, laser Raman (LRD) technology, ultrasonic technology, thermal conductivity (TCD) technology, and light scattering detection (LSD) technology. Cubic Instruments gas analyzers are widely used in environmental monitoring, metallurgy, coal chemical, biomass energy, and other industries, playing an important role in energy conservation and emission reduction. Cubic Instruments independently developed and produced portable infrared biogas analyzers, micro-flow infrared flue gas analyzers, and infrared gas analyzers that had successively obtained the national key new product certificate. The infrared gas analyzer has won the honor of the outstanding product award of the Chinese Instrument and Control Society, and its core technology won the Hubei Province Invention Patent Gold Award. In 2019, the Ministry of Industry and Information Technology awarded Cubic Instruments "Research and Industrialization of Micro-flow Infrared Flue Gas Sensors" for the "key product and process" one-stop application program demonstration project. Cubic Instruments was also recognized as the "one-stop" application program demonstration enterprise for its contribution to the project.

With decade-long dedications in technical innovations, strict quality control, and global business strategies, Cubic Instruments products have been exported to many countries and regions. Besides, Cubic Instruments is moving towards a higher target to be the international brand in the field of high-end and value-added applications of gas analysis instruments.

CORE TECHNOLOGIES



20+Years Focus

Emission Monitoring Solutions

Core Technologies

Professional Technical Engineers

Quick Service Response

Technical Support

Intellectual Property

Numerous National Invention Patents

International PCT Patents

QUALITY SYSTEM

ISO 9001: 2015

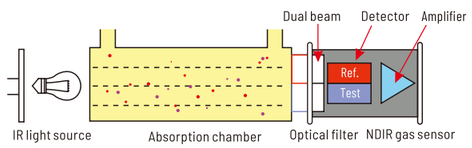
CE

IATF 16949:2016

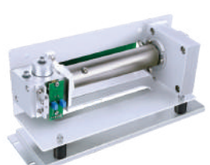
CORE TECHNOLOGIES

NDIR

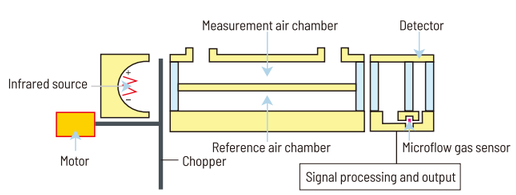
CO CO2 HC



Micro-flow NDIR

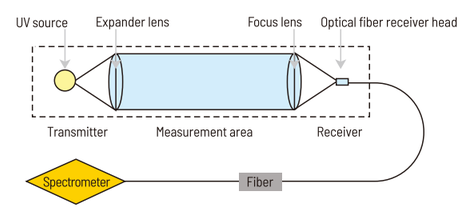


NO

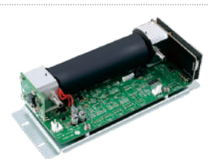


UV-DOAS

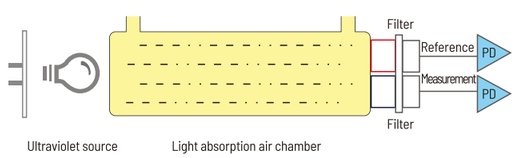
NO NO2



NDUV



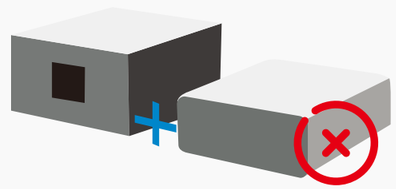
NO2



NOx MEASUREMENT TECHNOLOGIES COMPARISON

Indirect Measurement by Converter

Adopts converter to transfer NO2 to NO, and indirectly obtain the NO2 and NOx concentration by measuring NO.



Gas Analyzer + Converter

- Measurement accuracy is greatly affected by conversion efficiency.
- One analyzer plus one converter leads to complicated operation.
- Regular replacement of catalyst causes cost increasing.

Direct Measurement by Optical Gas Sensor

Direct measurement of NO and NO2 concentration, and calculate total reading of NOx.

Two optical measurement solutions of NOx:
Micro-flow NDIR NO gas sensor + NDUV NO2 gas sensor
UV-DOAS NOx gas sensor

- Higher measurement accuracy
- No consumables needed, maintenance free
- One machine for two gases measurement

EMISSION GAS ANALYZER SENSING SOLUTIONS

Portable Particle Counter
Gasboard-6200

PEMS
Gasboard-9805

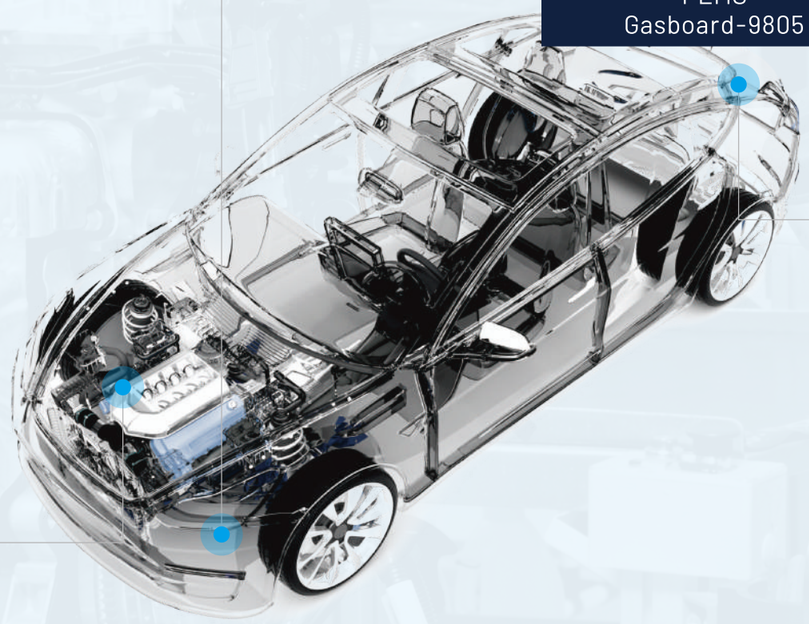
Engine Exhaust Measurement System
Gasboard-9801

Constant Volume Sampling System
Gasboard-9802

Headlight Tester
Gasboard-6100

Emission Gas Analyzer
Gasboard-5020/5230/5260

Opacity Meter
Gasboard-6010



Engine Tachometer
Gasboard-8220

Vmas Emission Gas Flow Meter
Gasboard-7800

Automobile Gas Sensor

CONTENT

Portable Emission Measurement System
Gasboard-9805

Cubic Instruments Gasboard-9805 is a Portable Emissions Measurement System (PEMS) which is used to measure emissions from combustion engines in real driving. It utilizes three different PEMS modules, including PEMS-GAS for measuring the concentrations of gas emissions (CO, CO2, THC, NO, NO2), PEMS-PN for measuring particulate matter, and PEMS-EFM for measuring exhaust flow rate. As part of the basic measurements, Gasboard-9805 can also collect location data by a GPS (Global Positioning System) module. In order to record actual driving environment conditions and calculate vehicle performance, it can measure a range of environmental conditions such as atmospheric temperature, humidity and pressure. With accurate time alignment function, Gasboard-9805 can synchronize all measurement data in time under the actual driving conditions. It meets the requirements primely in RDE (real-driving emission) test and provides the total mass emissions report. Additionally, the user-friendly PC software offers fast & accurate testing data and provides easy-to-install & easy-to-use experience for users. Integrated with advanced gas analyzers, exhaust mass flow meters, weather station, Global Positioning System (GPS) and connection to the vehicle networks, Gasboard-9805 offers an advanced solution for on-board measurement that complies with the emissions testing requirements of the EU and US. It is ideally suited for on-road and off-road applications ranging from large heavy-duty engines to small light-duty vehicles and off-road mobile machinery.

Applications

- Off-Road construction equipment (PEMS on top of unit shown below)
- Light duty vehicles, trucks and buses, rail and marine vessels real driving testing
- Measurement and analysis of the exhaust emissions directly from the vehicle,while on an actual road trip
- Fuel consumption measurement
- Analysis for engine development and exhaust after-treatment

Features

- Self-developed Gas Analysis Technologies
- Small Size, Light Weight, Low Energy Consumption
- Modular Design, Flexible to Use
- High standard Waterproof and Shockproof

Specifications

Main system				
Gases	CO	CO2	NO	NO2
Principle	NDIR	NDIR	NDUV	NDUV
Measurement Range	0~0.5~5%	0~5~20%	0~3000ppm	0~1000ppm
Response Time	T10-90 < 2.5s			
Accuracy	⩽ ±2.0%RS or ⩽ ±0.3%F.S.			
Linearity	Determination coefficient: ≥0.998; Standard deviation: ≤1%F.S.; Slope: 0.99~1.01; Intercept coefficient: ≤0.5%F.S.			
Repeatibility	≤±0.5%F.S.			
Drift	≤±1%F.S./8h			
Working Environment	Ambient temperature: -10~45°C; Ambient humidity: ≤90%RH; Altitude: 0~3000m			

EFM	
Exhaust Temp. Range	-5°C~500°C
Exhaust Temp Measurement Accuracy	⩽ ± 1% reading or ±2°C
Measurement Range	10~600kg/h; 100~2000kg/h
Measurement Accuracy	≤±2.0% reading or ≤±0.5% full scale
Measurement Linearity	Determination coefficient: ≥0.990; Standard deviation: ≤1% full scale; Slope: 0.99~1.01; Intercept coefficient: ≤1% full scale
Response Time	< 1s

THC/CH4 Analyzer		
Gases	THC	CH4
Principle	HFID	NMC-FID
Minimum Range	0~100ppmC	0~100ppmC
Maximum Range	0~10000ppmC	0~3000ppmC
Response Time	T10-90 ＜ 2.5s	
Accuracy	≤±2.0%RS or ≤±0.3%F.S.	
Linearity	Determination coefficient: ≥0.998; Standard deviation: ≤1%F.S.; Slope: 0.99~1.01; Intercept coefficient: ≤0.5%F.S.	
Repeatability	≤±0.5%F.S.	
Drift	≤±1%F.S./8h	

PN Analyzer	
Minimum Particle Size Limit	23nm or 10nm
Principle	Corona charging counting method
Measurement Range	600-1.3*109#/cm3
Accuracy	≤±10%
VPR Removal Efficiency	＞ 99.0% （C40）
Response Time	T90 < 5s

NH3/N2O Analyzer		
Gases	NH3	N2O
Measurement Range	0~1000ppm	0-1000ppm
Response Time	T10-90＜2.5s	
Accuracy	≤±2.0%RS or ≤±0.3%F.S.	
Linearity	Determination coefficient: ≥0.998; Standard deviation: ≤1%F.S.; Slope: 0.99~1.01; Intercept coefficient: ≤0.5%F.S.	
Repeatability	≤±0.5%F.S.	
Drift	≤±1%F.S./8h	

Engine Exhaust Measurement System
Gasboard-9801

Gasboard-9801 Engine Exhaust Measurement System is independently developed by Cubic Instruments, it is an integrated system specifically designed for measuring exhaust gas components such as THC, CH4, NOx, CO2, CO, O2 and additional NH3, N2O for upcoming EURO 7 standard request in laboratory for full-flow dilution sample gas or raw exhaust emission gases testing. It incorporates functional modules including sampling unit, gas conditioning unit, and multiple gas analyzers, making it suitable for all types of engines and fuels research, development, and certification testing.

Applications

- Engine exhaust measurement
- Engine type certification and production consistency inspection
- Marine engine exhaust measurement
- Non-road heavy engine exhaust measurement

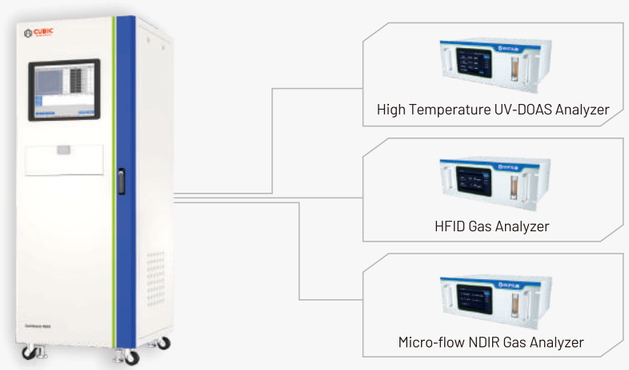
Features

- Self-development NDIR, NDUV, CLD, HFID and QCL patented gas sensing technologies.
- Wide range exhaust gas analyzer suitable for all laboratory emission test application scenarios including ultra-low emission levels.
- Continuous online measurement for diluted exhaust and raw exhaust gas with high accuracy and fast response.
- Equipped with multi-channel and multi-functional sampling units, flexibly responding to multi-point sampling measurement and EGR rate measurement

Specifications

Engine Exhaust Measurement System								
Gases	THC	CH4	NOx	CO	CO2	O2	NH3	N2O
Technology	HFID	NMC-FID	NDUV/CLD	NDIR	NDIR	MPD	TDLAS	TDLAS
Mini. Range	0~10ppmC	0~10ppmC	0~10ppmC	0~50ppmC	0~0.5%	0~1%	0-50 ppm	0-100 ppm
Max. Range	0~30000ppmC	0~3000ppmC	0~10000ppmC	0~10%	0~20%	0~25%	0-2000 ppm	0-2000 ppm
Response Time	T10-90<2.5s							
Accuracy	⩽±2.0%RS or ⩽±0.3%FS							
Linearity	Measure of Determination ≥ 0.998, SEE relative:<1%FS, Slope:0.99~1.01, Axial section relative:≤0.5%FS							
Repeatability	⩽±0.5%FS							
Drift	⩽±1%FS/8h							
Operating Environment	Ambient temp.: 5~40°C; Ambient humidity: <80%RH							

System Compositions



Remarks: The Gasboard-9801 Engine Exhaust Measurement System is equipped with high temperature box and high temperature sampling probe, which could help to effectively prevent condensation loss and ensure high measurement accuracy.

Constant Volume Sampling (CVS) System
Gasboard-9802

The Gasboard-9802 full-flow dilution constant volume sampling (CVS) system is designed for the measurement of diluted emissions from vehicles and engines. It has a complete and technologically advanced hardware configuration and software platform. When used in conjunction with a high-precision gas and particle online analyzer, it meets cold-start emissions test requirements under normal laboratory conditions for major mobile source emission standards, including the upcoming Euro 7 standard.

Applications

- Engine manufacturers
- Automotive manufacturers
- Universities and research institutes
- Authorized testing institutions

Features

With a wide range of diluted exhaust flow options, it accommodates the testing of engines and vehicles powered by various fuels and with different displacements.

Integrated with a high-performance heat exchanger and a venturi tube, it ensures precise control of diluted exhaust flow, guaranteeing system accuracy and stability.

Combined with the constant temperature control function of the heat exchanger and the air bag cabinet, it effectively prevents the condensation of diluted exhaust.

Equipped with a high-performance dilution air filter, it can meet the requirements for emission testing at ultra-low emission levels.

Specifications

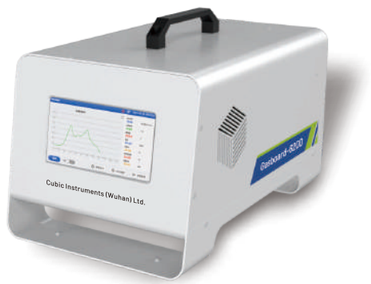
Constant Volume Sampler	
CVS Flow Rate	1~12 m^3/min; 3~24m^3/min; 9~60 m^3/min; 30~150m^3/min
CVS Temperature Control	40±5°C
Air Bag Sampling Flow Rate	3L/min, 6L/min, 9L/min
CVS Configuration	Up to 8 gas bags configurable
Particle Sampling Flow	35~65L/min
Environmental Conditions	Ambient temperature: 5~35°C; Relative humidity: <80%RH; Atmospheric pressure: 80~102 kPa

Benefits

- **High Detection Accuracy**
  System error is less than 2% of reading, complying with Euro 6/7 standard.
- **Maximum Adaptability**
  A variety of total exhaust flow levels are available for different displacement engines.
- **Easy Serviceability**
  Modular design facilitates fast integration, minimal maintenance and easy upgrades.
- **Compact Design**
  The compact design ensures equipment installation in high adaptation with other facilities such as engine and dynamometer on site.

Portable Particle Counter
Gasboard-6200

CUBIC Portable Particle Counter is designed to measure the particle number of fine particles in automotive exhaust gas. Based on DC (Diffusion Charge) principle, the portable particle counter determines the number of particles by measuring the charge carried on particles in sample gas. The exhaust gas can be directly measured, no need for filtration and dilution, ensuring long-term clean operation and reducing the maintenance costs effectively. The portable particle counter is designed with features of high sensitivity, high accuracy, fast response, excellent stability, etc. Its high-definition touch screen design better enhances HMI experience.



Applications

- Automobile emission PN detection
- Automobile DPF device failure detection

Features

- Diffusion Charge principle realizes high sensitivity of ultrafine particles measurement.
- Response time is less than 10 seconds, ensuring fast and reliable measurement of PN-PTI application.
- No affect from the smoke blockage and vibration, no filtration and dilution needed.
- Straight-through gas circuit greatly eliminates blocking risk and ensures long-term stable operation.
- No need for auxiliary equipment like compressed air device.
- Robust design with durable materials and sturdy structure, ensures minimal maintenance and excellent quality.

Specifications

Portable Particle Counter	
Measurement Range	5,000~10,000,000 #/cm^3
Accuracy	≤±25%
Particle Size	⩾ 23nm
Response Time	< 10s (T0-T95)
Working Temperature	0°C~55°C
Working Voltage	AC100~230V (50~60Hz)
Power Consumption	Start-up power consumption 700W Steady-state power consumption 200W
Air Inlet	Heat tracing pipe (230V or 110V AC heating), pipe length can be customized
Output	RS-232 (RS-485/Blue Tooth/4G/Wi-Fi customizable)
Dimension (L*H*W)	244*257*419(mm)
Weight	<10kg

Standards

- Netherlands Measurement Institute (NMi) PTI-PN Test Regulation
- Physikalisch-Technische Bundesanstalt (PTB) PTI-PN Test Regulation

Automobile Emission Gas Analyzer Gasboard-5020

Gasboard-5020 emission gas analyzer is designed for measuring the emissions of all gasoline, LPG and CNG vehicles. It is developed based on non-dispersion infrared (NDIR) principle to measure CO, CO_2, HC, and electrochemical sensors to measure O_2 and NO. The test reports can be printed on the built-in printer. Gasboard-5020 is equivalent to OIML R99 class0 standard and is very suitable for exhaust inspection of light and heavy vehicles such as automobiles and motorcycles, and then optimizing their exhaust.

Applications

- Automotive inspection station
- Car repair shop and garage
- Manufacturers and industrials
- University and lab researches

Features

- NDIR gas bench with regulated temperature system, high accuracy, better stability
- Equivalent to OIML R99 class 0 standard
- Cleanable NDIR gas chamber for easy maintenance
- Built-in printer can print out real time measurement data
- The engine tachometer can be connected with Gasboard-5020 by RS-232 communication
- Mass production ensures fast delivery

Specifications

Performance Parameter						
Measurements		CO_2, CO, HC, optional O_2, NOx gases.				
Technology		NDIR			ECD	
Measurement Range		CO_2	CO	HC	O_2	NOx
		0~20%	0~10% (*0~15% optional)	0~9999ppm (*0~20000ppm optional)	0~25%	0~5000ppm
Resolution		0.01%	0.01%	1ppm	0.01%	1ppm
Error	Rel.	±4%	±3%	±5%	±3%	±4%
(which ever is greater)	Abs.	±0.4%	±0.03%	±10ppm	±0.1%	±25ppm
Warm-up Time		10 minutes				
Response Time (T90)		10 seconds (NDIR), 30 seconds (ECD)				
Display		LCD display				
Power Supply		110V~220V±10% 50Hz ±1Hz				
Operation Temperature		0~40°C				
Dimension		260×180×360mm				
Flow Rate		0.7~1.2L/min				
Weight		6kg				
Standard Accessories		Sampling pipe and probe, standby filters, RS-232 cable, power cable				
Options		Built-in printer, RPM sensor, Oil temperature sensor				

Online Automobile Emission Gas Analyzer

Gasboard-5230

Gasboard-5230 Automobile Emission Gas Analyzer adopts micro flow NDIR principle with independent intellectual property and international PCT (CN2018100767) to detect NO concentration. The analyzer uses dual channel structure and special filters to resolve the problems such as environmental temperature instability and electronic component aging. Gasboard-5230 adopts the NDIR principle todetect CO_2 concentration and the NDUV principle to detect NO concentration without an NOx converter.

CO_2 NO NO_2

Features

- Mature micro-flow NDIR and NDUV technology
- Specialized software for signal linear correction
- Higher accuracy, good stability and strong anti-interference
- Supporting smoke degree analysis by connect with Gasboard-6000
- Direct NO_2 testing, no NOx converter needed, free maintenance
- Reserving oil temperature and tachometer port
- Multi-level filtration, stronger durability

Specifications

Gas	Range	Reading Permissible Error	
		Abs. Error	Rel. Error
CO_2	$(0.0\sim16.0)\times10^{-2}$vol	$\pm0.3\times10^{-2}$vol	±3%
	$(16.01\sim18.0)\times10^{-2}$vol	--	±5%
NO	$(0\sim4000)\times10^{-6}$vol	$\pm25\times10^{-6}$vol	±4%
	$(4001\sim5000)\times10^{-6}$vol	--	±8%
NO_2	$(0\sim1000)\times10^{-6}$vol	$\pm25\times10^{-6}$vol	±4%

Online Automobile Emission Gas Analyzer

Gasboard-5260

Gasboard-5260 Automobile Emission Gas Analyzer adopts micro-flow NDIR principle with independent intellectual property and international PCT (CN2018100767) to detect NO, Gasboard-5260 features a dual-channel structure sensor and special filters that effectively resolve issues related to environmental temperature instability and electronic components aging. Gasboard-5260 also adopts the NDUV principle to detect NO and the NDIR principle to detect HC, CO simultaneously, along with a long-life ECD O_2 sensor. This model can automatically calculate and display fuel ratio and support testing based on user-specified operating condition.

HC CO CO_2 NO NO_2 O_2

Features

- Mature micro-flow NDIR and NDUV technology
- Specialized software for signal linear correction
- Higher accuracy, good stability and strong anti-interference
- Direct NO testing, no NOx converter needed, free maintenance
- Auto temperature and pressure compensation
- Reserving oil temperature and tachometer ports
- Multi-level filtration

Specifications

Gas	Range	Reading Permissible Error	
		Abs. Error	Rel. Error
HC	$(0\sim2000)\times10^{-6}$vol	$\pm4\times10^{-6}$vol	±3%
	$(2001\sim5000)\times10^{-6}$vol	--	±5%
	$(5001\sim9999)\times10^{-6}$vol	--	±10%
CO	$(0.00\sim10.00)\times10^{-2}$vol	$\pm0.02\times10^{-2}$vol	±3%
	$(10.01\sim14.00)\times10^{-2}$vol	--	±5%
CO_2	$(0.0\sim16.0)\times10^{-2}$vol	$\pm0.3\times10^{-2}$vol	±3%
	$(16.01\sim18.0)\times10^{-2}$vol	--	±5%
NO	$(0\sim4000)\times10^{-6}$vol	$\pm25\times10^{-6}$vol	±4%
	$(4001\sim5000)\times10^{-6}$vol	--	±8%
NO_2	$(0\sim400)\times10^{-6}$vol	$\pm25\times10^{-6}$vol	±4%
	$(401\sim1000)\times10^{-6}$vol	--	±8%
O_2	$(0.0\sim25.0)\times10^{-2}$vol	$\pm0.1\times10^{-2}$vol	±5%

Opacity Meter

Gasboard-6010

Gasboard-6010 adopts leading partial flow technology to protect optical system and is developed to measure visible pollutants emitted from compression ignition engines or vehicles equipped with compression ignition engines.

Features

- Simultaneously displaying K and N value
- Partial flow technology to avoid pollution on optic system
- Thermostatic control gas chamber
- Auto-zeroing function
- Reserving oil temperature and RPM interface

Specifications

Performance Parameter	
Measurements	Opacity degree N: (0~99.99%) ; Light absorption coefficient K (0~16) m^{-1}
Resolution	N: 0.01%; K: 0.01m^{-1}
Error	±2.0%
Communication	RS-232/RS-485 digital output and print interface
Power Supply	AC220V±10%, 50Hz±1Hz
Display	LCD display

Engine Tachometer based on Vibration

Gasboard-8220

Gasboard-8220 adopts an advanced hardware design together with integrated software analysis technology to measure RPM through vibration and audio spectrum signal, and transfers data to emission gas analyzers, opacity meters and other machines.

Features

- Advanced hardware design and integrated software
- Auto calibration, higher accuracy, reliable performance
- Connecting emission gas analyzers and opacity meters
- Supporting for petro and diesel engine analysis
- Portable device, easy installation and operation

Specifications

Performance Parameter	
Measurements	4-stroke-diesel/gasoline
Range	Gasoline: (400~8000) rpm; Diesel: (400~6000) rpm
Operation Temperature	5°C~45°C
Relative Humidity	30~90%RH
Communication	RS-232, TTL signal pulse output, induced pulse-analog ignition signal
Power Supply	12VDC, 350mA
Display	LCD display

Vmas Emission Gas Flow Meter

Gasboard-7800

Gasboard-7800 vmas Emission Gas Flow Meter is developed to detect diluent vehicle exhaust flow based on vortex street principle and measure gas concentration by zirconia sensor. Gasboard-7800 is one of the core components of the Vmas system for measuring diluent gas flow and oxygen concentration, pressure and temperature of emission gas from petro engines. This model is mainly applied in vehicle inspection stations and automobile manufacturers, etc.

Features

- Good measurement stability and high measurement accuracy
- Fully meeting the measurement technology requirements of VMAS flowmeter
- Good vibration resistance, long service life, not affected by vibration on the measurement accuracy

Specifications

Items	Range	Resolution	Reading Permissible Error	
			Abs. Error	Rel. Error
Flow	(4~12) m^3/min	0.01 m^3/min	——	±4% (F · S)
O_2	(0.3~25)×10^{-2}	0.1×10^{-2}	±0.1×10^{-2}	±5%
Temperature	-30°C~150°C	0.1°C	±1°C	——
Pressure	70.0kPa~110.0kPa	0.1kPa	±0.5kPa	±3%
Zero/Span Error	O_2: ±2.5%F.S.			
Repeatability	Fow: ±2%F.S.; O: Rel. error is not greater than 1.5%			
Response Time	O_2: 5s			
Warm-up Time	<3 min			
Relative Humidity	0~95%RH			
Power Supply	AC220V±10%, 50Hz±1Hz			

Vehicle Headlight Tester

Gasboard-6100

Gasboard-6100 vehicle headlight tester adopts a dual-camera structure and a precision optical system for light-seeking positioning and measurement analysis. It combines digital image processing and motion control technology to form an intelligent measurement system that fully caters to the testing requirements of vehicle headlamps, including halogen lamps, xenon lamps, LEDs, and various other lamp types. It is suitable for motor vehicle safety technology/comprehensive performance testing lines, automobile manufacturer assembly (quality assurance) testing lines, and motor vehicle repair department maintenance testing.

Features

- Advanced optical system, detecting various parameters of different types headlamps quickly and accurately
- Designed with a large-screen LCD display ensures easy operation
- Automatic discrimination technology greatly eliminates external light interference, and ensures automatic tracking and high-accuracy positioning
- Powerful software function ensures convenient calibration and fault self-checking
- Quickly disassembled and assembled realizes easy moving and accurate measurement
- Reliable communication protocol to facilitate the original inspection system replaces the tester

Specifications

Performance Parameter	
Luminous Intensity	(0~120000) cd
High Beam Optical Axis Offset	Vertical direction: up 2°30 '-down3° Horizontal direction: left 3°-right3°
Low Beam Optical Axis Offset	Vertical direction: up 2°30 '-down3° Horizontal direction: left 3°-right3°
Headlight Height	(350~1400) mm
Reading Permissible Error	
Luminous Intensity	When the optical axis offset (angle) is zero, indication error ≤ ±10% (relative error) When the opticl axis offset value (angle) is any value within the verification range, indication error ≤ ±12%"
High Beam Optical Axis Offset	Indication error; no more than ±3.2cn/dam (±10') Difference between indications; no more than ±3.2cn/dam (±10')
Low Beam Optical Axis Offset	Indication error; no more than ±3.2cn/dam (±10')
Lamp Height	Indication error; no more than ±10mm
Working Condition	
Environmental Temperature	-10°C~40 °C
Power Supply	AC220V, 250w

NDIR Gas Sensor
Gasboard-2000

Gasboard-2000 NDIR gas sensor is developed to measure CO, CO_2, HC three gases. The Electrochemical O_2 and NOx sensors can be plugged in conveniently. It complies with international OIML R99 Class 1, 0, 00 standards, and widely adopted by OEM integrators, automobile emission gas analyzer manufacturers.

Features

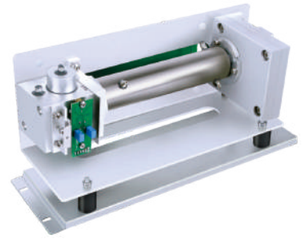
- One NDIR gas sensor for CO, CO_2, HC 3 gases measurements
- Ultra low range to ppm level measurement
- Embedded temperature-controlled system
- Cleanable gas chamber for easy maintenance
- Extended electrochemical O_2 and NO sensor

Specifications

Performance Parameter	
Measurements	HC, CO, CO_2
Range	HC: (0~20000) ppm CO: (0~15.00) % CO_2: (0~20.00) %
Accuracy	HC: (0~2000) ppm: Abs. error: ±4 ppm; Rel. error: ±3%; (2001~5000) ppm: Rel. error: ±5%; (5001~20000) ppm: Rel. error: ±10%
	CO: (0~10.00) %: Abs. error: ±0.02 %; Rel. error: ±3%; (10.01~15.00) %: Rel. error: ±5%
	CO_2: (0~16.00) %: Abs. error: ±0.3 %; Rel. error: ±3%; (16.01~20.00) %: Rel. error: ±5%
	* Remark: Abs. error or rel. error whichever is greater
Resolution	HC: 1ppm; CO_2: 0.01%; CO: 0.01%
Response Time(T_{90})	≤3.5s
Warm Up Time	10 minutes
Flow	(0.7~1.2) L/min
Communication	RS-232
Power Supply	12V±0.2V
Relative Humidity	(0~90) %RH (no condensation)
Dimension	L176*W70*H45 (mm)

Micro flow NDIR NO Gas Sensor
Gasboard-2100

Gasboard-2100 is a micro-flow NDIR NO gas sensor, it is developed by independent intellectual property rights and international PCT patent (PCT/CN2018100767) dual-chamber sensor technology. The gas chamber is composed of measured gas chamber and reference gas chamber. This design has great capacity to solve environmental temperature instability and electronic components aging issues, which is very suitable for low range automobile emission gas NO measurement with high accuracy.



Features

- Patented dual-chamber sensor design for high accuracy
- Micro-flow NDIR NO gas sensor replaces the electrochemical NO sensor
- Automatic temperature compensation
- Good stability and long lifetime

Specifications

Performance Parameter	
Measurement	NO
Range	0~5000ppm Measurement range can be customized
Accuracy	Abs. error: ±25ppm; Rel. error: ±4% (Whichever is greater)
Resolution	1ppm
Repeatability	≤1% F.S.
Response Time(T_{90})	<4s
Flow	(0.7~1.2) L/min
Warm-up Time	30min
Communication	RS-232
Power Supply	±12V, 5V
Relative Humidity	(0~90) %RH (no condensation)
Dimension	L261*W122*H177 (mm)

UV-DOAS NOx Gas Sensor

Gasboard-2200

Gasboard-2200 UV-DOAS NOx gas sensor adopts high-precision ultraviolet differential absorption spectroscopy gas analysis technology. With flashing xenon lamp as light source, when the light is transmitted in the measured gas, the intensity of the differential absorption characteristic produced is different which is used to derive the gas concentration and gas type. Using a unique algorithm, the long path is returned to the gas chamber multiple times to get high sensitivity and strong absorption signal, at the same time, it supports long service life and good stability. It can accurately measure the gas concentration of NO, NO_2, NH_3 and SO_2.

Features

- Advanced UV DOAS sensor for measurement up to 4 gases
- Measuring NO_2 directly without converter
- No moisture and vibration interference
- Automatic temperature compensation
- High precision, good stability and long life

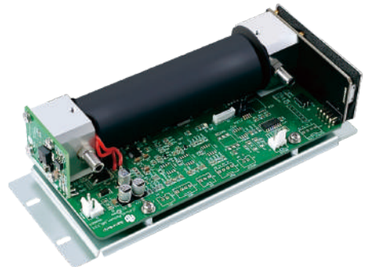
Specifications

Performance Parameter	
Measurements	NO, NO_2, NH_3*, SO_2*
Range	NO: 0~5000ppm, NO_2: 1000ppm (Measurement range can be customized)
Accuracy	Abs error: <25ppm; rel. error: <4% (Whichever is greater)
Resolution	1ppm
Response Time(T_{90})	<4.5s
Flow	(0.7~1.2) L/min
Warm-up Time	30min
Communication	RS-232 or RS-485
Power Supply	±12V, 5V
Power Consumption	<70W
Relative Humidity	(0~90) %RH (no condensation)
Dimension	L250*W150*H155 (mm)
*Gasboard-2200 can extend NH_3 and SO_2 measurements	

NDUV NO2 Gas Sensor

Gasboard-2300

Gasboard-2300 NDUV NO_2 gas sensor adopts non-dispersive ultraviolet absorption (NDUV) technology and highly stable pulsed LED UV source. The UV beam is absorbed & attenuated when passing through the gas chamber. The measured gas concentration is calculated according to Lambert-Beer law. The UV absorption method gas sensor is newly launched out and different from the UV differential method. It measures NO_2 concentration with strong anti-interference and high accuracy, which is very suitable for automobile emission gas monitoring.



Features

- Direct measurement for NO_2 by NDUV with high accuracy, no NOx converter needed
- Suitable for ultra-low range NO_2 monitoring, no moisture interference
- Modular design for easy integration and maintenance

Specifications

Performance Parameter	
Measurement	NO_2
Range	NO_2: 0~1000ppm (Measurement range can be customized)
Accuracy	Abs. error< ±25ppm; Rel. error<±4%; (Whichever is greater)
Resolution	1ppm
Response Time(T_{90})	≤4.5s
Flow	(0.7~1.2) L/min
Warm-up Time	10min
Power Supply	12V±0.2V
Consumption	<30W
Communication	RS-232
Relative Humidity	(0~90)%RH (no condensation)
Dimension	L176*W70*H45 (mm)