CATALOG

Air quality monitoring systems

- Environmental Monitoring Station
- Continuous emission monitoring systems EnviroCEM
- Stationary gas analyzers
- Portable gas analyzers
- Gas chromatographs

ISO 9001 · ISO 14001 · OHSAS 18001 CERTIFICATION™
Intertek

RIGHT SOLUTIONS

TOPAN

Dear customers and partners!

Topan LLP is a Kazakhstani company which operates in the sphere of providing services and supply of equipment for industrial companies in Kazakhstan.

One of the activities of Topan LLP is a complex equipping of environmental monitoring stations for companies of oil and gas sector (fields, oil refineries and gas processing plants), chemical industry, metallurgical companies, cement factories, thermal power plants and others.

Our company has a sound experience in the field of supply, commissioning, warranty and after-sales service and other related work with the equipment.

In this catalog, we offer you to familiarize yourself with a wide range of equipment for ***ecological control of air****, from the leading manufacturers of this product.*

For more detailed information and consultations call on the specified contacts on the back of the catalog or send a request to our e-mail addresses:

news@topan.kz info@topan.kz

We are happy to help you!

Best regards,

TOPAN Company.

CONTENT:

Environmental Monitoring Station

Purpose:
The Environmental Monitoring Station (EMS) is an independent block structure designed for monitoring ambient air, air in the work area and at the border of the sanitary protection zone.

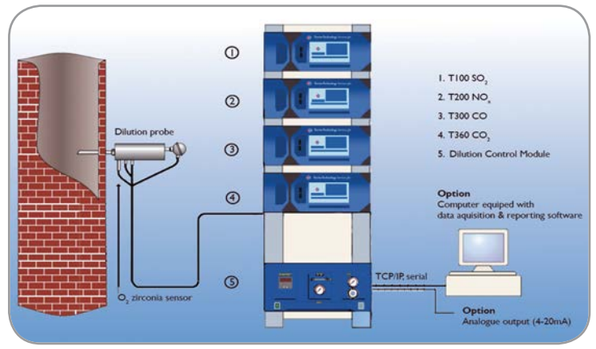
EMS standard specification consists of:
- sampling system;
- analytical equipment;
- the meteorological complex;
- devices for collecting, processing and storing information;
- heating / cooling systems;
- backup power supply systems;
- data transmission and reception systems;
- security and fire alarm system (SFAS).

By the way of siting, EMSs are divided into stationary and mobile (based on cars, trailers, sea transport).
The station for environmental monitoring of air can be used both independently and in a complex (group).

Description of standard EMS:

1. **The sampling system** – continuously performs air sampling and transporting the amount of air necessary for the analysis to the complex of analytical equipment. According to ISO 14000, air sampling is carried out at a height of 1.5 ... 3.5 m from the ground surface.
2. **Complex of analytical equipment** (analyzers, chromatographs, dustmeters, etc.). - designed to measure the "gas content" of air and the content of dust of different composition in the measured air, volatile organic compounds (VOC). The overall composition of the complex (list of substances to be determined) is determined on the basis of TS and / or data obtained after environmental audit.
3. **Meteorological equipment** (sensors for wind speed and direction, ambient temperature, relative humidity, barometric pressure) - conducts measurements of the environmental parameters at which the air is sampled and analyzed. According to ISO 14000, ambient temperature, barometric pressure and relative humidity sensors are installed near the sampling point of the air sample and at the same level. Measurement of wind speed and direction is carried out at an altitude of about 10 m from the ground surface.
4. **The device for collecting, processing and storing information** - provides continuous data acquisition from analytical and meteorological equipment, averaging over the required period of time, stores data for subsequent processing or transmission.
5. **The heating-cooling system** - ensures the maintenance of the optimal temperature for the operation of the devices regardless of the season.
6. **The backup power supply system** - as a rule, consists of an uninterruptible power supply and a generator (or a backup power line). The power of an uninterruptible power supply must be sufficient to maintain the entire system in operation for a certain period of time (determined by the Customer).
7. **The system of reception and transmission of information** - its use is determined on the basis of TS and / or at the request of the Customer. Provides the transfer of information from the EMS to the central monitoring post or dispatching post.
8. **Security and fire alarm system** - is established based on the TS and / or the wishes of the Customer.

Continuous emission monitoring systems EnviroCEM



Continuous emission monitoring systems are designed for continuous measurement in real time of concentrations of gas (smoke) emissions, as well as calculation of the total emissions of the following substances: nitrogen oxides (NO, NO_2, NO_x), sulfur dioxide (SO_2) carbon oxide and dioxide (CO, CO_2), oxygen (O_2), ammonia (NH_3), hydrogen sulfide (H_2S), hydrogen fluoride (HF), hydrogen chloride (HCl), toxic organic substances and others. Monitoring systems are equipped with devices for transmission of the data (including wireless).

TOPAN experts will design and build a continuous emission control system specifically to your needs. We provide support for the start-up and commissioning of the system, as well as provide training and maintenance.
Environmental emission monitoring systems EnviroCEM are developed taking into account the relevant regulatory requirements described in the air pollution control laws of various countries, including the Republic of Kazakhstan. They help to comply with the requirements of the law on emissions, collection and transfer of information to the state fund of state environmental monitoring data. Our systems allow you to control:
- Sulfur dioxide (SO_2)
- Monooxide of nitrogen (NO)
- Nitrogen dioxide (NO_2)
- Carbon dioxide (CO_2)
- Oxygen (O_2)
- Carbon monoxide (CO)
- Total hydrocarbon content
- Hydrogen sulphide (H_2S)
- Optical density and mass concentration of dust
- Ammonia (NH_3), etc.

We offer environmental emission monitoring systems from typical to more complex, performed according to the technical task of the customer, which allow to analyze a large number of components in several gas streams using specialized systems for data collection and processing. The systems provide automatic daily calibrations and do not require additional maintenance.
Our solutions for continuous emission control help to protect the environment and meet new, more stringent regulations, while improving technological processes.
Thanks to reliability, which has been repeatedly tested in practice, low cost of ownership, flexibility in building systems and high productivity, the Environmental Emission Monitoring System EnviroCEM is an excellent solution for managing technological processes in the harsh conditions of a modern regulatory framework.

Our solutions include:
- High-precision analyzers designed specifically for environmental monitoring of emissions
- development of gas analytical systems
- technical survey of the customer's site and approval of the final decision
- start-up and commissioning
- maintenance

Areas of application:
- Electric and heat generating companies;
- Waste incineration plant;
- Chemical companies;
- Petrochemical companies;
- Aluminum factories;
- Cement factories;
- Factories for the production of fertilizers.

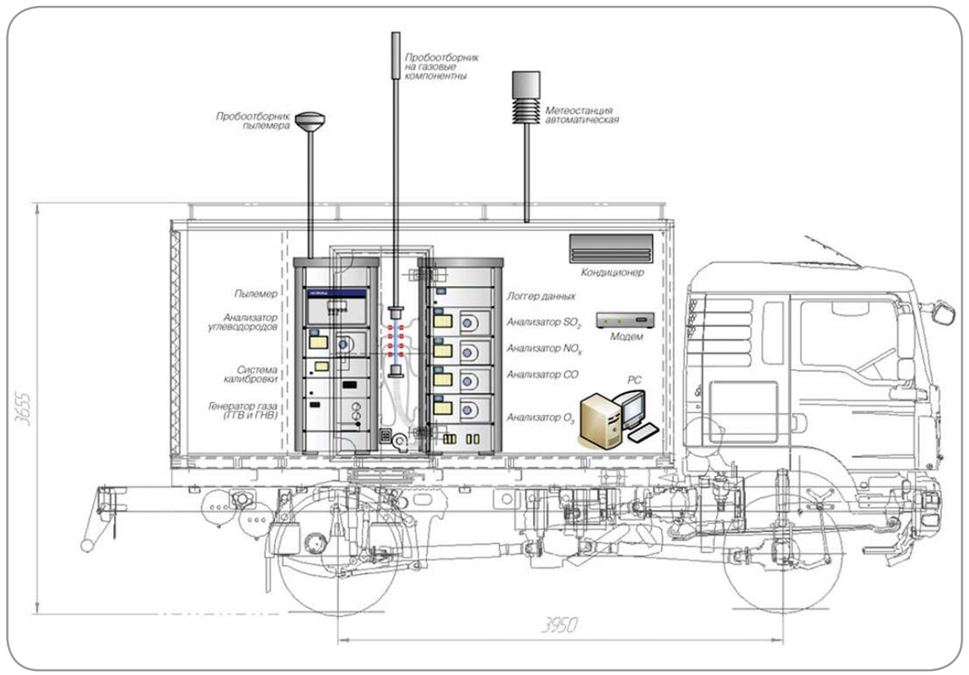
Mobile laboratory for environmental monitoring of atmospheric air

All ecological laboratories are equipped with the newest high-quality equipment, which allows working in any natural and climatic conditions (at temperatures from -30 ° C to +50 ° C and humidity up to 98%) with comfort and promptly obtaining the most accurate data. **A mobile environmental laboratory for air quality control, air pollution and industrial emissions of a special design is oriented to monitor the main parameters of the ambient air and control pollution and emissions.** Environmental laboratories can quickly solve a wide range of tasks for assessing the quality of the environment in an autonomous mode directly at the areas of control.

Ecological laboratories correspond to the requirements of all regulatory documents according to the list of measured components, test conditions, ranges and accuracy of measurement:

1. RD 52.04.186-89 "Guidelines for the control of atmospheric pollution";
2. GOST 17.2.6.02-86 "Protection of nature. Atmosphere. Automatic gas analyzers for controlling atmospheric pollution. General technical requirements";
3. GOST 17.2.3.01-86 "Protection of nature. Atmosphere. Rules of air quality control of settlements ";

Mobile ecological complexes will have issued documents for registration and a certificate of approval for the type of vehicle.



Specifications of the vehicle

Parameter	Description
Test objects	Atmospheric air (residential zone, SPZ); Natural and waste water, soil, etc.
Chassis	To customer's choice
Vehicle category	C
Registration	Set of documents for registration
Undercarriage	2 or 3 axles, full or rear drive, the order of the all-wheel drive variant is preferable; The car body and systems are being modified for operation in harsh conditions
Crew	Driver and engineer-technician
Climatic execution	Operation in all climatic zones of Kazakhstan

Measured components	Measuring range Lowest detection limit
Nitric oxide (NO), nitrogen dioxide (NO_2), the sum of nitrogen oxides (NO_x)	from 0 to 6.0 mg / m³; 0,7 mkg / m³
Ammonia (NH_3)	From 0 to 2.5 mg / m³; 0.4 µg / m³
Carbon monoxide (CO)	From 0 to 125 mg / m³; 25 µg / m³
Sulfur dioxide (SO_2)	0 to 6.0 mg / m³; 1.4 µg / m³
Hydrogen sulfide (H_2S)	0 to 6.0 mg / m³; 0.75 µg / m³
Methane (CH_4), the sum of hydrocarbons (in terms of methane; THC or ΣCH)	0 to 70 mg / m³; 15 µg / m³
Ozone (O_3)	0 to 2.0 mg / m³; 1 µg / m³
Total dust (TSP), PM10 dust	0 to 6 mg / m³; 0.1 µg / m³
Dust PM2.5	0 to 1.5 mg / m³; 0.1 µg / m³
Benzene (C_6H_6), toluene (C_7H_8), xylene (C_8H_{10}, sum of isomers); (BTX - Integral indicator)	0 to 3.0 mg / m³; 2 µg / m³
Other parameters	On request, after working out the TS

Measured meteorological parameters	Measuring range
Air temperature	From -52 to +60 ° C
Relative humidity of air	From 0,8 to 100%
Air speed	from 0.2 to 60 m / s
Air flow direction	0 to 360 °; Binding to the sides of the world by compass or GPS
Atmospheric pressure	From 600 to 1100 hPa

Mobile laboratory for environmental monitoring of atmospheric air

Model T100 UV Fluorescence SO_2 Analyzer

The Model T100 SO2 analyzer uses the proven UV fluorescence principle and advanced electronics to allow accurate, dependable, continuous measurements for ambient air quality, stack gas monitoring and other applications.

- Available with NumaView™ premium T Series software -

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T100 Specifications

Ranges	Min: 0 - 50 ppb full scale Max: 0 - 20,000 ppb full scale (selectable, dual-range supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	20 seconds
Rise/Fall Time	< 100 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 50 ppb
Sample Flow Rate	650 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40°C (with US EPA Approval)
Dimensions (HxWxD)	7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	35.7 lbs (16.7 kg)
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

* All certifications apply for legacy or NumaView™ T Series analyzer software
NumaView™ software is available as a no-charge option that must be specified at the time of purchase.
Specifications subject to change without notice.
All specifications are based on constant conditions.

Model T101 UV Fluorescence H_2S Analyzer

The Model T101 H_2S analyzer uses the proven UV fluorescence principle and advanced electronics to allow accurate, dependable, continuous measurements for ambient air quality, stack gas monitoring and other applications.
The Model T101 is equipped with an internally mounted catalytic converter set at 315°C to convert H_2S to SO_2. A switching mode alternately measures H_2S and SO_2 while showing both readings concurrently on the front display.

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T101 Specifications

Ranges	H_2S Min: 0-50 ppb Full scale Max: 0-10 ppm Full scale SO_2 Up to 0-20 ppm Full scale (selectable, independent ranges and auto ranging supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	20 seconds
Rise/Fall Time	< 120 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 50 ppb
Sample Flow Rate	650 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40°C
Dimensions (HxWxD)	7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	35.7 lbs (16.7 kg)
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

Specifications subject to change without notice.
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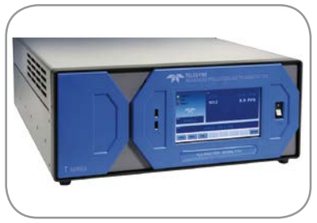
Stationary gas analyzers

Model T102 UV Fluorescence TRS Analyzer



The Model T102 TRS analyzer uses the proven UV fluorescence principle to measure Total Reduced Sulfur at levels commonly required for ambient air monitoring.
The Model T102 uses a high temperature external converter set at 850°C to allow conversion of H_2S, methyl mercaptan, dimethyldisulfide, and methyl-disulfide to SO_2 at this temperature with efficiency greater than 98%. A switching option alternately measures TRS and SO_2 while showing both readings concurrently on the front display.

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T102 Specifications

Ranges	H_2S Min: 0-50 ppb Full scale Max: 0-10 ppm Full scale SO_2 Up to 0-20 ppm Full scale (selectable, independent ranges and auto ranging supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	20 seconds
Rise/Fall Time	< 120 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 50 ppb
Sample Flow Rate	650 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40ºC
Dimensions (HxWxD)	Analyzer 7" x 17" x 23.5" (178 x 432 x 597 mm) Converter 7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	Analyzer 35.7 lbs (16.8 kg) Converter 7,3 / 11,8 kg
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

Specifications subject to change without notice.
All specifications are based on constant conditions.

Model T108 Total Sulfur Analyzer

The Model T108 Total Sulfur analyzer is designed to measure mixed sulfur impurities, collectively referred to as Total Sulfides, in air or carbon dioxide gas. Since there is no scrubber in the system, the instrument reading is the sum of the oxidized sulfur compounds and SO_2.
The Model T108 consists of a modified Model T100 SO_2 analyzer with special software and a Model 501TS high temperature thermal oxidizer. Sulfur compounds are heated as they pass through the converter and oxidized into SO_2. When analyzing CO_2, which generally contains no oxygen, approximately 6% O_2 is added to the sample before entering the converter.

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T108 Specifications

Ranges	Min: 0-50 ppb Full scale Max: 0-20,000 ppb Full scale (selectable, dual ranges and auto ranging supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	20 seconds
Rise/Fall Time	< 100 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 50 ppb
Sample Flow Rate	650 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40ºC
Dimensions (HxWxD)	Analyzer 7" x 17" x 23.5" (178 x 432 x 597 mm) Converter 7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	Analyzer 35.7 lbs (16.8 kg) Converter 7,3 / 11,8 kg
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

Specifications subject to change without notice.
All specifications are based on constant conditions.

Model T200 Chemiluminescence NO/NO_2 /NOx Analyzer

The Model T200 NO / NO_2 /NO_x analyzer uses the proven chemiluminescence detection principle and advanced electronics to allow accurate, dependable, continuous measurements for ambient air quality, stack gas monitoring and other applications.

- Available with NumaView™ premium T Series software -

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T200 Specifications

Ranges	Min: 0-50 ppb Full scale Max: 0-20,000 ppb Full scale (selectable, dual ranges and auto ranging supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	20 seconds
Rise/Fall Time	< 60 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 50 ppb
Sample Flow Rate	500 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40ºC
Dimensions (HxWxD)	7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	Analyzer 18 kg External pump: 15 lbs (7 kg)
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

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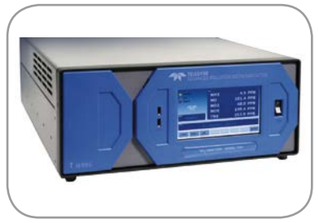
Model T201 Chemiluminescence NH_3 Analyzer

The Model T201 combines a specially configured chemiluminescence analyzer with an external thermal converter to give stable and repeatable NH_3 measurements at very low levels. In addition, the T201 provides simultaneous values for NO, NO_2, and NO_x concentrations.
The T201 is ideal for trace ammonia monitoring applications in ambient air as well as in clean rooms and make-up air units. Optional zero and span valves allow automatic, unattended calibration checks.



- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T201 Specifications

Ranges	Min: 0-50 ppb Full scale Max: 0-2,000 ppb Full scale (selectable, independent NH_3, NO, NO_2, NOx ranges supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.5 ppb (RMS)
Span Noise	1% of reading (RMS) above 50 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 0.5 ppb/24 hours
Span Drift	1% of full scale/24 hours
Lag Time	40 seconds
Rise/Fall Time	< 300 seconds to 90%
Linearity	1% of full scale
Sample Flow Rate	1000 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	15 - 40ºC
Dimensions (HxWxD)	Analyzer 7" x 17" x 23.5" (178 x 432 x 597 mm) Converter 7" x 17" x 23.5" (178 x 432 x 597 mm)
Weight	Analyzer: 43 lbs (20 kg) Converter: 24 lbs (11 kg) External pump: 16 lbs (7 kg)
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

Specifications subject to change without notice.
All specifications are based on constant conditions.

Model T300 Gas Filter Correlation CO Analyzer

Using IR Gas Filter Correlation technology, the Model T300 CO analyzer produces excellent zero and span stability, high signal-to-noise ratio, and provides advanced electronics to allow accurate, dependable, continuous measurements for ambient air quality, stack gas monitoring and other applications.

- Available with NumaView™ premium T Series software -

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T300 Specifications

Ranges	Min: 0-1 ppm Full scale Max: 0-1,000 ppm Full scale (selectable, dual-range supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.02 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 5 ppp
Lower Detectable Limit	0.04 ppm
Zero Drift	< 0.1 ppm/24 hours
Span Drift	< 0.5% of full scale/24 hours
Lag Time	10 seconds
Rise/Fall Time	< 60 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 5 ppm
Sample Flow Rate	800 cc/min ±10%
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40ºC
Dimensions (HxWxD)	7” x 17” x 23.5” (178 x 432 x 597 mm)
Weight	18 kg
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

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Specifications subject to change without notice.
All specifications are based on constant conditions.

Model T400 UV Absorption O_3 Analyzer

Using the proven UV Absorption measurement principle, the Model T400 provides stable measurements of O3 in ambient air.

- Available with NumaView™ premium T Series software -

- Large, vivid, and durable color touchscreen display
- All other T Series instrument platform features
- Lifetime technical support by phone and email
- Standard two-year warranty

T400 Specifications

Ranges	Min: 0-100 ppb Full scale Max: 0-10 ppm Full scale (selectable, dual ranges supported)
Measurement Units	ppb, ppm, µg/m³, mg/m³ (selectable)
Zero Noise	< 0.2 ppb (RMS)
Span Noise	< 0.5% of reading (RMS) above 100 ppb
Lower Detectable Limit	0.4 ppb
Zero Drift	< 1.0 ppb/24 hours
Span Drift	< 1% of reading/24 hours
Lag Time	10 seconds
Rise/Fall Time	< 20 seconds to 95%
Linearity	1% of full scale
Precision	0.5% of reading above 100 ppb
Sample Flow Rate	800 cc/min ±10%
IZS Specifications (optional)	Maximum Concentration: 1.0 ppm Minimum Concentration: 0.050 ppm Resolution: 0.5 ppb Repeatability (7 days): 1% of reading Initial accuracy: ± 5% of target
Power Requirements	100V-120V, 220V-240V, 50/60 Hz
Analog Output Ranges	10V, 5V, 1V, 0.1V (selectable)
Recorder Offset	±10%
Included I/O	1 x Ethernet: 10/100Base-T 2 x RS232 (300-115,200 baud) 2 x USB device ports 8 x opto-isolated digital outputs 6 x opto-isolated digital inputs 4 x analog outputs
Optional I/O	1 x USB com port 1 x RS485 8 x analog inputs (0-10V, 12-bit) 4 x digital alarm outputs Multidrop RS232 3 x 4 - 20mA current outputs
Operating Temperature Range	5 - 40ºC
Dimensions (HxWxD)	7” x 17” x 23.5” (178 x 432 x 597 mm)
Weight	28 lbs (12.7 kg) / 30.6 lbs (13.8 kg) with IZS
Certifications	MCerts: Sira MC0500067/07 US EPA: EQSA-0495-100 Russian standard: 50500-12 Pattern Approval Certificate of Measuring instruments of Republic of Kazakhstan

* with 80 Sample Digital Filter
** All certifications apply for legacy or NumaView™ T Series analyzer software
NumaView™ software is available as a no-charge option that must be specified at the time of purchas
Specifications subject to change without notice.
All specifications are based on constant conditions.

AL 2021 - Continuous Hydrogen Peroxide (H_2O_2) analyser for air and water samples

AL2021 Features:

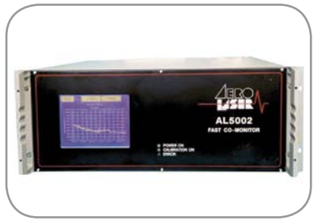
- Continuous online monitoring of H_2O_2 with unique sensitivity of 100ppt
- Provides absolute concentrations for H_2O_2 and relative values for other peroxides
- Analysis of gaseous and liquid samples with only one instrument
- H_2O_2 concentration readings within minutes
- Designed for climate research, environmental air monitoring and indoor air quality control
- Perfectly suited for monitoring H_2O_2 during decontamination procedures

The H_2O_2 monitor AL2021 from Aero-Laser has an extraordinary high sensitivity and a unique low detection limit of 100ppt (parts per trillion) for gaseous samples and 100 ng/liter (eq. 2x10-9 molar) for liquid samples, respectively. The complete chemical processing, including gas stripping, is integrated into the instrument.
The detection technique is based on an enzymatic peroxidise reaction, which is not only sensitive for H_2O_2, but also for other peroxides. Hence, after stripping the sample gas, the aqueous solution is separated in two channels. In channel A the concentration of all peroxides is measured, while H_2O_2 is selectively destroyed in channel B by the enzyme catalase. The absolute concentration of H_2O_2 is further calculated from the difference of the signals of both channels. These signals are obtained by exciting the products of the peroxidase reactions with UV light and detecting the fluorescent light by photomultipliers. With this method an extraordinary selectivity is achieved, avoiding interferences from other substances. **The AL2021 is the only instrument worldwide providing continuous concentrations of H_2O_2 in the range around and below 1ppb**.
The AL2021 was originally developed for environmental and climate research and is employed worldwide in atmospheric monitoring stations. Since H_2O_2 is getting more and more important in the field of sterilisation and decontamination, the instrument is widely used by the pharmaceutical industry for controlling of the atmosphere inside filling systems.

Specifications:

H2O2 detection technique	Fluorimetric, using an enzymatic reaction (peroxidase)
Linear detection range	0.1ppb to 3000ppb (gaseous), 100ng/liter - 3mg/liter (liquid)
Detection limit	100ppt (gaseous), 100ng/liter eq. $2x10^9$ molar (liquid)
Time resolution and delay	90sec (10% - 90%), ~300sec delay 2% full scale 0°C to +40°C
Noise Sample gas temperature Calibration and zeroing	2% full scale 0 C to +40 C Automatic zeroing and semi-automatic calibration using liquid standards or automatic calibration using internal gas generator (optional)
Operation	Front panel and remote software via RS-232
Data output	On display or via RS-232 interface (SQL-based graphic data logging software available)
Weight and dimensions	20kg, fit for 19" rack (whd: 45cm x 19cm x 56cm)
Power requirements	110VAC / 220VAC, 110W, 24VDC on request

AL 5002 - Continuous Very Fast And Sensitive Carbon Monoxide (CO) Analyser



The AL5002 from Aero-Laser is a very fast carbon monoxide (CO) monitor with an unique sensitivity below 1ppb (parts per billion). The detection of CO is based on a fluorimetric method, employing the excitation of CO at 150nm. The fluorescent light is measured with a highly sensitive photomultiplier, allowing for a very large dynamic range and an excellent selectivity.
The AL5002 calibrates within minutes, using only a low amount of calibration gas and an in-built zero gas source. The calibration procedure is fully automatic and can be scheduled in custom-set time intervals. The instrument is equipped with an internal computer and a hard drive for continuous data storage. The gas concentration is displayed in real time and can be logged via a standard RS-232 interface. All settings can be made on the conveniently large touch screen display or by remote control software.
The instrument is rugged and designed for field campaigns in rough environment, as well as for laboratory applications. There is a special aircraft version with 24V DC power supply. The AL5002 is widely used in remote monitoring stations and air quality/climate research campaigns.

AL5002 Features:

- Very fast, continuous, real time measurements
- Unique sensitivity limit of 1ppb
- Automatic calibration within minutes
- High linearity range from 1ppb to 100ppm

Special aircraft version

Specifications:

CO detection technique	VUV fluorescence
Linear detection range	~1ppb - 100000ppb
Detection limit	1.5ppb (integration time 1s) 0.8ppb (integration time 10s)
Rise and fall time (10% - 90%)	0.1s (ultra fast version with scroll pump) 1.5s (fast version with membrane pump)
Sample gas pressure	<200mbar - 1 200mbar equal to altitudes up to 12000m for airborne application
Sample gas temperature	0°C to +40°C
Calibration and zeroing	Fully automatic
Operation	Conveniently large touch screen or remote software via RS-232
Data output	Real time on touch screen or via RS-232 interface (SQL-based graphic data logging software available)
Data storage	2Gb internal data archive
Weight and dimensions	22kg, fit for 19" rack (whd: 45cm x 18cm x 59cm)
Power requirements	110 VAC / 220VAC or 24VDC (aircraft version), <100W

Gas analyzer semi-stationary MGA5

Device type: Semi-stationary (Up to 30 days of continuous measurement)
Measurements: O_2 / CO / NO / NO_2 / SO_2 / H_2S / CO_2 / CH_4 / Temperature / Diff. Pressure / m / s

Mobile semi-stationary gas analyzer for industry

- **Number of sensors: 2 to 9 - (O_2, CO, NO, NO_2, SO_2, H_2S, H_2, CH_4 or C_3H_8)**, temperature, pressure / discharge, differential pressure, + CO2 calculation, alpha, efficiency, flow rate, volumetric Consumption, Mass emissions.
- Graphic display with backlight (Russian +14 languages) with "ZOOM" function, built-in high-speed printer, gas cooler (Peltier) with automatic condensate removal, memory for 8500 blocks, outputs to PC.
- Included: built-in batteries, AC adapter, rugged housing, modular gas sampling probe, spare filters, leather trunk

The universal gas analyzer MRU MGA 5 is a multicomponent measuring modular system.
This means that this analyzer can be used as a mobile with autonomous power supply, as an accurate instrument for long-term measurements. If necessary, it is possible to use VarioPlus Industrial in a semi-stationary automatic measurement mode. It is intended for conducting routine tests, measuring Mass emissions, especially recommended for measurements in gas turbines.

Advantages:

- Use of infrared (NDIR) and electrochemical sensors
- Measurement of 9 gases simultaneously (3 infrared + up to 6 electrochemical)
- Graphic display with backlight (Russian +14 languages) with "ZOOM" function
- Operation in automatic measurement mode
- Built-in gas cooler (Peltier) with automatic condensate removal
- Gas temperature measurement up to 1700 ° C
- 8 programmable analog outputs 4 ... 20mA
- Ability to work with heated gas lines
- Allows you to work with the remote control
- Long service life
- Designed for active use
- Pressure / discharge / differential pressure measurement
- High-speed printer without carriage (print time 3 sec)
- Very robust case with carrying strap
- Suitable for all types of burners
- Easy to use
- Different lengths and material of probes
- Russian version of the on-screen menu of the device
- Built-in memory for 8500 measurements
- RS 232 interface for data transfer to a PC

Specifications:

Operation temperature:	0° - + 40°C,
	Max.humidity 95 % RH, without condensation
Storage temperature:	- 20° - + 50°C
Power supply and power consumption:	110-240 V / 250 W,
Main fuse:	10A
Reaction time:	20 seconds from the entrance to the gas analyzer
Heating time:	1 hour minimum
Indication:	Full-color LCD indicator with backlight
Output signals:	8 x analog outputs, 4 - 20 mA
	RS232 Interface
Sample preparation:	Integrated gas cooler with dew point + 5 ° C
	A filter that captures particles <1µ
Control of gas supply:	Flow control with gas flow control
Calibration:	Programmatically, mandatory CGS for each gas, air for zero calibration
Dimensions:	500 x 520 x 295 mm
Weight:	19 kg
Protection class:	IP 21

Gas components and measuring ranges:

Measured components	Measuring range	Sensor type
O_2	0 - 25 %	Electrochemical sensor
CO	0 - 1.000 ppm / 0 - 100 %	IR (NDIR) module
CO_2	0 - 10 % / 0 - 100%	IR (NDIR) module
CH_4	0 - 1.000 ppm / 0 - 100 %	IR (NDIR) module
C_3H_8	0 - 1.000 ppm / 0 - 100 %	IR (NDIR) module
SO_2	0 - 1.000 ppm / 0 - 5.000 ppm	IR (NDIR) module
NO	0 - 2000 ppm / 0 - 5.000 ppm	IR (NDIR) module
NO_2	0 - 500 ppm / 0 - 1.000 ppm	IR (NDIR) module
H_2	0 - 1 % / 0 - 100 %	Thermocondensing

Calculated values:

- ppm relative to xx% O_2
- mg / m^3
- mg / m^3 relative to xx% O_2
- mg / sek with Pitot tube

Features:

- Measurement of the gas temperature by a thermocouple located on the probe
- Sampling hose with heating (up to 20 m) with autonomous thermoregulation
- Flow measurement with Pitot tube and emission calculation (mg / s)
- External sensor data recording 4-20 mA via AUX input
- NO_2 / NO converter for TRUE NOx measurements

Portable gas analyzers

Gas analyzer semi-stationary MGA5 +

Device type: Semi-stationary (Up to 30 days of continuous measurement)
Measurements: O_2 / CO / NO / NO_2 / SO_2 / H_2S / CO_2 / CH_4 / C_3H_8 / H_2 / Temperature / Diff. Pressure / m / s

High-precision mobile semi-stationary gas analyzer

- With the ability to quickly change ranges of measurement and calibration without gas (CBC) cylinders!
- Number of gases to be measured: 6 - (O2, CO, NOx, converter (NO2 to NO), CH4 or SO2), temperature, pressure / discharge, differential pressure, + CO2 calculation, alpha, efficiency, flow rate, volumetric flow, Mass Emissions.
- Graphic display with backlight (Russian +14 languages) with "ZOOM" function, external high-speed printer, 2 gas refrigerators (Peltier) with dew point stabilization + 5 ° C, with automatic condensate removal, memory for 8500 blocks, outputs to PC.

Precision gas analyzer MRU MGA5+ is a unique semi-stationary measuring system that allows to conduct high-precision technological and ecological official measurements with the accuracy of the best stationary gas analyzers.
It is intended for carrying out of official and responsible tests, measurements, it is especially recommended for carrying out of measurements in gas turbines.

Advantages:
Using high-precision infrared (NDIR) multichannel sensors with the ability to quickly change the measuring ranges (from 200 to 1.000ppm), allows you to conduct the most accurate measurements. In this case, if the measuring range set by the user is exceeded (up to 10 times), the sensor does not enter saturation mode, and the analyzer displays the current value.
In addition, the **MRU MGA5** + has a unique automatic calibration system without gas (CGS) cylinders (option).
MGA5 + is a mobile gas analysis system that combines mobility and highest measurement accuracy.

- Graphic display with backlight (Russian +14 languages) with "ZOOM" function
- Operation in automatic measurement mode
- Built-in gas cooler (Peltier) with automatic condensate removal
- Gas temperature measurement up to 1700 ° C
- 8 programmable analog outputs 4 ... 20mA
- Ability to work with heated gas lines
- Allows you to work with the remote control
- Long service life
- Designed for active use
- Pressure / discharge / differential pressure measurement
- High-speed printer without carriage (print time 3 sec)
- Very robust case with carrying strap
- Suitable for all types of burners
- Easy to use
- Different lengths and material of probes
- Russian version of the on-screen menu of the device
- Built-in memory for 8500 measurements
- RS 232 interface for data transfer to a PC

Specifications:

Electrochemical sensor O_2 (service life 5 years)	
Measurement range	0 - 25,0 %
Accuracy / Resolution	± 0,2 % об. / 0,01 %
Multi-gas IR module	
Range of CO	0-200 ppm to 0-1000 ppm
Error	± 2% of the range or 5% of the measurement. Val.
Resolution	1 ppm
Range of CO_2	0-4% to 20% by volume.
Error	± 2% of the range or 5% of the measurement. Val.
Resolution	0.0001% vol.
Range of NO	0-200 ppm to 0-1000 ppm
Error	± 2% of the range or 5% of the measurement. Val.
Resolution	1 ppm
Range CH_4	0-200 ppm to 0-1000 ppm
Error	± 2% of the range or 5% of the measurement. Val.
Resolution	1 ppm
SO_2 Range	0-200 ppm to 0-1000 ppm
Error	± 2% of the range or 5% of the measurement. Val.
Resolution	1 ppm
Catalytic converter NO2 to NO	
NO_2 range	0-100 ppm
T gas temperature	
Range	0 - 650 ° C (stainless steel tube)
Range	0 - 1100 ° C (Inconel alloy tube)
Range	0 - 1750 ° C (ceramic tube)
Error	± 2 ° C to 200 ° C, 1% of the change. St. 200 ° C
Air temperature of the burner	
Range / Error	0 - 100 °C / ± 1 °C
Differential pressure (option)	
Range	± 100 hPa
Error	± 0.03 hPa or 1% of the change. Val.
Flow rate	
Range	1 m / s to 100 m / s
Error	± 1 m / s or 1% of change. Val.
Common specifications	
Terms of Use	+ 5 ° C - + 45 ° C
Storage temperature	Not more than 95% RH, without condensation
Main fuse	- 20 ° C to + 50 ° C
Speed	10 amp
Warm-up time	20 seconds, without transport delay
Display	30 min
Output signals	Graphic LCD display with backlight
Sample preparation	8 analog outputs 4-20mA, digital interface RS 232
Gas test control	Built-in gas cooler with dew point + 5 ° C, particle filter <1µm
Software calibration. Calibration gases for each gas channel, clean air for zero setting	
Protection class	IP 21
Dimensions	
Main Control Unit	500 x 520 x 295 mm / 17 kg
IR Analyzer	500 x 520 x 205 mm / 20 kg

Portable gas analyzers

Delta 65 gas analyzer

The Delta 65 gas analyzer is suitable for setting up burners operating on the following types of fuel: natural gas, diesel fuel, propane, butane, liquefied gas, dry wood, coal.
The device allows for a long-term analysis of O_2, CO and CO_2 in flue gases when burning various types of fuel, measuring the temperature of the flue gas and air temperature, measuring pressure / dilution, calculating the excess air factor, heat loss, fuel combustion efficiency.

Advantages:
- Clear graphic display
- Mains and battery powered
- Optional lengths of probes, as well as a handle for interchangeable tubes and probe tubes of different lengths
- Condensate trap with filters
- RS 232 interface
- IR interface for printer
- Built-in memory for 100 measurements
- Protective case with magnets
- Acoustic alarm exceeding the CO threshold

A simplified model Delta 65-S is also available, which can be used as an additional device for measuring NO, SO2, H2S and various CO ranges.

Detailed information about the device:

Specifications:

Parameter	Measuring range	Error	Resolution
Oxygen (O_2)	0... +21.%	±0.2 % abs.	0.1 %
CO (with compensation for H_2)	0... 10000 ppm	±10 ppm or ±5% from m.value	1 ppm
Carbon dioxide (CO_2) (calculation)	0... 20 %	±0.3% abs. calc.	0.1 %
Gas temperature	0... +650 °C	1 °C or ±1 % from m.value.	0.1 °C
Air temperature	0... +100 °C	1 °C or ±1 % from m.value.	0.1 °C
EFFICIENCY	0... 100 %		
Losses	calculation		
Draft / depression	-5... +35 гПа	±0.03 hPa or ±1 % from m.value.	0.01 hPa
Working temperature	+5... +45 °C		
Powered	From NiCd rechargeable batteries or power supply unit from mains 230 V		
Dimensions	155 x 90 x 42 mm		
Weight	0,5 kg		

Contents of supply:
- O_2 sensor
- CO sensor
- Accumulators
- Mini-USB interface
- for connection to a PC
- and charging the batteries
- Protective case with magnet
- Condensate trap with filter
- LCD display (4 lines)
- IR printer interface
- Memory for 100 measurements
- Thrust / rarefaction measurement
- Case

Portable gas analyser Delta 65-S

NEW GENERATION OF MRU GAS ANALYSERS!!!

Device Type: Portable
Measurements: O_2 / CO / NO / Temperature / Differ. pressure

- MSM technology - replacement of sensors in "field" conditions
- Micro-SD card for saving measurements in EXCEL format.
- USB for connecting to a PC and charging from the network.
- Touchscreen color screen (intuitive navigation through the menu).
- Very light: about 400g.

Ready-to-work kit "PROFI" in the case:
O_2, CO (10.000ppm), thrust-pressure, diff. pressure, T of gas, leak test, memory of 1,000 measurements + Micro SD card (4GB) with adapter, AC adapter, battery, spare reusable filter, probe 250mm.
With the possibility of retrofitting:
- NO_x sensor,
- high-speed thermal printer
- bluetooth module

The following options are available for ordering:
1. A set PROFI (O_2 + CO)
2. A set PROFI (O_2 + CO + NO)
3. A set PROFI (O_2 + CO + Printer)
4. A set PROFI (O_2 + CO + NO + Printer)

MRU DELTA 65-S - THE BEST CHOICE FOR THE OPERATOR!
Suitable for "cottages" and for industrial boilers
The MRU company (Germany) presents a universal high-tech gas analyzer

Number of gas channels at the same time						
	O_2	CO	$NO(NO_x)$	Printer	°C	ΔP
3	B	B	O	O	B	B

B basic supply | O option

Domestic boilers and stoves:
Use the "PROFI" kit in the case: the kit with 2 basic sensors (O_2 and CO) is perfect for monitoring and setting up all types of burners, furnaces, boilers, among them condensing.

Industrial boilers and furnaces:
Use the "PROFI" kit in the acse + NO_x 3rd sensor (option).
In DELTA 65-S you can install the 3rd NOx sensor !!! (Both at purchase, and later, if necessary).

New MSM sensor technology:
Using pre-calibrated sensors (MSM technology) saves time for servicing.

Convenience in work:
A simple intuitive menu and touch screen allow you to hold and operate the analyzer with one hand, including gloves.

Memory and interfaces:
Supplied in the basic package:
- memory for 1,000 measurements
- micro SD card (4GB) with the possibility of processing in EXCEL format
- IR port for high-speed thermal printer.
- The mini USB port provides a wide choice for transferring, storing and processing data.
- You can order the bluetooth module (optional) to transfer data to your smartphone

Main features:
- 2 or 3 gas analyzer O_2, CO, NO_x
- Resistance to overloads due to chemical underfire: Sensor measuring range CO 0 - 10.000 ppm
- Color touch screen with bright backlight and intuitive interface
- Calculation of heat engineering parameters: CO_2, Alpha, loss, efficiency, dew point
- Measurement of draft, pressure, diff. pressures

- Temperature measurement (2 channels)
- At least 10 standard and 4 individual fuels
- Li-Ion battery for 10 hours of operation
- Built-in memory for 1,000 measurements
- Built-in micro SD card (4 GB) for data storage and transfer (adapter included)
- All modern data transfer interfaces:
- USB, micro SD card, Bluetooth (optional) IR port for high-speed thermal printer

All possible interfaces for data storage and transmission:
- Micro SD card (4GB),
- Mini USB port,
- IR port for printer,
- Bluetooth™ (optional) for wireless transfer to your smartphone

Fully dismountable condensate collector with reusable Teflon filter

Reliable fixation on the steel surface with 4 powerful built-in magnets

Simplicity in operation with a color screen and bright backlight will intuitively guide you through all the measuring programs of the analyzer

Rapid replacement of the sensor by the user with the new MSM technology

High speed thermal printer MRU with IR interface

Official specifications:

Measured components:	Range:	Error:
Oxygen O_2 (basic sensor)	0 ... 21,0 % abs., resolution 0,1 %	± 0,2 o6% (abs.)
Carbon monoxide CO (Basic sensor)	0 ... 10.000 ppm, resolution 1 ppm	±20 ppm < 400 ppm, 5 % from measured value < 2.000 ppm, 10 % from measured value > 2.000 ppm
Nitric oxide NO	0 ... 4.000 ppm	±10 ppm < 100 ppm, 10 % from measured value > 100 ppm
Flue gas temperature	To +650°C (optionally to +1200°C), resolution 0,1°C	±1°C ...< 200 °C, ±1 % from measured value > 200 °C
Differential temperature	-40°C…+1200°C, resolution 0,1°C	± 1 °C or 0,5 %
Ambient temperature	0 ... 100 °C, resolution 0,1 °C	± 1 °C
Combustion air temperature	0 ... 100 °C, resolution 0,1 °C	± 1 °C
Thrust	± 50 HPa, resolution 0,01 гПа	± 0,02 HPa (mbar)
Differential pressure	± 100 HPa (mbar), resolution 0,01 HPa	± 0,02 HPa (mbar)
Additional measurements Calculated parameters	CO in air, Leak test CO_2, loss, combustion efficiency, dew point	
Calculated parameters	***Depending on the type of fuel***	
Types of fuel	Natural gas, associated gas, propane, butane, diesel, fuel oil, wood, pellets, coal, and others	
Carbon dioxide CO_2	0 ...20 %	
Dew point	°C, resolution 0,1 C	
Losses of qA	0 ... 99,9 %, resolution 0,1 %	
Combustion efficiency	0 ... 120 %, resolution 0,1 %	
Excess of air	1 ... 9,99 %, resolution 0,01 %	
General technical specifications		
Gas sampling probe	Probe length x 250mm x Ø8 (650 ° C) with measurement of gas temperature and draft in the chimney	
Working temperature	+ 5 ° C ... + 45 ° C, RH not more than 95%, without condensation	
Storage temperature	- 20 ... + 50 ° C	
Memory	1,000 measurements + micro SD card (4 GB) with adapter	
Interfaces	Standard: Mini USB, Micro SD card with adapter, IR port Optional: Bluetooth ™ (data transfer to a smartphone, or to a PC)	
Internal power supply	Built-in Li-Ion battery for 10 hours of operation	
External power supply	The network adapter is 100 ... 240 V / 50 Hz or from USB (included)	
Protection class	IP 40	
Weight	About 400 grams	
Dimensions	(W x H x D) 82 x 169 x 44 mm	

Portable gas analyzers

Portable gas analyzer NOVA Plus

Device type: Portable
Measurements: O_2 / CO / NO / NO_2 / SO_2 / H_2S / CO_2 / CH_4 / C_3H_8 / Temperature / Dif. pressure / m/s

MULTIFUNCTIONAL GAS ANALYZER FOR ECOLOGICAL AND TECHNOLOGICAL MEASUREMENTS

The number of sensors: from 1 to 9 - is determined by the user (O_2, CO, NO, NO_2, SO_2, H_2S, CH4, C3H8, CO_2), temperature, pressure / discharge, differential pressure, + CO_2 calculation, alpha, efficiency, center search function of gas flow, measurement of gas flow rate, relative humidity, dew point.
Bluetooth wireless communication between the measuring and control modules - up to 100 !!! Meters, as well as communication with a PC or phone.
Saving data to the SD card in EXCEL format
Contactless !!! Charging the remote module, or via mini-USB.
Measures up to 9 types of gases simultaneously + speed, humidity, dew point, etc. NOVA Plus is reliability, convenience and accuracy of measurement.
Ideal device for commissioners and technologists.

- The MRU NOVA Plus industrial multi-gas analyzer is designed to perform critical measurements in power engineering, industry, for precise adjustment and control of boilers and turbines, as well as measurements for environmental purposes.
- The NOVA Plus gas analyzer can operate in harsh operating conditions, using any type of fuel, incl. Fuel oil, wood, coal, and others.
- This gas analyzer allows measuring up to 9 gas types simultaneously for a long time. In addition to measuring gases, the MRU NOVA Plus can measure the speed of gas and air flows, relative humidity, dew point, gas and air temperature.

Advantages:

- Very easy to use, practical and reliable
- Measurement of 1 to 9 gas types simultaneously
- Electrochemical and IR sensors
- Very high measurement accuracy
- Ability to work for a long time (built-in gas cooler)
- Wireless communication between the analyzer block and the control module
- Differential pressure measurement
- Measurement of gas flow rate
- Official error for NO, CO, NO_2 from 5 ppm
- Designed for harsh working conditions
- Optional pump for purging the CO sensor
- Ability to set up to 3 CO channels with automatic range switching CO. → CO → CO.
- Ability to install 2 NO channels with automatic band switching NO → NO
- Suitable for all types of boilers and turbines
- Gas sampling probes of different lengths
- The possibility of simultaneous indication in ppm and mg
- Built-in portable printer
- Built-in SD card for 2 megabytes
- The possibility of diagnosing burners
- Work from built-in batteries up to 20 hours or from 220 V network.
- Highly efficient built-in gas cooler
- Connectors made of stainless steel

The control module has a wireless connection to the gas analyzer unit, which allows remote measurements.
In addition, the control module can operate as a separate device, measure temperature, pressure, flow rate, humidity, dew point.
So, you can check and adjust the ventilation system, the quality of the boiler boost, etc.

Official specifications:

Gas measuring channels:	Measurement range of volume fraction	Limits of permissible error	
		abcolute	relative, %
O_2 channel	(0 – 21,0) %	± 0,2 %	–
CO channel (low to 300 ppm^{-1})	(0 – 100) ppm^{-1} (over 100 – 300)ppm^{-1}	± 5 ppm^{-1}	± 5
CO channel (to 10000 ppm^{-1})	(0 – 200) ppm^{-1} (over 200 – 4000) ppm^{-1} (over 4000) ppm^{-1}	± 10 ppm^{-1}	± 5 ± 10
CO channel (to 10000 ppm^{-1}), with the CO channel installed (low 300 ppm^{-1})	(over 300 – 4000) ppm^{-1} (over 4000) ppm^{-1}		± 5 ± 10
CO channel (high to 20000 ppm^{-1})	(0 – 800)ppm^{-1} (over 800 –4000) ppm^{-1} (over 4000 – 20000) ppm^{-1}	± 40 ppm^{-1}	± 5 ± 10
CO channel (veru high to 10 %)	(0 – 0,4) % (over 0,4 – 10) %	±0,02 %	±10
NO channel (low to 300 ppm^{-1})	(0 – 50)$млн^{-1}$ (over 50 – 100)ppm^{-1} (over 100–300) ppm^{-1}	±5 ppm^{-1} ± ppm^{-1}	± 10
NO channel (to 4000 ppm^{-1})	(0 – 100)ppm^{-1} (over 100 – 4000) ppm^{-1}	± 10 ppm^{-1}	± 10
NO channel (to 4000 ppm^{-1}), when the channel is installed NO (low 300 $млн^{-1}$)	(over 300 – 4000) ppm^{-1}		± 10
NO_2 channel (to 500 ppm^{-1})	(0 – 50) ppm^{-1} (over 50 – 100) ppm^{-1} (over 100 – 500) ppm^{-1}	± 5 ppm^{-1} ± 10 ppm^{-1}	± 10
SO_2 channel (to 5000 ppm^{-1})	(0 – 100) ppm^{-1} (over 100 – 4000) ppm^{-1}	± 10 ppm^{-1}	±10
H_2S channel (to 200 ppm^{-1})	(0 – 100) ppm^{-1} (over 100 – 2000) ppm^{-1}	±10 ppm^{-1}	± 10
CO_2 channel infrared (40 %)	(0 – 10) % (over 10 – 20) %	± 0,5 %	± 5
CO_2 channel infrared (0 - 3% …30%)	(0 - 3% …30 %)	from ± 0,5 %	± 3
CO channel infrared (3% …30 %)	(0 - 10000 ppm^{-1}…10 %)	from ± 0,03 %	± 3
CH_4 channel infrared (0 - 10000 ppm^{-1}…3 %)	(0 - 10000 ppm^{-1}…3 %)	from 60 ppm^{-1}	± 3
C_3H_8 channel infrared (0 - 2000 ppm^{-1}…0 - 5000 ppm^{-1})	(0 - 2000 ppm^{-1}…0 - 5000 ppm^{-1})	from 30 ppm^{-1}	± 3

Temperature measurement:

Temperature measurement range	Limits of permissible error	
	absolute	relative, %
(0 –650)°C (Stainless steel probe, thermocouple type K)		
from 0 to + 200 °C higher + 200 to650°C	± 2 °C.	± 1
(0 –1000)°C Probe made of INCONEL alloy, thermocouple type K)		
to + 200 °C higher + 200 °C	± 2 °C.	± 1
Air temperature 0 ... 100 °C (stainless steel probe, thermocouple type K)		
to + 100 °C	± 1 °C.	

Portable gas analyzers

Pressure measurement:

Measurement range Differential pressure, overpressure, vacuum pressure	Limits of permissible error	
	absolute	relative, %
From -2 hPa …to 2 hPa From – 100hPa…to -2 hPa from 2 hPa …to 100 hPa	± 0,02 hPa	± 1

Relative humidity / speed measurement:

Measurement range	Limits of permissible error	
	absolute	relative, %
Speed measurement (impeller)		
0 – 10 m/s higher 10 m/s	± 0,3 m/s	± 3
Relative humidity measurement		
3% RH … 98% RH	-	± 3

Additional specifications:

Parameter	Description
Ambient temperature, ° C:	From 5 ... to 45
Relative humidity, %	Up to 95, without condensation
Storage temperature, ° C:	From minus 20 to 50
Power supply:	Built-in battery, from an external 220 V source
Power consumption, W, not more:	12 W
Protection class:	IP 20
Dimensions, mm, not more than:	470x314x235
Weight, kg, not more:	(With thermobox 292x150x68)

Gank-4 gas analyzer

Gas analyzer GANK-4 of modifications A, W, AW is designed for automatic continuous monitoring of concentrations of harmful substances in the air (A), in the air of the working area (W), in industrial emissions and technological processes for environmental protection, labor safety and optimization of technological processes.
Controls 150 harmful substances by selection without sampling at measuring point

Specifications:

The range of measured concentrations Gank-4 (A)	From 0.5 MPC ad * to 0.5 MPC wz **
The range of measured concentrations of Gank-4 (W)	From 0.5 MPC wz * to 20 MPC wz **
The range of measured concentrations of Gank-4 (AW)	From 0.5 MPC ad * to 20 MPC wz **
Measurement time	10-30sec.
Measurement error, not more than	20%
Overall dimensions, mm	250x200x150
Weight, kg	Not more 3,5
Power consumption, W	Not more 8
Ambient temperature	From + 50°C to + 500°C
With thermostat TP-1	From - 50°C
Powered by built-in battery	12V
Power supply from the network	220V, 50Hz

Various components are measured by exchangeable chemical cassettes or built-in sensors. Each chemical cassette contains an electronic memory in which the measured substance and measurement parameters are recorded.
* MPC a.d. - Average daily maximum permissible concentration of admixture in the atmosphere, in mg / m^3, (for substances for which sensors are manufactured).
** MPC w.z. - the maximum permissible concentration of harmful substance in the air of the working area, in mg / m^3.

Portable gas analyzers

Gas analyzer portable Optima 7

Main features:
Device type: Portable
Measurements: O_2 / CO / NO / NO_2 / SO_2 / H_2S / CO_2 / CH_4 / C_3H_8 / Temperature / Delta P /m / s

COMPACT HIGH-SPEED GAS-ANALYZER

O_2 Sensors (Long Life) up to 6 years
Electrochemical sensors O_2 and CO with H_2 compensation
Ability to install IR sensors
Number of gases simultaneously: from 1 to 7 - to choose from (O_2, CO, NO, NO_2, SO_2, H_2S, CH_4, CO_2) + temperature + pressure / discharge + differential pressure + CO_2 calculation, alpha, EFFICIENCY + Flow + measurement of gas flow rate

Advantages:

- Comfortable durable and lightweight case (800g)
- Measurement of 1 to 7 types of gases simultaneously
- Up to 3 CO channels with auto-switching: CO low → CO → COhigh.
- Up to 2 NO channels with auto-switching: NO low → NO
- Very high official measurement accuracy in the Russian Federation from ± 5 ppm
- Recommendations for use from the Research Institute "Atmosphere"
- Possibility of official measurements in winter to - 30 ° C!
- Thrust / pressure / diff. Pressure / gas flow rate
- Optional pump for purging the CO sensor
- Suitable for all types of boilers and turbines
- Gas sampling probes up to 2 meters long at temperatures up to 1700 ° C
- Multi-lingual version of the device's on-screen menu
- The possibility of simultaneous indication in ppm and mg
- Memory 16000 blocks + SD card for 2 GB (data in Excel format !!!)
- Mini USB interface for transferring data to a PC and charging batteries
- Operation from built-in batteries up to 15 hours or from a 220 V network
- Condensate collector with stainless steel elements
- Connectors made of stainless steel
- Infrared interface for data transfer to a portable high-speed IR
- Thermal printer (optional printer)

High-speed graphic IR Thermal printer (optional). High speed printing (about 2 seconds per report). The usual thermal paper is used (it is used in cash registers Ø46mm width 57mm.). Easy paper replacement. 4x1600 mAh NI-MH battery is used with the ability to charge from a mini-USB cable.
Anti-impact thermocover (thermobox) for gas analyzer operation in frosty weather:
Up to -15 ° C without internal heating function up to -30 ° C with internal heating function
Created specifically to facilitate measurements in frosty weather. Use of the cover allows not only to work in winter, incl. in hard-to-reach places, but also give the measurements an OFFICIAL status.

Specifications:
Gas measurement channels

Measurement range of volume fraction	Limits of permissible error	
	absolute	relative, %
O_2 channel		
(0 - 21,0) %	± 0,2 %	-
CO channel (low to 300 ppm^{-1})		
(0 - 100) ppm^{-1} (over 100 - 300)ppm^{-1}	± 5 ppm^{-1}	± 5
CO channel (to 10000 ppm^{-1})		
(0 - 400) ppm^{-1} (over 400 - 10000) ppm^{-1}	± 20 ppm^{-1}	± 5
CO channel (to10000 ppm^{-1}), when installed channel CO (low 300 ppm^{-1})		
(over 300- 400) ppm^{-1} (over 400 - 10000) ppm^{-1}	± 20 ppm^{-1}	± 5
CO channel (high to 20000 ppm^{-1})		
(0 - 800)ppm^{-1} (over 800 -4000) ppm^{-1} (over 4000 - 20000) ppm^{-1}	± 40 ppm^{-1}	± 5 ± 10
COchannel (very high to 10 %)		
(0 - 0,4) % (св. 0,4 - 10) %	± 0,02 %	± 10
NO channel (low to 300 ppm^{-1})		
(0 - 50)ppm^{-1} (over 50 - 100)ppm^{-1} (over100-300) ppm^{-1}	± 5 ppm^{-1} ± 10ppm^{-1}	± 10
NO channel (to 4000 ppm^{-1})		
(0 - 100)ppm^{-1} (over100 - 4000) ppm^{-1}	± 10 ppm^{-1}	± 10
NO channel (to 4000 ppm^{-1}), when installed channel NO (low 300 ppm^{-1})		
(over300 - 4000) ppm^{-1}		± 10
NO2 channel (до 500 ppm^{-1})		
(0 - 50) ppm^{-1} (over 50 - 100) ppm^{-1} (over 100 - 500) ppm^{-1}	± 5 ppm^{-1} ± 10 ppm^{-1}	± 10
SO_2 channel (to 4000 ppm^{-1})		
(0 - 100) ppm^{-1} (over 100 - 4000) ppm^{-1}	± 10 ppm^{-1}	± 10
H_2S channel (to 300 ppm^{-1})		
(0 - 100) ppm^{-1} (over 100 - 300) ppm^{-1}	± 10 ppm^{-1}	± 20
CO_2 channel infrared (20 %)		
(0 - 10) % (over 10 - 20) %	± 0,5 %	

Temperature measurement channels

Temperature measurement ranges	Limits of permissible error	
	absolute	relative, %
(0 -650) °C (Stainless steel probe, thermocouple type K)		
from 0 to + 200 °C higher + 200 to 650 °C	± 2 °C	± 1
(0 -1000) °C Probe made of INCONEL alloy, thermocouple type K)		
to + 200 °C higher + 200 °C	± 2 °C	± 1
Air temperature 0 ... 100 °C (stainless steel probe, thermocouple type K)		
to + 100 °C	± 1 °C.	

Pressure measurement channels

Measurement range of differential pressure, overpressure, vacuum pressure	Limits of permissible error	
	absolute	relative, %
From minus 2 hPa ...to 2hPa From minus 100hPa...to minus 2hPa from 2hPa...to 100hPa	± 0,02 hPa	± 1

Additional specifications

Parameter	Description
Ambient temperature, ° C:	From 5 ... to 45 From minus 15 to 40 (with a thermocouple) From minus 30 to 40 (with thermobox)
Relative humidity, %:	Up to 95, without condensation
Storage temperature, ° C:	From minus 20 to 50
Power supply:	Built-in battery, from an external 220 V source or from a USB port of a computer
Power consumption, W, not more:	7 W (with 18 W thermobox)
Protection class:	IP 20 (with thermobox I P 21)
Dimensions, mm, not more than:	244x113x54(With thermobox 292x150x68)
Weight, kg, not more:	0,9 kg, with a thermocouple 1,2 kg, with thermobox 2,7 kg

Portable gas analyzers

Gas analyzer Vario Plus Industrial

Device Type: Portable
Measurements: O_2 / CO / NO / NO_2 / SO_2 / H_2S / CO_2 / CH_4 / C_3H_8 / H_2 / Temperature / Diff. Pressure / m / s

With the possibility of operation in a semi-stationary mode

- The most accurate gas analyzer in its class!
- Ideal device for ecologists and technologists.
- Number of sensors: 2 to 9 - O_2, CO, NO, NO_2, SO2, H_2S, H_2, CH4 or C3H8, temperature, pressure / discharge, differential pressure, + CO_2 calculation, alpha, efficiency, flow rate, Mass emissions.
- Up to 6 electrochemical sensors (O_2, CO, NO, NO2, SO_2, H_2S).
- Up to 3 infrared NDIR sensors (O_2, CO, CH_4 or C_3H_8).
- Graphic display with backlight (Russian +14 languages) with "ZOOM" function, built-in high-speed printer, gas cooler (Peltier) with automatic condensate removal, memory for 8500 blocks, outputs to PC. Included: built-in batteries, mains adapter, rugged housing, modular gas sampling probe, spare filters, leather trunk.

The universal **gas analyzer MRU Vario Plus Industrial** is a multicomponent measuring modular system.
This means that this analyzer can be used as a mobile with autonomous power supply, as an accurate instrument for long-term measurements. If necessary, it is possible to use the **MRU Vario Plus Industrial** in a semi-stationary automatic measurement mode. It is intended for conducting routine tests, measuring Mass emissions, especially recommended for measurements in gas turbines.

Advantages:

- Use of infrared (NDIR) and electrochemical sensors
- Measurement of 9 gases simultaneously (3 infrared + up to 6 electrochemical)
- Graphic display with backlight (Russian +14 languages) with "ZOOM" function
- Operation in automatic measurement mode
- Built-in gas cooler (Peltier) with automatic condensate removal

Gas temperature measurement up to 1700 ° C

- 8 programmable analog outputs 4 ... 20mA
- Ability to work with heated gas lines
- Allows you to work with the remote control
- Long service life
- Designed for active use
- Pressure / discharge / differential pressure measurement
- High-speed printer without carriage (print time 3 sec)
- Very robust case with carrying strap
- Suitable for all types of burners
- Easy to use
- Different lengths and material of probes
- Russian version of the on-screen menu of the device
- Built-in memory for 8500 measurements
- RS 232 interface for data transfer to a PC

Specifications:

Electrochemical sensors	Measured values	Limits of permissible errors
O_2	Measurement range:	0 - 21,0 %
	Measurement error:	± 0,2 % abs.
CO (with H_2 compensation)	Measurement range:	0 - 4.000 ppm, Overload to 10.000 ppm
	Measurement error:	± 20 ppm or 5 % from m.value / > 4.000 ppm 10 % from m.value / > 4.000 ppm
CO very high **(option)**	Measurement range:	0 - 40.000 ppm, overload to 100.000 ppm
	Measurement error:	± 200 ppm or 5 % from m.value / > 40.000 ppm 10 % from m.value / > 40.000 ppm
NO **(option)**	Measurement range:	0 - 1.000 ppm, overload to 5.000 ppm
	Measurement error:	± 5 ppm or 5 % from m.value / > 1.000 ppm 10 % from m.value / > 1.000 ppm
NO_2 **(option)**	Measurement range:	0 - 200 ppm, перегрузка до 1.000 ppm
	Measurement error:	± 5 ppm or 5 % from m.value / > 200 ppm 10 % from m.value / > 200 ppm
SO_2 **(option)**	Measurement range:	0 - 2.000 ppm, overload to 5.000 ppm
	Measurement error:	± 10 ppm or 5 % from m.value / > 2000 ppm
H_2S **(option)**	Measurement range:	0 - 50 ppm, overload to 500 ppm
	Measurement error:	± 5 ppm or 5 % from m.value / < 50 ppm
H_2 **(option)**	Measurement range:	0 - 1%, overload to 2%
	Measurement error:	± 0,02% or 5 % from m.value / < 1% 10 % from m.value / > 1%
With multi-gas IR module		
CO	Measurement range:	min. 0 - 10.000 ppm to max. 0 - 30 %
	Measurement error:	± 40 ppm or 5 % from m.value
CO_2	Measurement range:	min. 0 - 3 % to max. 0 -30 %
	Measurement error:	± 0,50 % or 5 % from m.value
C_XH_Y as C_3H_8	Measurement range:	min. 0 - 10.000 ppm to max. 0 - 5 % as C_3H_8
	Measurement error:	± 20ppm or 5% from m.value
C_XH_Y as CH_4	Measurement range:	min. 0 - 10.000 ppm to max. 0 - 5 % as CH_4
	Measurement error:	± 60 ppm or 5% from m.value
Flue gas temperature TA	Measurement range:	0 - 650 °C Stainless steel probe
	Measurement error:	0 - 1.100 °C Inconel alloy probe
	Measurement range:	0 - 1.750 °C with ceramic probe
	Measurement error:	± 2 °C / < 200 °C 1 % from m.value > 200 °C
Combustion temperature TL	Measurement range:	0 - 100 °C
	Measurement error:	± 1 °C
Draft / depression	Measurement range:	± 100 hPa
	Measurement error:	± 0,03 hPa or 1% from m.value
Differential pressure	Measurement range:	± 100 hPa
	Measurement error:	± 0,03 hPa or 1% from m.value
Gas flow rate (with Pitot tube)	Measurement range:	1 m/s to 100 м/с
	Measurement error:	± 1 m/s or 1 % from m.value
	Mass emissions:	g/ s, ...
Estimated values: (Dependent on the type of fuel)		
CO_2 (Estimated for an unidentified direct measurement of CO_2 (calculation is based on the selected fuel type and the measured value of O2)	Measurement range:	0 - CO_2 max
Dew point:	°C	
Losses with flue gases qA:	0 - 99,9 %	
Efficiency ή:	0 - 120 %	
Dimension of measurement data:	mg/Hm3, Relative to O_2, mg / kWh, NO_x as mg / Nm_3NO_2, mg / s.	
Common data:		
Operation temperature:	+ 5 - + 45 °C, max. 95 % without condensation	
Storage temperature:	- 20 - + 50 °C	
Supply voltage:	Net 110 - 230 Vac, 50/60 Hz 12 V / 1,8 Ah with internal battery, 2 hours of operation	
Protection class:	IP 21	
Weight:	About 7.000 g (without bag and accessories)	
Dimensions:	530 x 490 x 310 mm	

Portable gas analyzers

DAG 500 gas analyzer

Purpose and application area

The DAG-500 gas analyzer is designed for measuring concentrations of carbon monoxide, oxygen, sulfur dioxide, nitrogen oxides, nitrogen dioxide, temperature measurement, pressure / rarefaction and soot content in gas emissions of fuel-burning plants.

Description

1. The DAG-500 gas analyzer is an automatic portable multichannel indicating continuous instrument.
2. The measuring part of the DAG-500 gas analyzer uses a method for analyzing multicomponent gas mixtures using a set of electrochemical sensors that have selective sensitivity to various components of the gas mixture and generate electrical signals proportional to the concentration of the components measured.
3. The flue gas temperature is measured by means of a thermocouple XA (K) placed in the controlled area.
4. Constructively the DAG-500 gas analyzer is made in the form of a rectangular measuring unit with a keyboard and a display on the front panel. On the end panel of the gas analyzer there are:

- connector for external power supply "+ 12V";
- connector for probe connection with thermocouple;
- a connector for connecting a cable to communicate with a computer or an external printer;
- connector for connecting an external sensor cable;
- connection for gas sampling;
- Pressure / vacuum connection.

5. The DAG-500 gas analyzer is designed for operation in explosion-proof conditions in continuous, short-term, short-time modes.
6. The measurement results (in%, mg / m^3, ppm) can be stored in non-volatile memory, output to an external printer or an IBM PC type computer through the RS232 interface.
7. The DAG-500 gas analyzer has the ability to connect external sensors.

Main technical characteristics

The DAG-500 gas analyzer provides measurement of the parameters of flue gases with characteristics in accordance with Table. 1.

Table 1.

Determined component	Measuring range	Limits of the allowed basic error		Nominal price of the unit of the smallest category
		Absolute	Relative	
Oxygen (O2)	0 – 21 %	± 0,2 %	–	0,1 %
Carbon monoxide (CO)	0 – 30 000 ppm	± 300 ppm (0 – 6000 ppm)	± 5 % (6000 – 30 000 ppm)	1 ppm
	0 – 6 000 ppm	± 60 ppm (0 – 1200 ppm)	± 5 % (1200 – 6 000 ppm)	1 ppm
	0 – 2 000 ppm	± 20 ppm (0 – 400 ppm)	± 5 % (400 – 2 000 ppm)	1 ppm
	0 – 1 000 ppm	± 10 ppm (0 – 200 ppm)	± 5 % (200 – 1 000 ppm)	1 ppm
	0 – 500 ppm	± 5 ppm (0 – 100 ppm)	± 5 % (100 – 500 ppm)	1 ppm
Nitric oxide (NO)	0 – 2 000 ppm	± 40 ppm (0 – 400 ppm)	± 10 % (400 – 2 000 ppm)	1 ppm
	0 – 1 000 ppm	± 20 ppm (0 – 200 ppm)	± 10 % (200 – 1 000 ppm)	1 ppm
	0 – 500 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (100 – 500 ppm)	1 ppm
	0 – 250 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 250 ppm)	1 ppm
Nitrogen dioxide (NO_2)	0 – 100 ppm	± 3 ppm (0 – 20 ppm)	± 15 % (20 – 100 ppm)	1 ppm
	0 – 50 ppm	± 2 ppm (0 – 10 ppm)	± 15 % (10 – 5 ppm)	1 ppm
Sulfuric anhydride (SO_2)	0 – 4 000 ppm	± 80 ppm (0 – 800 ppm)	± 10 % (800 – 4 000 ppm)	1 ppm
	0 – 2 000 ppm	± 40 ppm (0 – 400 ppm)	± 10 % (400 – 2 000 ppm)	1 ppm
	0 – 1 000 ppm	± 20 ppm (0 – 200 ppm)	± 10 % (200 – 1 000 ppm)	1 ppm
	0 – 500 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (100 – 500 ppm)	1 ppm
Gas flow temperature	-20 – +800 °C	± 3 °C (-20 – +300 °C)	± 1 % (300 – 800 °C)	1 °C
Ambient temperature	0 – 60 °C	± 1 °C	–	1 °C
Pressure / vacuum	± (0–5,0) KPa	± 0,02 KPa (0...0,4 KPa)	± 5% (0,4...5 KPa)	1 Pa
Carbon dioxide (CO_2)	Not standardized (Determination by calculation)			

- The limit of the permissible variation of indications, bd, is 0.5 of the limit of the permissible error.
- Warm-up time, s, not more than 240
- Settling time, s, not more than 180
- Interval of operating time without correction of readings, h 1000
- Supply voltage, V (220)
- Power consumption, W, not more than 10
- Mains frequency, Hz (50 ± 1)
- Mean time between failures, hour, not less than 10000
- Average service life, years, not less than 8
- Overall dimensions, mm, not less than 220x105x65
- Weight, kg, not more than 1,5

Terms of Use:

- Operating temperature range, °C 10 - 40
- Relative humidity, 10 -85
- atmospheric pressure, kPa 91-105.

Dag 510 gas analyzer

Purpose and application area

Gas analyzers "DAG-510" are designed for:

- measurement of oxygen (O_2), carbon monoxide (CO), nitrogen oxide (NO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), hydrogen sulfide (H_2S) and hydrocarbons (methane or propane) in the off-gas of fuel-burning plants;
- temperature measurements at the sampling point and ambient temperature;
- measurement of absolute pressure, pressure difference;
- determination by the calculation method in accordance with GOST 17.2.4.06-90 of the speed and flow rate of gas-dust flows when working with a measuring probe - pneumometric tube Pitot or NIIOGAZ;
- determination by calculation method of carbon dioxide (CO_2) and the amount of nitrogen oxides (NO_x);
- Determination of the technological parameters of the fuel-burning plants by the calculation method - the excess air factor and the heat loss coefficient.

The field of application of gas analyzers is the control of the content of pollutants in the off-gases of stationary and mobile sources of industrial emissions for the purpose of ecological control and optimization of the combustion process of fuel.

Description

The gas analyzer "DAG-510" (hereinafter - gas analyzer) is an automatic multifunctional portable device.

The gas analyzer is produced in six modifications, differing from each other in the list of the components to be determined, measuring ranges.

Depending on the modification, the gas analyzer is equipped with either a probe with a heated sampling hose and a sample preparation unit "BPP-510", or a probe with a connecting hose and a condensate collector.

The principle of the gas analyzer is based on the use of a set of electrochemical measuring sensors for measuring O_2, CO, NO, NO_2, SO_2, and H_2S contents of an infrared optical sensor for measuring hydrocarbon content, a thermoelectric transducer for measuring gas flow temperature, semiconductor sensors for measuring ambient temperature , measurements of absolute pressure and pressure difference.

Structurally, the gas analyzer is made in a rectangular case, the front panel of which has a display, keyboard, thermal printer, one of the side panels connecting plug.

The power supply of the gas analyzer is carried out from the built-in rechargeable battery, the recharging of the battery is performed from a DC source with a voltage of 12V. The supply of the sample preparation unit is carried out from the AC voltage network.

The gas analyzer is equipped with an RS 232C interface and a memory for storing measurement results.

Main technical specifications

1. The list of measured parameters, measuring ranges and limits of the permissible basic error of gas analyzers, depending on the modification, are given in Table 1.

Table 1.

Determined component	Measuring range	Limits of the allowed basic error		Nominal price of the unit of the smallest category
		Absolute	Relative	
Modification «Dag-510-GV»				
Carbon monoxide (CO)	0 – 40 000 ppm	± 100 ppm (0 – 1000 ppm)	± 10 % (1000 – 40 000 ppm)	1 ppm
Nitric oxide (NO)	0 – 2 000 ppm	± 25 ppm (0 – 250 ppm)	± 10 % (250 – 2 000 ppm)	1 ppm
Nitrogen dioxide (NO2)	0 – 400 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (50 – 400 ppm)	1 ppm
Modification «Dag-510-GS»				
Carbon monoxide (CO)	0 – 4 000 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (100 – 4 000 ppm)	1 ppm
Nitric oxide (NO)	0 – 400 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 400 ppm)	1 ppm
Nitrogen dioxide (NO2)	0 – 200 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 200 ppm)	1 ppm
Modification «Dag-510-GH»				
Carbon monoxide (CO)	0 – 400 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 400 ppm)	0,1 ppm
Nitric oxide (NO)	0 – 100 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 100 ppm)	0,1 ppm
Nitrogen dioxide (NO_2)	0 – 50 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 50 ppm)	0,1 ppm
Modification «Dag-510-MB»				
Carbon monoxide (CO)	0 – 40 000 ppm	± 100 ppm (0 – 1000 ppm)	± 10%(1000 - 40 000 ppm)	1 ppm
Nitric oxide (NO)	0 – 2 000 ppm	± 25 ppm (0 – 250 ppm)	± 10 % (250 – 2 000 ppm)	1 ppm
Nitrogen dioxide (NO_2)		± 10 ppm (0 – 100 ppm)	± 10 % (100 – 400 ppm)	1 ppm
Sulfuric anhydride (SO_2)	0 – 2000 ppm	± 25 ppm (0 – 250 ppm)	± 10 % (250 – 2 000 ppm)	1 ppm
Hydrogen sulfide (H_2S)	0 – 400 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (100 – 400 ppm)	1 ppm
Modification «Dag-510-MC»				
Carbon monoxide (CO)	0 – 4 000 ppm	± 10 ppm (0 – 100 ppm)	± 10 % (100 – 4 000 ppm)	1 ppm
Nitric oxide (NO)	0 – 400 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 400 ppm)	1 ppm
Nitrogen dioxide (NO_2)	0 – 200 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 200 ppm)	1 ppm
Sulfuric anhydride (SO_2)	0 – 400 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 400 ppm)	1 ppm
Hydrogen sulfide (H_2S)	0 – 200 ppm	± 5 ppm (0 – 50 ppm)	± 10 % (50 – 200 ppm)	1 ppm
Modification «Dag-510-MH»				
Carbon monoxide (CO)	0 – 400 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 400 ppm)	0,1 ppm
Nitric oxide (NO)	0 – 100 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 100 ppm)	0,1 ppm
Nitrogen dioxide (NO_2)	0 – 50 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 50 ppm)	0,1 ppm
Sulfuric anhydride (SO_2)	0 – 50 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 50 ppm)	0,1 ppm
Hydrogen sulfide (H_2S)	0 – 50 ppm	± 1 ppm (0 – 10 ppm)	± 10 % (10 – 50 ppm)	0,1 ppm
The measured parameters common for all modifications				
Oxygen (O_2)	0 – 21 % об.	>± 0,25 % об.	–	0,01 % об.
Hydrocarbons (according to CH4 or C_3H_8) * <	0 – 5000 ppm	± 100 ppm (0 – 1000 ppm)	± 10 % (1000 – 5000 ppm)	1 ppm
Gas flow temperature	-20 – +800 °C	± 3 °C (-20 – +300 °C)	± 1 % (300 – 800 °C)	0,1 °C
Ambient temperature	0 – 50 °C	± 1 °C	–	0,1 °C
Absolute pressure *	80,0 - 110,0 кПа	± 1 кПа	–	10 Pa
Differential pressure *	± (0–2,5) kPa	± 0,025 kPa	–	0,1 Pa
Gas flow rate *	Not standardized (Determination by calculation)			
Carbon dioxide (CO_2)				
The sum of nitrogen oxides (NO_x)				
Coefficient of excess air				
Heat loss factor				

Note - Measured channels marked with "" are installed on a separate order.*

Portable gas analyzers

2. The limit of the allowed variation of the readings, in fractions of the limit of the permissible basic error of 0.5
3. The limit of the allowed total additional error from the change in the content of permissible non-measurable components of the analyzed gas mixture, in fractions of the limit of the permissible basic error of 0.5
4. The limit of the permissible additional error from the change in the moisture content of the analyzed gas mixture, in fractions of the limit of the permissible basic error of 0.5
5. The maximum flow rate of the analyzed gas mixture, l / min, not more than 1.5
6. Warm-up time, min, not more than 10
7. Settling time, s, no more than 300
8. Interval of working time without correction of indications, h, not less than 1000
9. Supply voltage:
- *gas analyzer, V 12 ± 2*
- *sample preparation unit, B 220*

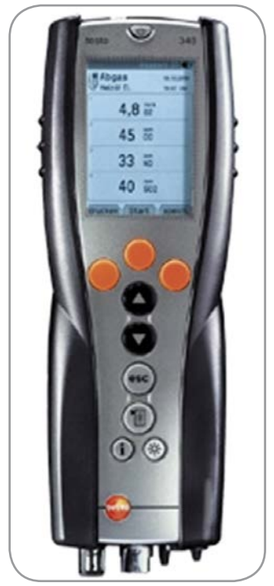
10. Network frequency, Hz 50 ± 1
11. Power consumption:
- *gas analyzer, W, not more than 20*
- *sample preparation unit, W, not more than 500*

12. Overall dimensions:
- *gas analyzer, mm, no more than 280 x 120 x 120*
- *sample preparation unit, mm not more than 280 x 250 x 210*

13. Weight:
- *gas analyzer, kg, not more than 3*
- *sample preparation unit, kg, not more than 12*

14. Mean time between failures, hour, not less than 10000
15. Average service life, years, not less than 8
16. Operating conditions:
- *Operating temperature range, °C 5 - 40*
- *relative humidity at 30 °C,% 10 - 75*
- *atmospheric pressure, kPa 84.0 - 106.7*
- *maximum amplitude of vibration (with frequency from 5 to 35 Hz), mm 0,35*
- *environment non-explosive*

Portable flue gas analyzer Testo 340



The compact form and the available technology make the Testo 340 ideal for operation, service and maintenance, as well as for control measurements of industrial boilers, gas turbines, stationary industrial engines, thermal processes.

Advantages of the Testo 340:
- Maximum number of sensors: 4
- In a standard way, the device is equipped with an O2 sensor. You can configure 3 additional sensors by choice: CO (with H2 compensation), COlow (with H_2 Compensation), NO, NOlow, NO_2 and SO_2
- In a standard way, the function of measuring differential pressure and speed built-in in the gas analyzer
- CO (with H_2 compensation) and NO sensor with replaceable filters. This filter prevents the passage of certain gases through the sensor. If the filter is worn out, the user can replace it.
- Optimal protection depends the device from shock.

Testo 340 - calculated parameters:
- Dew point
- Heat loss + EFFICIENCY
- CO - undiluted
- NOX
- Flow rate (volumetric flow, mass flow)
- Lambda
- Gas consumption
- Battery capacity (%)
- Sensor diagnostics

Portable flue gas analyzer Testo 350

Testo 350 is a flexible, portable measuring system for a broad range of combustion applications.

This advanced analyser can be used to

- adjust all types of industrial burners
- measure concentrations in raw and clean gas over a longer time period
- check the atmospheres of all types of process furnaces
- maintain stationary motors such as modular cogeneration stations
- check gas pressures and gas velocities in flue gas and/or fresh air ducts.

The TESTO 350 analyzer unit is designed to control flue gases and can measure O2 (factory setting) and the concentration of the following gases: CO, COlow, NO, NOlow, NO2, SO2, H2S, CH, CO2 (by a separate IR sensor or by calculation) , Calculation of NOX, as well as the flow rate of off-gas (using Pitot tubes), EFFICIENCY, thrust / pressure, built-in differential pressure measurement, trigger input, USB output, probe connection terminals for temperature measurement (K-type NiCr-Ni and type S Pt10Rh-Pt).

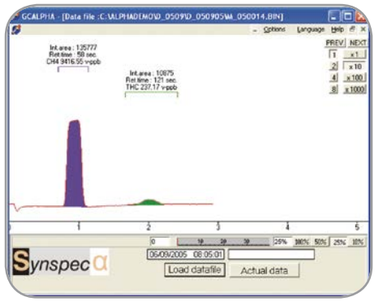
The TESTO 350 control unit is designed to control the measuring system and display measurement data. The unit can be removed from the analyzer unit and retrofitted with a lithium-ion battery. All settings are made using the arrow buttons. The measurement results are displayed on a color graphic display. Due to the built-in memory, the measurement data can be transferred from the analyzer block to the control unit. If necessary, with the help of one control unit, it is possible to control several analyzer units with an optimal level of convenience.

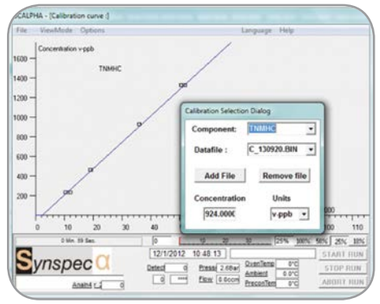
- The possibility to control the analyzer unit and transmit measurement data even in cases where control is performed from a distant point from the chimney, which is especially useful for measurements, for example, on industrial burners.
- The possibility of transferring measurement data from the analyzer unit to the control unit allows to remove the control unit from the analyzer block and transfer it to another location in order to analyze the received data, while the analyzer unit remains in the same place to continue the measurements.

In order to protect the display of the Testo 350 control unit from damage during long-term measurements or during the transport of the analyzer from one object to another, the control unit can be mounted face down in the analyzer unit.

The Synspec ALPHA M/TNMHC analyser 114 / 115 / 116 is built for the analysis of methane and the sum of all other hydrocarbons in air (TNMHC).

Total non-Methane Hydrocarbons (TNMHC) have already been measured for a long time in many countries. Synspec designed three analyzers for this: the Alpha 114 for background monitoring, the Alpha 115 for standard ambient monitoring and the Alpha 116 for emission monitoring.
In view of the growing interest in ozone precursors the sum of hydrocarbons is also important. In many areas in the world monitoring of hydrocarbons is just beginning. There are many different compounds in the TNMHC value and the relation between them is unknown and different in diverse areas. Especially in areas where many oxygenated hydrocarbons are found the value of TNMHC measurement is useful. To have a general overview of all hydrocarbons from C2 to C10 the Synspec Alpha 115 is the instrument of choice.
Methane originates from the following sources: natural gas, modern farming methods and bacterial soil activity. Methane generation is depending on temperature, humidity and compost activity. At waste deposits the emission of methane often has to be monitored.

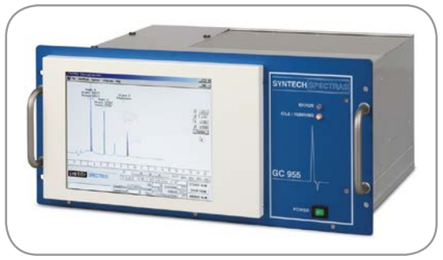




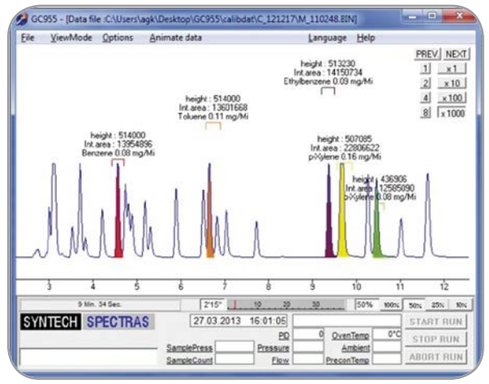
Specifications:

General	SERIES 115, cycle time 3 minutes,
Detector	FID detector. Lower detection limit for methane 0.1ppm, TNMHC - 100 ppb
Range	For methane 0.1 - 10ppm, can be configured up to 100ppm For TNMHC 0.05 - 20ppm
Repeatability	nominal < 1%
Consumption of gas	air: dry, clean, 250ml/min, 2,5bar Hydrogen: quality 5.0, 3,5 bar, 20 ml/min
Dimensions	19" rack, 3 standard Height Units, depth 39 cm
Power demand	220 V AC, 200 VA (110 V AC available)
Included hardware	Computer Pentium class, harddisk >40Gb, 6" full colour LCD, PS2 keyboard/mouse
Included software	WindowsXPe for controlling the device: direct monitoring by keyboard and mouse, or from a remote head PC (RS232 / Ethernet LAN / modem), it is possible to create protocols for data exchange; Set of programs for gas chromatography Synspec

Analyzer of benzene and aromatic hydrocarbons Synspec GC955 model 601



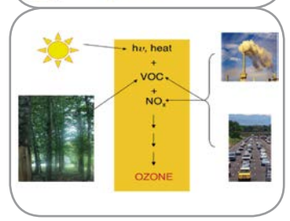
Purpose:
Monitoring of benzene, toluene, ethylbenzene, xylenes (BTEX) and other hydrocarbons in ambient air.
Gas chromatographs Syntech Spectras GC955 series 600 are designed for qualitative and quantitative analysis of organic and inorganic mixtures of substances.
The field of application is chemical, petrochemical, food, pharmaceutical and other industries.
The principle of operation of chromatographs is based on the separation of mixtures of substances and their subsequent detection. Chromatographs are completed with the following types of detectors: a flame ionization detector (FID), a photo-ionization detector (PID).
Chromatographs can simultaneously work with two types of detectors. In operation, both packed and capillary columns can be used. Sampling is carried out using a membrane pump, the sample enters a gas chromatography column, where it is separated. Chromatographs provide preliminary concentration of a sample of gas, carried out with the help of an indirect piston system. The process of separation of the gas mixture is carried out in a separating column consisting of two parts: a cleaning column and an analytical shaft. The compounds that have passed through the cleaning column pass through the analytical shaft to the sensor, the joints that have been separated in the cleaning column are further separated in the analytical shaft. In order to separate hydrocarbons with boiling points below 20 ° C, the preconcentration tube is cooled to minus 5 ° C (for Syntech Spectras GC955 series 800 chromatographs).
The GC 955 chromatograph software fully automates the performance of chromatographic analysis: setting and monitoring of performance parameters, recording of output signals, processing of measurement results.



Specifications:

General	SERIES 600, cycle time 15 minutes, Programmable temperature 50 – 70°C
Detector	FID-detector. Lower detection limit for Benzene 0.1 µg / m³ (0.03vppb). Upper limit: 300 ppb
Repeatability	nominal < 3% at 1ppb (For benzene, capillary column)
Consumption of gas	air: no Nitrogen: quality 5.0, 4 bar, 6 ml / min
Dimensions	19" rack, 5 standard Height Units, depth 39 cm
Power demand	220V, 50Hz, 100VA (110 V AC available)
Included hardware	Pentium III class computer, hard disk capacity> 40 Gb 2.5 "form factor, full-color 10" LCD display, I / O ports 4 x RS232, 2 x USB, Ethernet, PS2 keyboard / mouse
Included software	WindowsXPe for controlling the device: direct monitoring by keyboard and mouse, or from a remote head PC (RS232 / Ethernet LAN / modem), it is possible to create protocols for data exchange; Set of programs for gas chromatography Synspec

Ozone precursor analyzer Synspec GC955 models 611 and 811



Why measure measure ozone precursors?
Ozone is among the most reactive substances in ambient air. In the stratosphere it has a protecting function as it will filter the strongest sun radiation. In the troposphere, the lowest layer of the air, it can be harmful for humans, agriculture and in nature.
Ozone is formed naturally, but also by a reaction of nitrogen oxides and hydrocarbons in certain atmospheric conditions. The reaction is faster under strong sun radiation, high temperature and high humidity. The products of these reactions are photochemical smog, containing not only ozone, but also very toxic hydrocarbons and fine dust particles. Ozone is a clear indicator of this process.
Depending on the climate the formation will also occur with low concentrations of nitrogen oxides. The hydrocarbon concentration is then the limiting factor in the ozone formation. As different hydrocarbons have a different reactivity in the ozone formation it is useful to measure the individual concentrations.

Specifications:
The system 611 is a gas chromatograph with a built-in preconcentration system. Hydrocarbons are pre-concentrated on Tenax GR, desorbed thermally and separated on an DB1 equivalent column, to reach optimal separation from interfering hydrocarbons. Analysis is done by a photo ionization detector. This ensures high sensitivity and good identification.
The system 811 is a gas chromatograph with a built-in cooled preconcentration system. Hydrocarbons are preconcentrated on Carbosieves SIII at 5 °C, desorbed thermally and separated on a combination of two columns, a capillary film column and a capillary PLOT column. In this way the low boiling hydrocarbons can be separated. Analysis is done by a photo ionization detector and a flame ionization detector. This ensures high sensitivity and good identification.

	611 OZONE PRECURSORS FRACTION C6-C10	811 OZONE PRECURSORS FRACTION C2-C5
General	SERIES 600, cycle time 30 min, temp program 20 - 90 °C	SERIES 800, cycle time 30 Min, temp program 50 - 100 °C
Detector	PID detector. Lower detection level for benzene 0.4 µg/m³ (0.15 vppb). Range: up to 300 ppb..	PID and FID detector. Lower detection level for butene 0.4 µg/m³ . Range: up to 300 ppb.
Reproducibility	typical <3% патри 1ppb (benzene, with capillary column)	typical <3% at 1ppb (1,3-butadiene, with capillary column)
Consumption of gas	Nitrogen: quality 5.0, 4 bar, 25 ml/min	Instrument air: dry and clean, 3 bar, 2 x 250 ml/min Nitrogen: quality 5.0, 4 bar, 25 ml/min Hydrogen: quality 5.0, 3 bar, 20 ml/min
Dimensions	19" rack, 5 standard Height Units, depth 39 cm net	19" rack, 5 standard Height Units, depth 39 cm net
Power demand	220 V AC, 200 VA (110 V AC available)	220 V AC, 200 VA (110 V AC available)
Included hardware	Computer Pentium III class, hard disk ≥40Gb, 2.5", display LCD 10.4 " colour, various data connection options	In an 611/811 combination, shares the computer of the 611. Can be provided with its own computer
Included software	WindowsXPe for controlling the device: direct monitoring by keyboard and mouse, or from a remote head PC (RS232 / Ethernet LAN / modem), it is possible to create protocols for data exchange; Set of programs for gas chromatography Synspec	
Extra equipment needed	For the application 811 Permapure dryer, included in the system, needing 250 ml/min dry zero air For the application 611 no extra	
Instrument gases	Nitrogen best provided from a bottle, optional from generator. Hydrogen and zero air: from a generator, optional from bottles.	

Ozone precursor analyzer Synspec GC955 models 615 and 815

Toxic hydrocarbons can enter the atmosphere as part of the emissions of industrial enterprises for the production of polymers, drugs, oil refining, etc. This analyzer is designed to measure the content of hydrocarbons that have toxic and / or carcinogenic properties, as well as those involved in the formation of ozone.
System 615 is a gas chromatograph with an integrated sample pre-concentration system. The hydrocarbons are concentrated on a Tenax GR carrier, thermally desorbed and separated on a DB1 column, thus achieving optimum separation of the interfering hydrocarbons. For detection, flame ionization and photo-ionization detectors are used.
The system 815 is a gas chromatograph with a built-in cooled preconcentration system. Hydrocarbons at 5 ° C are concentrated on a Carbosieves SIII carrier, thermally desorbed and separated on a system consisting of two columns: with a pellicular and a surface porous (PLOT) sorbent, which makes it possible to separate low boiling hydrocarbons. For detection, flame ionization and photo-ionization detectors are used.
The basic set for toxic hydrocarbon measurements Synspec 615 offers a list of hydrocarbons, for which the system is configured by default. However, some toxic hydrocarbons have low boiling points and can not be determined in cases where the GC 615 system alone is used. This problem can be solved by using the 615/815 combined system.

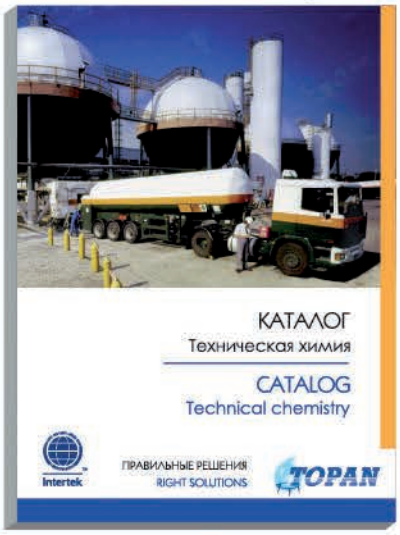
Specifications:

	Model 615 (Toxic hydrocarbons with a boiling point of 50 ... 250 ° C)	Model 815 (Toxic hydrocarbons with a boiling point of -70 ... 80 ° C)
General	SERIES 600, cycle time 30 min, programmable temperature 50 – 100°C	SERIES 800, cycle time 30 min, programmable temerature 50 – 100°C
Detector	PID, FID. Lowest detection level for benzene 0.4 µg/m^3 (0.15 vppb). Range: up to 300 ppb..	PID and FID detector. Lowest detection level for butene 0.4 µg/m^3, for other hydrocarbons 0,4-1 µg/m^3. Range: up to 300 ppb.
Reproducibility	typical <3% at 1ppb (benzene, with capillary column)	typical <3% at 1ppb (1,3-butadiene, with capillary column)
Consumption of gas	Working air: dry and clean, 3 bar, 2 x 250 ml / min Nitrogen: quality 5.0, 4 bar, 25 ml / min Hydrogen: quality 5.0, 3 bar, 20 ml / min	Working air: dry and clean, 3 bar, 2 x 250 ml / min Nitrogen: quality 5.0, 4 bar, 25 ml / min Hydrogen: quality 5.0, 3 bar, 20 ml / min
Dimensions	19" rack, 10 standard Height Units, depth 39 cm net	19" rack, 10 standard Height Units, depth 39 cm net
Power demand	220V, 50Hz, 300VA(110 V AC available)	220V, 50Hz, 300VA(110 V AC available)
Included hardware	Pentium III class computer, hard disk capacity> 40 Gb 2.5 "form factor, full-color 10" LCD display, I / O ports 4 x RS232, 2 x USB, Ethernet, PS2 keyboard / mouse	The 615/815 kit uses a computer for 615 computers. It can be equipped with a separate computer
Included software	WindowsXPe for controlling the device: direct monitoring by keyboard and mouse, or from a remote head PC (RS232 / Ethernet LAN / modem), it is possible to create protocols for data exchange; Set of programs for gas chromatography Synspec	
Extra equipment needed	The 815 module includes a module for drying gases No additional hardware is required for the 611 system	
Instrument gases	Nitrogen best provided from a bottle, optional from generator. Hydrogen and zero air: from a generator, optional from bottles.	

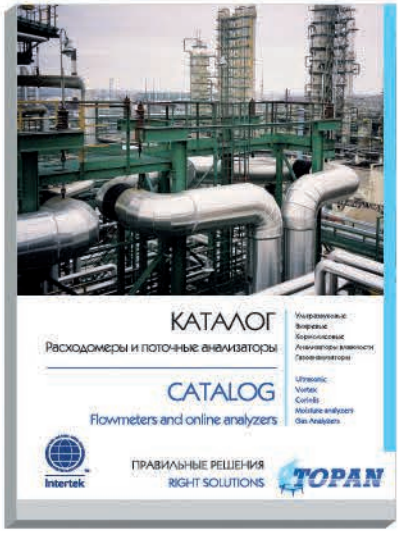
Laboratory ware and accessories

Laboratory chemicals

Technical chemistry



Flowmeters and on-line analyzers



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