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Since 1989 OPTEC JSC has been developing and manufacturing high-quality and cost-effective analytical equipment. Located in St. Petersburg, Russia,our company offers a comprehensive range of instruments for numerous application fields,such us ambient air quality monitoring,occupational safety, industrial processes control,research. Our product portfolio includes portable or fixed, mono-or- multi channeled gas analyzers, air monitoring stations, combusting processes controllers,sampling pumps,sampling probes,calibration gas generators, Raman spectrometers,data loggers and software packages.

Being focused on demanding requirements in terms of accuracy and reliability,we implements only advanced technologies. Most of our devices are compatible and can be integrated into a sophisticated multi-component air analysis network.

We provide customers with onsite preventative maintenance and repair services ensuring years of dependable performance.

All measuring systems have approvals and certificates in Russian Federation, Kazakhstan, Belorussia and China. Some of our products are awarded by the Government of Russia and Federal Agency on Technical Regulation and Metrology.

For getting more information about our products please contact us by support live chat,email info@optec.ru or call +7 (812) 325-55-67

Chelibanov V. P., Zykova I. A.
«Analytical instruments for ecology, industry and scientific research.
Catalog 2019.» - Saint- Petersburg

The publication describes the products of OPTEC JSC.

Chelibanov V. P.,Zykova I. A.

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ОПТЭК®
ПРИБОРЫ ДЛЯ НАУЧНЫХ ИССЛЕДОВАНИЙ

SINGLE-COMPONENT AND MULTI-COMPONENT GAS ANALYZERS FOR CONTROL OF AIR OF THE WORKING ZONE

Section I

www.optec.ru

OZONE ANALYZER 3.02 P-R

SPECIFICATIONS

Range	0 – 0,25 ppm 0 – 0,5 mg/m³
Inaccuracy	± 20%
Display resolution	0,001 mg/m³
Zero drift	< 1 ppb for 30 days
Calibration drift	< 5% for month
Response time	within 60 s
Sensor life expectancy	1 year
Output signal:	0-5 (4-20) mA RS-232
Dimensions	270x390x145 mm
Weight	6 kg
Power supply	230V, 50 Hz
Power consumption	50 W
Sampling gas flow	1,8±0,2 l/min

OPERATION CONDITIONS

Temperature	+10...+35 °C
Atmospheric pressure	630–800 mm Hg.
Humidity	< 95%
Volume Flow	1,8 ± 0,2 l/min

OPERATIONAL PRINCIPLE

Chemiluminescent

DESCRIPTION

3.02P-R is a detector of ozone levels in non-hazardous area. The device incorporates high accu-racy results and easy operation.

APPLICATION

Occupational safety

Indoor air quality monitoring

FEATURES

Built-in sample pump

Continuous measuring

Automatic recalibration and sensor diagnostics

Low power consumption

Adjustable visual/audible alarm.

Digital display, analog output.

Relay for external equipment control

Internal data storage

Compact and lightweight

Table 1

Model	Component	Range	Inaccuracies		
			Absolute inaccuracy Δ, mg/m³	Reduced inaccuracy (FS) γ, %	Relative inaccuracy δ, %
MGL–19.1A	CO	0–200 mg/m³	±(2+0,1C_x)	–	–
MGL–19.2A	H_2S	0–10 mg/m³	–	±25	–
		10–100 mg/m³		–	±25
MGL–19.3A	SO_2	0–10 mg/m³	–	±25	–
		10–100 mg/m³		–	±25
MGL–19.4A	NO	0–3 mg/m³	–	±25	–
		3–30 mg/m³		–	±25
MGL–19.5A	NO_2	0–2 mg/m³	–	±25	–
		2–20 mg/m³		–	±25
MGL–19.6A	Cl_2	0–1 mg/m³	–	±25	–
		1–10 mg/m³		–	±25
MGL–19.7A	NH_3	0–100 mg/m³	±(2+0,15C_x)	–	–
MGL–19.8A	O_2	0–25%	–	±2,5	–

Table 1.1

Model	Component	Range	Inaccuracies		
			Absolute inaccuracy Δ, mg/m³	Reduced inaccuracy (FS) γ, %	Relative inaccuracy δ, %
MGL–20A	HCN	0–0,3 mg/m³	–	±25	–
		0,3–3,0 mg/m³		–	±25

PORTABLE HYDROGEN CYANIDE (HCN) ANALYZER MGL-20A

SPECIFICATION

Measuring range	0–3,0 mg/m³
Display scale resolution	0,01 mg/m³
Relative inaccuracy	±25% 0 – 0,3 mg/m³
Reduced inaccuracy	±25% 0,3 – 3,0 mg/m³
Response time	within 5 min
Sensor life expectancy	3,5 years
Power supply	Rechargeable battery (360 hour runtime)
Dimensions	120×60×28 mm
Weight	0,3 kg

OPERATING CONDITIONS

Temperature	+5…+40°C
Atmospheric pressure	630–800 mm Hg
Humidity	< 95%

For minimizing of cross-sensitivity sample gas should correspond to the

OPERATIONAL PRINCIPLE

Electrochemical

concentrations specified in table 2.

DESCRIPTION

Portable HCN analyzer MGL-20A is specially designed for providing safety in extremely toxic HCN contained environments. The device is delivered in a protective case.

APPLICATION

Personal safety
Gold mining

DESCRIPTION

Gaseous diffusion
Digital display shows real-time gas concentrations.
Long-life electrochemical sensor
Adjustable alarm setpoints with audible and visual indicators.
Easy maintenance
Lightweight

OPTIONAL

External sample pump “ABP–04–2”

Long life battery – for 15 days continuous operation

Table 2. Environmental contaminants

Model	Concentration, mg/m³								
	Dust	CO	H_2S	SO_2	NO	NO_2	Cl_2	NH_3	O_2,%
MGL-20A	40	20	10	10	3,0	0,01	1,0	20	22

SPECIFICATIONS

Models	See table 3
Display scale resolution	1,0 mg/м³ (MGL–19.1A,19.2A,19.3A, 19.7A), 0,1 mg/m³ (MGL–19.4A,19.5A, 19.6A) 0,1 % vol.for MGL–19.8A
Response time	within 3 min.
Sensor life expectancy	3,5 years (1,5 year for MGL–19.8A)
Power supply	Rechargeable battery (360 hours runtime)
Dimensions	120×60×48 mm
Weight	0,3 kg

OPERATION CONDITIONS

Temperature	+5...+40°C
Atmospheric Pressure	630 – 800 mm Hg
Humidity	< 95%

For minimizing of cross-sensitivity sample gas should correspond to the concentrations specified in table 3.

OPERATIONAL PRINCIPLE

Electrochemical

APPLICATION

Personal safety

DESCRIPTION

Single-component portable analyzers MGL–19A series indicate CO, H_2S, SO_2, NO, NO_2, Cl_2, NH_3, O_2 concentrations.

FUNCTIONAL FEATURES

Digital display shows real-time gas concentrations.
Extended sensor life
Adjustable alarm setpoints with audible and visual indicators.
Easy maintenance.
Long life battery – for 15 days continuous operation.

OPTIONAL

External sample pump “ABP–04–2”

Table 3

Model	Concentration, mg/m³								
	Dust	CO	H_2S	SO_2	NO	NO_2	Cl_2	NH_3	O_2, %
MGL-19.1A	40	–	10	10	3,0	2,0	1,0	20	25
MGL-19.2A	40	20	–	10	3,0	2,0	1,0	20	25
MGL-19.3A	40	20	10	–	3,0	1,0	1,0	20	25
MGL-19.4A	40	20	1,0	10	–	2,0	1,0	20	25
MGL-19.5A	40	20	1,0	10	3,0	–	0,2	20	25
MGL-19.6A	40	20	2,5	10	3,0	0,08	–	20	25
MGL-19.7A	40	20	5,0	5,0	3,0	2,0	1,0	–	25
MGL-19.8A	40	200	10	100	30	20	10	200	–

SPECIFICATIONS

Measuring range	0 - 3,0 mg/m³
Power supply	~230 V, 50 Hz (24V optional)
Output Signal	0-5 or 4-20 mA
Alarm set points	Low and high alarm (factory calibrated)
Sensor life expectancy	3,5 years
Enclosure material	Plastic MGL- 20M Metallic MGL- 20Mm
Dimensions	210×145×80 mm 195×155×80 mm
Weight	0,7 kg MGL- 20M 1,3 kg MGL- 20Mm

OPERATIONAL CONDITIONS

Temperature	−20...+40 °C +5...+40 °C
Pressure	630 – 800 mm. Hg
Humidity	Up to 98%

For minimizing of cross-sensitivity analyzed environment should correspond to the concentrations specified in table 4

DESCRIPTION

MGL-20M is a compact single-channel alarm analyzer for exact measurements HCN concentration and immediate warning if the level is increased.

APPLICATION

industrial safety
Gold mining

OPERATIONAL PRINCIPLE

Electrochemical

FUNCTIONAL FEATURES

Gaseous diffusion
Continuous monitoring
Long-life electrochemical sensor
Covers up to 200 m² area.
Two relays for external equipment control
Visual two-stage alarm, manual override
Quick and easy wall mounting

OPTIONAL

External sample pump “ABP- 01” can be included by additional request

Table 4

Model	Concentration, mg/m³								
	Dust	CO	H_2S	SO_2	NO	NO_2	Cl_2	NH_3	O_2, %
MGL-20M	40	20	10	10	3,0	0,01	1,0	20	22

SPECIFICATIONS

Model, components, ranges and errors	See table 6
Power supply (BOI)	~230 V, 50 Hz
Power supply (BPP)	From BOI via twisted-pair cable
Sensor life expectancy	3,5 years (1,5 years for MGL-19M-8)
Response time	Within 60 s
Output Signal	4-20 mA (BIO) RS-232 (BOI)
Display scale resolu-tion, (BOI)	0-0,5 mA (BPP) 4-20 mA (BPP)
Display scale resolu-tion, (BOI)	1mg/m³(CO, H_2S, SO_2) 0,1mg/m³(NO, NO_2, Cl_2)
Display scale resolu-tion, (BOI)	0,1% (O_2)
Dimensions (BOI)	270×390×145 mm
Dimensions (BPP)	210×145×80 mm (XP) 195×155×80 mm (XPm)
Weight (BOI)	4 kg
Weight (BPP)	0,7 kg MGL-19M-XP 1,3 kg MGL-19M-XPm
Connecting channels	Up to 8

OPERATING CONDITIONS

Temperature	+5...+40 °C
Pressure	630 – 800 mm Hg.
Humidity	< 98%

DESCRIPTION

Modular analyzer MGL-19M allows to measure concentrations of main air pollutants as CO, H_2S, SO_2, NO, NO_2 Cl_2, O_2. The analyzer contains system controller (BOI) and up to 8 various re-mote module units MGL-19M-XP (BPP).

APPLICATIONS

Indoor air quality monitoring
Occupational safety
Industrial hygiene and safety

OPERATIONAL PRINCIPLE

Elecrochemical

FEATURES

Flexibility with type and number of units
Continuous monitoring up to 8 components simul-taneously
Up to 300 m distance between module units and system controller
Adjustable visual and audible alarm, manual over-ride.
Connections for external equi pment control
Quick and easy to install and relocate

OPTIONAL

External sample pump “ABP-01”

For minimizing of cross-sensitivity sample gas should correspond to the concentrations specified in table 5.

Table 5

Model	Component	Range	Inaccuracies		
			Absolute inaccuracy Δ, mg/m³	**Reduced inaccuracy (FS)** γ, %	**Relative inaccuracy** δ, %
MGL– 19M–1	CO	0–20 mg/m3 20–200 mg/m³		+25 –	– +25
MGL– 19M–2	H_2S	0–10 mg/m³		±25	–
		10–100 mg/m³		–	±25
MGL–19M–3	SO_2	0–10 mg/m³		±25	–
		10–100 mg/m³		–	±25
MGL– 19M–4	NO	0–3 mg/m³		±25	–
		3–30 mg/m³		–	±25
MGL–19M–5	NO_2	0–2 mg/m³		±25	–
		2–20 mg/m³		–	±25
MGL–19M–6	Cl_2	0–1 mg/m³		±25	–
		1–10 mg/m³		–	±25
MGL–19M–8	O_2	0–25%		±2,5	–
MGL–20M	HCN	0-0,3 mg/m³ 0,3-3,0 mg/m³		-	±25

SPECIFICATIONS

Models and components	See Table 7
Measuring ranges and errors	See Table 8
Power supply	230 V, 50 Hz - 12 V - Rechargeable battery
Sample flow rate	1,0 ± 0,5 l/min
Sensor life expectancy	3,5 years
Display resolution	See Table 6
Output signal	RS-232
Dimensions	235x390x112 mm
Weight	6 kg

OPERATION CONDITIONS

Temperature	+10...+40 °C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 98%

DESCRIPTION

Portable multicomponent analyzer KASKAD-N for short term determination of CO, NO, NO_2, SO_2, H_2S concentrations in non-hazardous area.

APPLICATION

Indoor air quality monitoring
Industrial hazard gases inspection

OPERATIONAL PRINCIPLES

Electrochemical

FEATURES

Built-in sample pump
Simultaneous multicomponent analysis
High selectivity
Reducing cross-sensitivity effect software
Data storage
Compact and light-weight
Long life battery – for 8 hours continuous operation

Table 6

Display scale resolution, mg/m³

H_2S	SO_2	NO	NO_2	CO
1	1	0,1	0,1	1

Table 7

Model	Concentrations , mg/m³				
	H_2S	SO_2	NO	NO_2	CO
KASKAD-N 31.1	0–100			0–20	0–200
KASKAD-N 31.2	0–100		0–30		0–200
KASKAD-N 31.3	0–100		0–30	0–20	
KASKAD-N 31.4			0–30	0–20	0–200
KASKAD-N 41.1	0–100		0–30	0–20	0–200
KASKAD-N 41.2		0–100	0–30	0–20	0–200

Table 8

Characteristics of gas analyzers	KASKAD-N 31.X KASKAD-N 41.X

Components	Upper range Lower range	Inaccuracies	
		absolute Δ , mg/m³	relative δ, %
H_2S	0–10 mg/m³	±2,5	—
	10–100 mg/m³	—	±25
SO_2	0–10 mg/m³	±2,5	—
	10–100 mg/m³	—	±25
NO	0–3 mg/m³	±0,75	—
	3–30 mg/m³	—	±25
NO_2	0–2 mg/m³	±0,5	—
	2–20 mg/m³	—	±25
CO	0–20 mg/m³	±4	—
	20–200 mg/m³	—	±20

ОПТЭК®
ПРИБОРЫ ДЛЯ НАУЧНЫХ ИССЛЕДОВАНИЙ

AIR CONTROL DEVICES IN RESIDENTIAL AND SANITARY-PROTECTION ZONES

Section II

www.optec.ru

C – 310A SULFUR DIOXIDE ANALYZER

SPECIFICATIONS

Measuring ranges,	0-2 mg/m³
Measurement unit	ppm or mg/m³
Display scale resolution	0,001 mg/m³
Zero drift	<1 ppb for 30 days
Calibration drift	< 3% for 30 days
Linearity inaccuracy	2% of full scale
Warm-up time	24 hours
Response time	3 min
Data outputs	0 – 5 (4 – 20) mA,
Interface	RS-232, RS-485 (Modbus)
Power supply	220V, 50Hz
Power Consumption	60 W
Dimensionstion	482x435x132 mm
Weight	10 kg
Sampling gas flow	1,0 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+10…+35 °C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Non-condensing, < 98%

DESCRIPTION

C-310A gas analyzer is designated for measuring sulfur dioxide low concentrations.

APPLICATION

Urban air monitoring, ambient air monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Chemiluminescence

FEATURES

Built-in sample pump
Continuous monitoring
Automatic self-calibration and sensor diagnostics
Internal data storage
Selectable averaging period
19XX rack mounting
Low power consumption

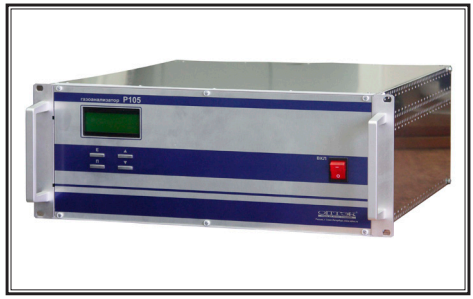
ADDITIONAL

ABP-07 battery module to provide internal gas line purging during a power failure

SPARE PARTS

Fluoroplastic hose
Air Filters

P-105 NITROGEN OXIDE AND DIOXIDE ANALYZER



SPECIFICATIONS

Measuring ranges,	NO, NO_2 0 – 4,0 mg/m³
Display scale resolution	0,0001 mg/m³
Measurement units	mg/m³ , ppm (selectable)
Warm-up time	60 min
Response time	< 30 sec
Data outputs	0 – 20 (4 – 20) mA
Interface	RS-232, RS-485 (Modbus)
Dimensionstion	580×485×178 mm
Power Consumption	250 W
Weight	9 kg
Power supply	220V, 50Hz
Sample flow rate	0,6 ± 0,2 l/min.

OPERATING CONDITIONS

Ambient temperature	+5...+40°C
Atmospheric pressure	630 - 800 mm Hg
Relative humidity	Non-condensing, < 95%

DESCRIPTION

The dual-channel analyzer P-105 operates according to the referent detection principle. The instrument is able to detect even the faintest amount of nitrogen oxide/dioxide in the atmosphere.

APPLICATION

Urban air monitoring
Mobile air quality monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Gaseous chemiluminescence
(referent principle)

FEATURES

Built-in sample pump
Continuous monitoring
High sensitivity and selectivity
Internal data storage
Selectable averaging period
Rack mounting
Minimum maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

P-205 NITROGEN OXIDE AND DIOXIDE ANALYZER

SPECIFICATIONS

Measuring ranges,	NO, NO_2 0 – 2,0 mg/m³
Measurement unit	ppm or mg/m³
Display scale resolution	mg/m³ , ppm (selectable)
Warm-up time	60 min
Response time	40 sec
Data outputs	0 – 20 (4 – 20) mA
Interface	RS-232/RS-485 (Modbus)
Power supply	220V, 50Hz
Power Consumption	400 W 50W
Dimensionstion	Converter: 580×485×132 mm Measuring unit : 580×485×178 mm
Weight	Converter:9 kg Measuring unit:12 kg
Sample flow rate	1,0 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+5...+40 °C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Non-condensing, < 95%

DESCRIPTION

Gas analyzer P-205 is designed to measure the mass concentrations of NO/NO_2. The device is delivered in two parts: converter and measuring unit.

APPLICATION

Roadside air monitoring
Urban air monitoring,
Mobile air quality monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Absorption in ultraviolet

FEATURES

Built-in sample pump
Continuous monitoring
High sensitivity and selectivity
Internal data storage
Selectable averaging period
Rack mounting
Minimum maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

H-105 AMMONIA, NITROGEN OXIDE AND DIOXIDE ANALYZER

SPECIFICATIONS

Components and measuring ranges	NO, NO_2: 0 – 4,0 mg/m³ NH_3 :0 – 2,0 mg/m³
Display scale resolution	0,0001 mg/m³
Measurement units	mg/m³ , ppm (selectable)
Warm-up time	60 min
Response time	40 sec
Data outputs	0 – 20 (4 – 20) mA
Interface	RS-232, RS-485 (Modbus)
Power supply	220V, 50Hz
Power Consumption	500W
Dimensionstion	Converter: 580×485×132 mm Measuring unit : 580×485×178 mm
Weight	22 kg
Sample flow rate	0,7 ± 0,3 l/min

OPERATING CONDITIONS

Temperature	+5...+40 °C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Non-condensing, < 95%

DESCRIPTION

Ultrasensitive gas-analyzer H-105 is based on the referent measuring principle for reliable measurements of ammonia and nitrogen oxide/dioxide. The device is delivered in two parts: converter and measuring unit.

APPLICATION

Urban air monitoring, Mobile air quality monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Gaseous chemiluminescence
(referent method)

FEATURES

Built-in sample pump
Continuous monitoring
High sensitivity and selectivity
Automatic self-calibration and diagnostics
Internal data storage
Selectable averaging period
Rack mounting
Minimum maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

SPECIFICATIONS

Measuring ranges (mg/m³) NH_3,NO,NO_2	0 – 1 mg/m³
Display scale resolution	0,001 mg/m³
Zero drift	<1 ppb for 30 days
Calibration drift	< 3% for 30 days
Linearity inaccuracy	< 2% of full scale
Warm-up time	24 hours
Output data	0 – 5 (4 – 20) mA
Interface	RS-232, RS-485 (Modbus)
Power consumption:	H-320/H-320A
measuring unit	50 W/70 W
converter	400 W/800 W
Power supply	220V, 50Hz
Dimensions:	482x435x132 mm
measuring unit	482x460x132 mm/ 482x570x132 mm
converter	482x420x132 mm/ 482x570x132 mm
Weight (2 blocks)	H-320/H-320A 18 kg/20 kg

OPERATING CONDITIONS

Temperature	+10 ...+35°C
Atmospheric pressure	630 - 800 mm Hg
Humidity	up to 95 %

DESCRIPTION

H-320-series analyzers are competitive instru-ments for low-levels NH_3, NO and NO_2
Model H-320 for NH_3
Model H-320A for NH_3, NO, NO_2
Each device is delivered in two parts: converter and measuring unit

APPLICATION

Ambient air monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Chemiluminescence

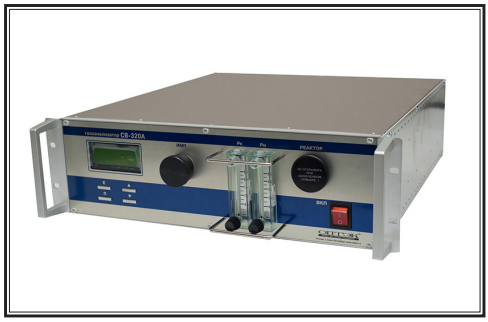
FEATURES

Built-in sample pump
Continuous monitoring
Automatic self-calibration and sensor diagnos-tics
Internal data storage
Selectable averaging period
Rack mounting

ADDITIONAL

ABP-07 battery module for providing internal gas line purging during a power failure
Fruoroplastic hose
Spare filter elements

CB-320-A1 SULFUR DIOXIDE AND HYDROGEN SULPHIDE ANALYZER



SPECIFICATIONS

Components and measuring ranges	SO_2 0 – 2,0 mg/m³ H_2S 0 – 0,2 mg/m³
Display scale resolution	0,001 – SO_2 channel 0,0001 – H_2S channel
Measurement unit	ppm or mg/m³
Zero drift	<1 ppb for 30 days
Calibration drift	< 3% for 30 days
Linearity inaccuracy	< 2% of full scale
Warm-up time	12 hours
Response time	5 min
Data outputs	4 – 20 mA or 0 – 5 mA
Interface	RS-232, RS-485 (Modbus)
Power supply	220 V, 50 Hz
Power Consumption	350 W
Dimensions	482x610x145 mm
Weight	12 kg
Sample flow rate	0,9 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+10 ...+35°C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Non-condensing, < 98%

DESCRIPTION

Single or dual channel analyzer for precise low H_2S and SO_2 concentration detection. The in-strument is available in two modifications:

CB-320-A1-H_2S is a single channel H_2S ana-lyzer

CB-320-A1-H_2S, SO_2 is a dual channel $SO_2$and H2S analyzer.

APPLICATION

Urban air monitoring
Gas monitoring systems, ambient air monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Chemiluminescence

FEATURES

Built-in sample pump
Continuous monitoring
Simultaneous H2S and SO2 detection
Automatic self-calibration and sensor diagnostics
Internal data storage
Selectable averaging period
19XX rack mounting

ADDITIONAL

ABP-07 battery to provide internal gas line purging during a power failure

SPARE PARTS

Fluoroplastic hose
Air Filters

Analyzed gas probe should correspond to the concentrations specified in the table:

Cl_2 less than 0.1 mg/m^3	NO less than 0.5 mg/m^3
NO_2 less than 0.5 mg/m^3	NH_3 less than 1.0 mg/m^3
O_3 less than 0.2 mg/m^3	SO_2 less than 2.0 mg/m^3 (for H_2S channel)
CO less than 20.0 mg/m^3	H_2S less than 0.2 mg/m^3 (for SO_2 channel)
Organic sulfur compounds less than 0.05 mg/m^3	Atmospheric dust less than 5 mg/m^3

3.02 P-A OZONE ANALYZER

SPECIFICATIONS

Measuring range,	0 – 0,5 mg/m³
Relative inaccuracy	± 20%
Display scale resolution	0,001 mg/m3
Data output	0-5(or 4-20)mA
Interface	RS-232, RS-485 (Modbus)
Zero drift	<1 ppb for 30 days
Calibration drift	< 5% for 30 days
Linearity inaccuracy	< 2% of full scale
Sensor life expectancy	1 year
Dimensions	410x482x132mm
Weight	8 kg
Power supple	220В, 50 Hz
Warm-up time	100 min
Sampling gas flow	1,8 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+10 ...+35°C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Non-condensing, < 98%

DESCRIPTION

3.02P-A is a fixed automatic instrument for continuous ozone detection. The device may be used as a “stand alone” instrument or it can be integrated into a sophisticated multi-component air monitoring network.

APPLICATION

Urban air monitoring
Monitoring stations

OPERATING PRINCIPLE

Chemiluminescence

FEATURES

Built-in sampling pump
Continuous monitoring
Automatic recalibration and sensor diagnostics
Internal data storage
19’’- rack mounting configuration
Internal dust filters

SPARE PARTS

Fluoroplastic hose
Air Filters

F-105 OZONE ANALYZER

SPECIFICATIONS

Measuring range	0 – 10 mg/m³
Display resolution	0,001 mg/m³
Measurement unit	ppm or mg/m³
Accuracy	2 % or 1,5 ppb
Relative inaccuracy	± 7 %
Warm-up time	30 min
Response time	5 min
Data outputs	0 – 5 (4 - 20) mA
Interface	RS-232, RS-485 (Modbus)
Power supply	220 V, 50 Hz
Power Consumption	50 W
Dimensions	482x610x145 mm
Weight	8,2 kg
Sample flow rate	1,0 ± 0,3 l/min

OPERATING CONDITIONS

Temperature	+10 ...+35°C
Atmospheric pressure	630 - 800 mm Hg
Humidity	Up to 95%

DESCRIPTION

F-105 is a gas analyzer for measuring low and medium ozone levels, providing immediately ac-curate and reliable results. The device may be used as a “stand alone” instrument or it can be integrated into a sophisticated multi-component air monitoring network.

APPLICATION

Urban air monitoring, mobile air quality monitoring stations
Occupational safety
Industrial perimeter air quality monitoring
Process control
Atmospheric research

OPERATING PRINCIPLE

UV absorption

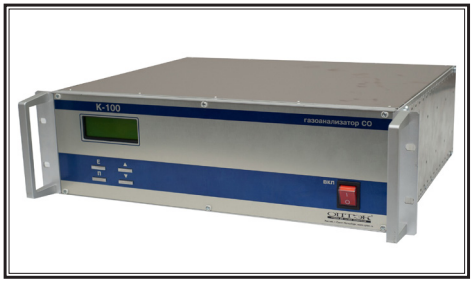
FEATURES

Built-in sample pump
Continuous monitoring
Internal data storage
Selectable averaging period
Rack mounting
Easy maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

K-100 CARBON MONOXIDE ANALYZER



SPECIFICATIONS

Measuring range	0 – 50,0 mg/m³
Digital scale resolution	0,1 mg/m³
Measurement unit	ppm or mg/m³
Sensor life expectancy	3,5 years
Zero drift	0,1 ppm for 30 days
Calibration drift	5% for 30 days
Linearity inaccuracy	2% of full scale
Warm-up time	10 min
Response time	2 min
Data outputs	0 – 5 (4 - 20) mA
Interface	RS-232, RS-485 (Modbus)
Power supply	230 V, 50 Hz
Power Consumption	50 W
Dimensions	482x420x135 mm
Weight	8 kg
Sample flow rate	1,0 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+5 …+40°C
Atmospheric pressure	630 - 800 mm Hg
Humidity	<95% non-condensing

DESCRIPTION

K-100 analyzer is designated to measure low concentrations of carbon monoxide with high precision.

APPLICATION

Ambient air monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research.

OPERATING PRINCIPLE

Electrochemical

FEATURES

Built-in sample pump
Continuous monitoring
Low warm-up time
Internal data storage
Selectable averaging period
Rack mounting
Easy maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

OPTOGAS-500.4C CARBON DIOXIDE ANALYZER

SPECIFICATIONS

Measuring range	0 – 2000 ppm
Absolute inaccuracy 0–300 ppm	±60 ppm
Relative inaccuracy 300–2000 ppm	±20%
Warm-up time	10 min
Response time	3 min
Data outputs	0–5 (4–20) mA RS-232, RS-485
Interface	RS-232, RS-485 (Modbus)
Power supply	220 V, 50 Hz
Power Consumption	25 W
Dimensions	485x450x135 mm
Weight	10 kg
Sample flow rate	1,0 ± 0,2 l/min

OPERATING CONDITIONS

Temperature	+5...+40°C
Atmospheric pressure	84–106,7 kPa
Humidity	Up to 95%

DESCRIPTION

Analyzer is designated for continuous measuring of carbon dioxide.

APPLICATION

Ambient air monitoring stations
Industrial perimeter air quality monitoring
Indoor air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

Non-dispersive infrared (NDIR)

FEATURES

Built-in sample pump
Continuous monitoring
Low warm-up time
Internal data storage
Selectable averaging period
Rack mounting
Easy maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

DESCRIPTION

«OPTOGAS–500» gas analyzers are designated for automatic monitoring of following components:

- **CO, CO_2, NO, O_2** and hydrocarbons in exhaust gases from automotive vehicles with petrol or diesel engines;
- **CO, CO_2, NO, O_2, CH_4,** and temperature in industrial gas emissions;
- **CO_2** in ambient air, and industrial gas mixtures;
- **CO** in industrial gas mixtures.

«OPTOGAS–500» MODIFICATIONS:

- OPTOGAS–500.1C,H,–500.1P,–500.2C,H,–500.6C,H – for automotive exhaust analysis;
- o OPTOGAS–500.3,–500.3(C,H) to measure gas temperature and composition of industrial emis-sions;
- OPTOGAS–500.4; –500.4C for ambient air analysis ;
- o OPTOGAS–500.7(C,H),–500.8(C,H),–500.9 (C,H) for technological gas mixtures control.

«OPTOGAS–500» gas analyzers are automatic instruments with continuous mode of operation in portable or fixed cases. It is executed in one body and delivered with built-in or external sample conditioning system (except. mod «OPTOGAS–500.4»).

THE NUMBER OF MEASURING CHANNELS IS CUSTOMIZED AND DETERMINED BY THE CUSTOMER IN THE ORDER.

OPERATING PRINCIPLE

- NDIR - CO, CO_2, CHx,
- Electrochemical – NO, O_2 NO_2
- Paramagnetic – O_2.

FEATURES

- High selectivity
- Simultaneous continuous operation;
- Data output 0–5 (4–20 mA), RS-232; RS-485
- Low maintenance cost

SPARE PARTS

- Ambient temperature +5°C ... +40°C ;
- Pressure, кPa 84–106,7 (630-800 mm. Hg.);
- Humidity – up to 95 %, 30°C;
- Power voltage ~220 V, 50 Hz (=12V for portable analyzers). Portable analyzers can be delivered with built-in rechargeable battery).

Table 9

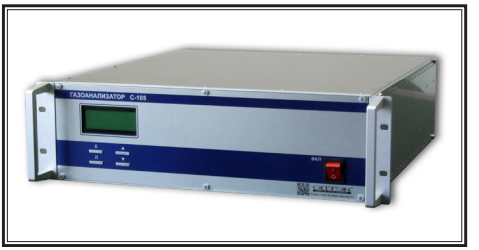
Models	Norms				
	Analyzed component	Measurement Range, ppm (% vol.)	Main inaccuracy limits		
			Absolute, Δ, ppm (% vol.)	Reduced, γ, %	Relative, δ, %
OPTOGAS-500.1C (19''rack mounting) **OPTOGAS-500.1H (wall mounting)** For diesel engines exhaust gases 1 - 6 channels NDIR (CO, CO_2, CH_x) EC (NO, NO_2, O_2)	CO	0 – 10000 vol.%	-	±6	-
	CH_x	0 – 300 ppm 300 – 10 000 ppm	±20 ppm -	- -	- ±6
	CO_2	0 – 16 vol.%	-	±6	-
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol. -	- -	- ±6
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm –	– –	– ±15
	NO	0 – 200 ppm 200 – 5000 ppm	±20 ppm -	- -	- ±10
OPTOGAS-500.1P Portable, for diesel engines exhaust gases NDIR (CO, CO_2, CH_x)	CO	0 – 7500 ppm	-	±5	
	CH_x	0 – 1000 ppm 1000 – 2000 ppm	- -	±5 -	- ±5
	CO_2	0 – 20 vol.%	-	±3.5	-
OPTOGAS-500.2 (C,H) 1 - 6 channels Fixed, rack or wall mounting For petrol engines exhaust gases NDIR (CO, CO_2, CH_x) EC (NO, NO_2, O_2)	CO	0 – 7,0 vol.%	±0.2 % vol.	-	±6
	CH_x	0 – 3000 ppm	±20 ppm	-	±6
	CO_2	0 – 16 vol.%	±1.0 % vol.	-	±6
	O_2	0 – 21 vol.%	±0.2 % vol.	-	±6
	NO	0 – 5000 ppm	±20 ppm	-	±10
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm –	– –	– ±15

Table 10

Models	Norms				
	Analyzed component	Measurement Range, ppm (% vol.)	Main inaccuracy limits		
			Absolute, Δ, ppm (% vol.)	Reduced, γ, %	Relative, δ, %
OPTOGAS-500.3 1 – 6 channels (Temperature channel is obligatory) Portable For industrial emissions monitoring NDIR (CO, CO_2, CH_x) EC (NO, O_2)	CO	0 – 600 ppm 600–5000 ppm	±30 ppm -	- -	- ±5
	CH_x	0 – 1000ppm 1000 – 10000 vol.%	±100ppm -	- -	- 10
	CO_2	0 – 6 vol.% 6 – 20 vol.%	±0.6 % vol. -	- -	- ±6
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol. -	- -	- ±5
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -	- -	- ±10
	T°,C	100 – 800°C	-	-	±3
OPTOGAS-500.3 (C,H) 1 – 5 channels Fixed, rack or wall mounting For industrial emissions monitoring NDIR (CO, CO_2, CH_x) EC (NO, O_2)	CO	0 – 600 ppm 600 – 5000 ppm	±30 ppm -	- -	- ±5
	CO_2	0–6 vol.% 6–20 vol.%	±1.0 % vol. -	- -	- ±6
	CH_x	0–1000ppm 1000–10000	±0.01 % -	- -	- 10
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol. -	- -	- ±5
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -	- -	- ±10
OPTOGAS-500.4 Portable For ambient air analysis, NDIR	CO_2	0 – 300 ppm 300 – 2000 ppm	±60 ppm -	- -	±20
	CO	0 – 2,6 ppm	-	±20	-
		2,6 – 43,0 ppm	-	-	±20
OPTOGAS-500.4C Fixed, single -or dual channel For ambient air analysis, NDIR	CO_2	0–300 ppm 300–2000 ppm	±60 ppm -	- -	±20
	CO	0 – 2,6 ppm	-	±20	-
		2,6 – 43,0 ppm	-	-	±20

Models	Norms				
	Analyzed component	Measurement Range, ppm (% vol.)	Main inaccuracy limits		
			Absolute, Δ, ppm (% vol.)	Reduced, γ, %	Relative, δ, %
OPTOGAS-500.6 (C,H) Fixed For petrol engines exhaust Ultra precise NDIR (CO, CO_2, CH_x) EC (O_2)	CO	2,6 – 43,0 ppm	±0.03 % vol.	-	±3
	CH_x	0 – 2000 ppm	±10 ppm	-	±5
	CO_2	0 – 16 vol.%	±0.05 % vol.	-	±4
	O_2	0 – 21 vol.%	±0.1 % vol.	-	±3
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -	- -	- ±10
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm -	- -	- ±15
OPTOGAS-500.7 P,C,H Portable, fixed For technological mixtures analysis, NDIR	CO	0 – 0,5 об% 0,5 – 15 vol.%	±0.03% vol -	- -	- ±6
OPTOGAS-500.8 P,C,H Portable, fixed For technological mixtures analysis, NDIR	CO_2	0 – 30 об%	-	±5	-
OPTOGAS-500.9 C,H Fixed For technological mixtures analysis, PM	O_2 (PM)	0 – 21%	±0,2% -	- -	- ±5

C-105CV HYDROGEN SULPHIDE ANALYZER



SPECIFICATIONS

Measuring range	0 – 0,2 0,2-1,0 mg/m³
Display scale resolution	0,0001 mg/m³ 0,001 mg/m³
Measurement units	mg/m³ ,ppm (selectable)
Linearity error	2 %
Zero drift	<1 ppb for 30 days
Calibration drift	<3 % for 30 days
Data outputs	0 – 20 (4 – 20) mA RS-232,RS-485
Dimensions:	560x482x132 mm
Weight:	14,5 kg
Power consumption	240 W
Power supply	220 V,50 Hz
Warm up time	60 min
Response time	<5min
Sample flow rate	1,0 ± 0,3 l/min

OPERATING CONDITIONS

Ambient temperature	+5...+40°
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	< 95% (non-condensing)

DESCRIPTION

Analyzer is designated for reliable measurements of H_2S low concentrations.

APPLICATION

Urban air monitoring,
Mobile air quality monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

UV fluorescence

FEATURES

Built-in sample pump
Continuous monitoring
Internal data storage
Selectable averaging period
Rack mounting
Easy maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

C-105M SULFUR DIOXIDE ANALYZER

SPECIFICATIONS

Measuring range	0 – 5mg/m³
The limit of error of measurement redused 0-0,4 mg/m³	±20 %
relative 0,04-5,0 mg/m³	±20 %
Measurement units	mg/m³ ,ppm (selectable)
Nominal unit smallest category indicator	0,001 mg/m³
Data outputs	0 – 20 (4 – 20) mA RS-232,RS-485
Dimensions:	560x482x132 mm
Weight:	12,5 kg
Power consumption	190 W
Power supply	230 V,50 Hz
Warm up time	60 min
Average service life	At least 6 years

OPERATING CONDITIONS

Ambient temperature	+5...+40°
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	< 95% (non-condensing)

DESCRIPTION

Analyzer is designated for reliable measurements of S_2O low concentrations.

APPLICATION

Urban air monitoring,
Mobile air quality monitoring stations
Industrial perimeter air quality monitoring
Atmospheric research

OPERATING PRINCIPLE

UV fluorescence

FEATURES

Built-in sample pump
Continuous monitoring
Internal data storage
Selectable averaging period
Rack mounting
Easy maintenance

SPARE PARTS

Fluoroplastic hose
Spare filter elements

CAN BE USED FOR:

• Continuous automatic measurements of numerous air pollutants including ozone, carbon monoxide, carbon dioxide, nitrogen monoxide, nitrogen dioxide, sulphur dioxide, sulphic acid, ammonia, hydrocarbons, formaldehyde.
• Data collection, processing and storage
• Remote access and data transport via GSM, LAN and Internet.

The station contains a set of automatic air monitoring instruments, mounted into 19'' rack and connected with an air sampling probe, data logger.
It is possible to extend capabilities by adding appropriate measuring devises and meteorological equipment.

The station is fully matched with all atmospheric monitors produced by Optec JSC and may contain up to 8 measuring channels.

PAK8816: software /hardware multi-channel platform contains next levels:
• Data acquisition system extracts and averages the responses of sensors with further interface with an external data logger via RS-232 and RS-485.
• Data logger collects the data and creates a database for further transfer via Internet or LAN to a storage area network, enabling Web database access.
• Storage area network provides remote users with an access to data obtained from any monitoring station in the network.

FEATURES

Sustainable operation
May be used different types of connection between levels
Simultaneous multi-user operation
Data processing and representing from several data loggers
Up to 247 instruments in one autonomous data acquisition system with 1200m distance between units.
Extended functionality allows to collect the results from various types of sensors.

Metrological characteristics of the air monitoring station SKAT **Table 11.**

Component	Range measurements, mg / m³	Absolute, Δ, mg/m³	Main inaccuracy limits		Model
			Reduced, γ, %	Relative, δ, %	
O_3	0–0,03 0,03–0,5		±20 —	— ±20	«3.02П-А»
	0–0,1 св.0,1–1,0 св. 1,0–10,0	±0,02 ±(0,014+0,06C_x) —		— — ±7	«Ф-105»
SO_2	0–0,05 0,05–2,0		±25 —	— ±25	«С-310А» «СВ-320А-1»
	0–0,05 0,05–5,0	±0,01 —		— ±20	«С-105М»
NO	0–0,08 0,08–1,0		±25 —	— ±25	«Р-310А» «Н-320А»
	0-0,04 0,04-4,0		±20 —	— ±20	«Р-105»
NO_2	0–0,08 0,08–1,0		±25 –	— ±25	«Р-310А» «Н-320А» «Р-310А-1»
	0-0,04 0,04-4,0		±20 —	— ±20	«Р-105»
CO	0–3 3–50		±20 —	— ±20	«К-100»
CO_2	0–550 550–3700	±110		— ±20	«Optogas-500.4C»
H_2S	0–0,008 0,008–0,2		±25 —	— ±25	«СВ-320А-1»
NH_3	0–0,2 0,2–1,0		±25 —	— ±25	«Н-320», «Н-320А»

PZ-VZ ZOND AIR SAMPLING PROBE

Air sampling probes are specially designed for continuous providing gas monitors with air to be analyzed. Customer's tasks dependently might be used in mobile stations or stationary monitoring plants, laboratories.
Single channel models are used for dust and aerosol analyzing only.
5 or 6 channels models can be connected with the most air monitoring instruments producing by our company.
For achieving reliable results and prolonging working time of instruments it is recommended to use probes with integrated anti-moisture system. For instance the probe with anti-condensate heating element is more suitable for places with significant difference between temperature outside and inside the shelter where measurements are occurred.

DESCRIPTION

The PZ-VZ probes are specially designed for ambient air monitoring stations.

OPERATING CONDITIONS

Ambient air temperature	-50 ...+50°C
Atmospheric pressure	630 – 800 mm Hg.
Relative humidity	Up to 90%

Table 12

Model	Dimensions mm / weight, kg	Application
Single channel probes for dust and aerosol monitors		
PZVZ Zond-1	230x60 / 0,1	Portable
PZVZ Zond-1-O	1030x160 / 2	For stationary monitoring systems
PZVZ Zond-1-Om	630x160 / 2	For mobile monitoring systems
5-6 channel probes for air monitoring systems		
PZVZ Zond-5(6)	1100x110 / 3	Standard model for stationary monitoring systems
PZVZ Zond-5m(6m)	690x110/ 3	Standard model for mobile monitoring systems
PZVZ Zond-5-O(6-O)	1140x110/ 3	With integrated anti-condensate heating element. For stationary monitoring systems during summertime.
PZVZ Zond-5-Om(6-Om)	740x110/ 3	With integrated anti-condensate heating element For mobile monitoring systems during summertime
PZVZ Zond-5-C(6-C)	1280x120/ 3	With integrated moisture release unit. For stationary monitoring systems during winter period.
PZVZ Zond-5-OC(6-OC)	1330x120/ 3	Combined both mentioned above anti condensate units stationary monitoring systems for whole year use.

Models with anti-moisture units require uninterruptible power supplies.

ОПТЭК®
ПРИБОРЫ ДЛЯ НАУЧНЫХ ИССЛЕДОВАНИЙ

ONE-
MULTI-COMPONENT
GAS ANALYZERS FOR CONTROL
INDUSTRIAL GAS EMISSIONS

Section III

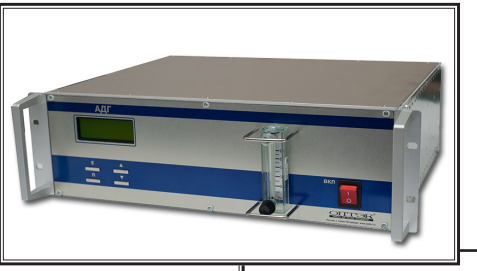


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Table 13

Model	Range of measured concentrations, g/m³						
	H_2S	SO_2	NO	NO_2	CO	O_2, vol.%	T,°C
	KASKAD-N Series multicomponent gas analyzers						
KASKAD-N 52.1	0–0,1			0–0,2	0–20	0–25	50–800
KASKAD-N 52.2	0–0,1		0–3,0		0–20	0–25	50–800
KASKAD-N 52.3	0–0,1		0–3,0	0–0,2		0–25	50–800
KASKAD-N 52.4			0–3,0	0–0,2	0–20	0–25	50–800
KASKAD-N 62.1	0–0,1		0–3,0	0–0,2	0–20	0–25	50–800
KASKAD-N 62.2		0–5,0	0–3,0	0–0,2	0–20	0–25	50–800
KASKAD-N 62.3		0–5,0	0–3,0	0–0,2	0–6,0	0–25	50–800

Standard Set of delivery: gas analyzer,operation manual,verification procedure manual, built-in battery,built-in sample pump,cable,software,carrying bag,gas sampling probe with thermocouple,filter and condensate trap unit.

Length of sampling probe — 330,560,930,1180 or 1530 mm.

Metrological characteristics of gas analyzers Kaskad-N 52.X, 62.X *Table 14.*

Component	Measuring range	Inaccuracies		
		Absolute Δ	Relative δ, %	Reduced, % γ
H_2S	0–100 mg/m³	±(5+0,15C_x) mg/m³	—	—
SO_2	0–1,0 g/m³	±(0,01+0,14C_x) g/m³	—	—
	1,0–5,0 g/m³	±(0,05+0,1C_x) g/m³	—	—
NO	0–1,0 g/m³	±(0,01+0,14C_x) g/m³	—	—
	1,0–3,0 g/m³	±(0,05+0,1C_x) g/m³		
NO_2	0–50 mg/m³	±(5+0,2C_x) mg/m³	—	—
	50–200 mg/m³	±(10+0,1C_x) mg/m³	—	—
CO	0–6,0 g/m³	±(0,01+0,05C_x)mg/m³	—	—
CO	0–2,0 g/m³	±(0,02+0,065C_x) g/m³	—	—
	2,0–20,0 g/m³	±(0,05+0,05C_x) g/m³		
O_2	0–25 %	—	—	±2,5
CO_2	0–25%	Determination by calculation		
T, °C	50–800 °C	—	±3	—

KASKAD-N MULTICOMPONENT GAS ANALYZERS FOR EMISSION MONITORING

SPECIFICATIONS

Models	
Components and ranges:	See Table 13
CO	0 – 6,0/20,0 g/m³
O_2	0 – 25 vol. %
NO	0 – 3,0 g/ m³
NO_2	0 – 0,2 g/m³
SO_2	0 – 5,0 g/m³
H_2S	0 – 0,1 g/m³
CO_2	calculated
Temperature of sample	+50...+800°C
Sample flow rate	1,0 ±0,5 L/min
Calibration drift	<5% for 30 days
Linearity inaccuracy	1% of full scale
Inaccuracy	See table 12
Sensor life expectancy	3,5 years, 1,5 years for O_2
Data output	RS-232
Power supply	220 V, 50 Hz or 12 V rechargeable battery
Dimensions	235x370x145 mm
Weight	5 kg

OPERATING CONDITIONS

Temperature	+10...+40°C
Atmospheric pressure	630...800 mm Hg
Gas sample temperature	+50 ... + 800 °C
Humidity	Non-condensing 15 ... 95%

OPERATING PRINCIPLE

Electrochemical

DESCRIPTION

Portable multichannel gas analyzers KASKAD-N series are designed for periodical control of temperature and main air pollutants as NO, NO_2, CO, H_2S, SO_2, O_2 in emissions. Models vary depending on number and type of measurable components. The instrument calculates and indicates some thermotechnical characteristics, e.g. the heating losses and air surplus coefficient. Each instrument is delivered with a sample probe.

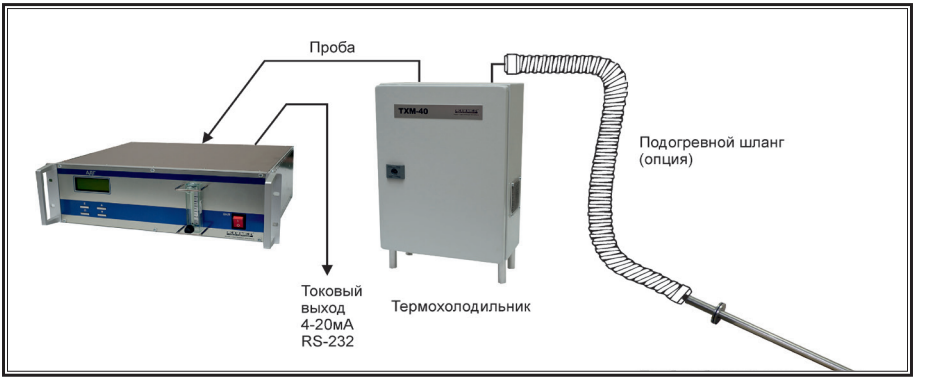
Length of gas sampling probe — 330, 560, 930, 1180 or 1530 mm.

APPLICATION

Industrial emission measurements
Combustion control
Industrial process testing
Thermo processes testing
Boiler and burner testing and tuning

FEATURES

Built-in sample pump
Reducing cross-sensitivity effect software
Simultaneous multicomponent analysis
Auto-zero function
Data storage
Compact and lightweight
Long life battery – for 8 hours continuous operation



SPECIFICATIONS

Medial resource of operation , not less	8 years*
Power voltage	~220 V, 50 Hz
Power consumption	95 W (two units)
Dimensions (measuring unit)	
ADG-304,ADG-305	482x410x132 mm
ADG-304H,ADG-305H	300x160x460 mm

** Sensors replacement is not taken in consideration*

Dimensions (sample conditioning unit)	265x130x330 mm
Weight of measuring unit	8 kg (ADG-304, 305) 10 kg (ADG-304H, ADG-305H)
Weight of sample conditioning unit (THM-40)	5 kg

OPERATION CONDITIONS

Ambient temperature	+5 … +40 °C
Relative humidity	15...98 %
Ambient pressure	630…800 mm Hg

ADG-304(H)-CO	ADG-304(H)-CO/NO	ADG-304(H)-CO/O_2/NO
ADG-304(H)-O_2	ADG-304(H)-CO/SO_2	ADG-304(H)-CO/O_2/SO_2
ADG-304(H)-NO	ADG-304(H)-O_2/NO	ADG-304(H)-CO/NO/SO_2
ADG-304(H)-SO_2	ADG-304(H)-O_2/SO_2	ADG -304(H)-O_2/NO/SO_2
ADG-304(H)-CO/O_2	ADG-304(H)-NO/SO_2	ADG-304(H)-CO/O_2/NO/SO_2

ADG-305(H)-CO	ADG-305(H)-CO/NO	ADG-305(H)-CO/O_2/NO
ADG-305(H)-O_2	ADG-305(H)-CO/NO_2	ADG-305(H)-CO/O_2/NO_2
ADG-305(H)-NO	ADG-305(H)-O_2/NO	ADG-305(H)-CO/NO/NO_2
ADG-305(H)-NO_2	ADG-305(H)-O_2/NO_2	ADG -305(H)-O_2/NO/NO_2
ADG-305(H)-CO/O_2	ADG-305(H)-NO/NO_2	ADG-305(H)-CO/O_2/NO/NO_2

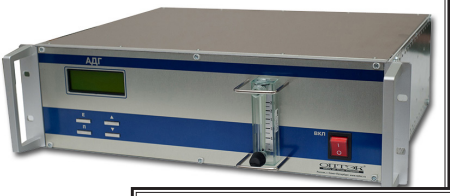
Modifications and metrological characteristics of ADG gas analyzers *Table 15.*

Modification	Norms				
	Analyzable component	Measuring range	The limits of admissible main inaccuracy		
			Sub-ranges	Absolute, Δ, ppm (vol. %)	Relative δ, %
ADG-304 **ADG-304H** Number of measuring channels: from 1 to 4 (according to order)	CO	0 – 5000 ppm	0 –200 ppm 200 – 5000 ppm	± 20 ppm —	— ± 10
	NO	0 – 1000 ppm	0 –100 ppm 100 – 1000 ppm	± 30 ppm —	— ± 15
	SO_2	0 – 2000 ppm	0 –200 ppm 200 – 2000 ppm	±30 —	— ± 15
	O_2	0 – 21 vol. %	0 – 4 vol. % 4 – 21 vol. %	± 0,4vol.% —	— ± 10
ADG-305 **ADG-305H** Number of measuring channels: from 1 to 4 (according to order)	CO	0 – 1000 ppm	0 –100 ppm 100–1000 ppm	±10 ppm —	— ± 10
	NO	0 – 1000 ppm	0 –100 ppm 100–1000 ppm	±15 ppm —	— ± 15
	NO_2	0 – 100 ppm	—	±15 ppm	—
	O_2	0 – 21 vol. %	0–4 vol.% 4–21 vol.%	± 0,4vol.% –	— ± 10

ASSIGNMENT

ADG gas analyzers are intended for automatic continuous measurement of carbon oxide, nitrogen oxide, nitrogen dioxide, sulfur oxide concentrations and oxygen volume concentration in stack gases of fuel burning devices.

rack-mounted modification



wall modification

AREA OF APPLICATION

Emissions monitoring.
ADG gas analyzers are the fixed automatic instruments with continuous mode of operation. It contains two units: measuring unit and sample conditioning unit.
ADG gas analyzers are intended for operation in non-hazardous area.

OPERATION PRINCIPLE

Electrochemical.
Information in the built-in display of measuring unit includes current magnitude of measured concentration, date and time of measurement.

Analyzer has built-in pump.
Composition of sample conditioning unit depends on operation conditions.

The method of conditioning – water removal by freezing (thermo electrical Peltie effect).

ADDITIONAL FEATURES

Measuring unit has RS-232 interface, current outputs 4-20 mA for each measuring channel.

Case of the device:
for rack mounting (ADG-304,-305)
for wall mounting (ADG-304H, -305H)

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ANALYZERS
SPECIAL PURPOSE

Section IV

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DESCRIPTION

«OPTOGAS–500» gas analyzers are designated for automatic monitoring of following components:

CO, CO_2, NO, O_2 and hydrocarbons in exhaust gases from automotive vehicles with petrol or diesel engines;

CO, CO_2, NO, O_2, CH_4, and temperature in industrial gas emissions;

CO_2 in ambient air, and industrial gas mixtures;

CO in industrial gas mixtures.

«OPTOGAS–500» modifications:

OPTOGAS–500.1C,H, –500.1P, –500.2C,H, –500.6C,H – for automotive exhaust analysis;

OPTOGAS–500.3, –500.3(C,H) to measure gas temperature and composition of industrial emissions;

OPTOGAS–500.4; –500.4C for ambient air analysis ;

OPTOGAS–500.7(C,H), –500.8(C,H), –500.9 (C,H) for technological gas mixtures control.

«OPTOGAS–500» gas analyzers are automatic instruments with continuous mode of operation in portable or fixed cases. It is executed in one body and delivered with built-in or external sample conditioning system (except. mod «OPTOGAS–500.4»).

The number of measuring channels is customized and determined by the customer in the order.

OPERATING PRINCIPLE

- NDIR - CO, CO_2, CH_x,
- Electrochemical – NO, O_2, NO_2
- Paramagnetic – O_2.

FEATURES

High selectivity
Simultaneous continuous operation;
Data output 0–5 (4–20 mA), RS-232;
Low maintenance cost

OPERATING CONDITIONS

Ambient temperature +5°C...40°C
Pressure, кPa 84–106,7 (630-800 mm. Hg.)
Humidity – up to 95 %, 30°
Power voltage ~220V 50 Hz (=12V for portable analyzers). Portable analyzers can be delivered with built-in rechargeable battery).

OPTOGAS-500 modifications *Table 16.*

Models	Norms				
	Analyzed component	Measurement Range, ppm (% vol.)	Main inaccuracy limits		
			Absolute, Δ, ppm (% vol.)	Reduced, γ, %	Relative, δ, %
OPTOGAS-500.1C (19"rack mounting) **OPTOGAS-500.1H (wall mounting)** For diesel engines exhaust gases 1 - 6 channels NDIR (CO,CO_2, CH_x) EC (NO,NO_2 ,O_2)	CO	0 – 10000 vol.%	-	±6	-
	CH_x	0 – 300 ppm 300 – 10 000 ppm	±20 ppm -	- -	- ±6
	CO_2	0 – 16 vol.%	-	±6	-
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol.	- -	- ±6
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm –	– –	– ±15
	NO	0 – 200 ppm 200 – 5000 ppm	±20 ppm -	- -	- ±10
OPTOGAS-500.1P Portable,for diesel engines exhaust gases NDIR (CO,CO_2, CH_x)	CO	0 – 7500 ppm	-	±5	
	CH_x	0 – 1000 ppm 1000 – 2000 ppm	- -	±5 -	- ±5
	CO_2	0 – 20 vol.%	-	±3.5	-
OPTOGAS-500.2 (C,H) 1 - 6 channels Fixed,rack or wall mounting For petrol engines exhaust gases NDIR (CO,CO_2, CH_x) EC (NO,NO_2 ,O_2)	CO	0 – 7,0 vol.%	±0.2 % vol.	-	±6
	CH_x	0 – 3000 ppm	±20 ppm	-	±6
	CO_2	0 – 16 vol.%	±1.0 % vol.	-	±6
	O_2	0 – 21 vol.%	±0.2 % vol.	-	±6
	NO	0 – 5000 ppm	±20 ppm	-	±10
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm –	– –	– ±15

Table 16

OPTOGAS-500.3 1 – 6 channels (Temperature channel is obligatory) Portable For industrial emissions monitoring NDIR (CO, CO_2, CH_x) EC (NO,O_2)	CO	0 – 600 ppm 600–5000 ppm	±30 ppm -		- ±5
	CH_x	0 – 1000ppm 1000 – 10000 vol.%	±100ppm -		- 10
	CO_2	0 – 6 vol.% 6 – 20 vol.%	±0.6 % vol. -		- ±6
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol. -		- ±5
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -		- ±10
	T°,C	100 – 800°C	-	-	±3
OPTOGAS-500.3 (C,H) 1 – 5 channels Fixed,rack or wall mounting For industrial emissions monitoring NDIR (CO, CO_2, CH_x) EC (NO,O_2)	CO	0 – 600 ppm 600 – 5000 ppm	±30 ppm -	- -	- ±5
	CO_2	0–6 vol.% 6–20 vol.%	±1.0% vol. -	- -	- ±6
	CH_x	0–1000ppm 1000–10000	±0.01 % -	- -	- 10
	O_2	0 – 4 vol.% 4 – 21 vol.%	±0.2 % vol. -	- -	- ±5
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -	- -	- ±10

Table 16

OPTOGAS-500.4 Portable For ambient air analysis, NDIR	CO_2	0 – 300 ppm 300 – 2000 ppm	±60 ppm -	- -	±20
	CO	0 – 2,6 ppm 2,6 – 43,0 ppm	- -	±20 -	- ±20
OPTOGAS500.4C Fixed, single -or dual channel For ambient air analysis, NDIR	CO_2	0–300 ppm 300–2000 ppm	±60 ppm -	- -	- ±20
	CO	0 – 2,6 ppm 2,6 – 43,0 ppm	-	±20	±20
OPTOGAS-500.6 (C,H) Fixed For petrol engines exhaust Ultra precise NDIR (CO, CO_2, CH_x) EC (O_2)	CO	0-5,0%	±0.03 %	-	±3
	CH_x	0 – 2000 ppm	±10 ppm	-	±5
	CO_2	0 – 16 vol.%	±0.05 % vol.	-	±4
	O_2	0 – 21 vol.%	±0.1 % vol.	-	±3
	NO	0 – 200 ppm 200 – 2000 ppm	±20 ppm -	- -	- ±10
	NO_2	0 – 100 ppm 100 – 1000 ppm	±15 ppm -	- -	- ±15
OPTOGAS-500.7 P,C,H Portable, fixed For technological mixtures analysis, NDIR	CO	0 – 0,5 об% 0,5 – 15 vol.%	±0.03% vol -	- -	- ±6
OPTOGAS-500.8 P,C,H Portable, fixed For technological mixtures analysis, NDIR	CO_2	0 – 30 об%	-	±5	-
OPTOGAS-500.9 C,H Fixed For technological mixtures analysis.	O_2 (PM)	0-4% 4 – 21%	±0,2% -	- -	- ±5

OPTOGAS – 500.1 SERIES MULTICOMPONENT GAS ANALYZERS

SPECIFICATIONS

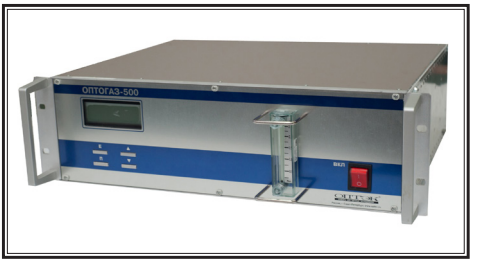
Range of measuring concentrations	
CO	0–10000ppm
CO_2	0–16 vol. %
Carbohydrates CH_x	0–10000ppm
NO	0–5000ppm
NO_2	0–1000ppm
O_2 (in fixed models)	0–21 vol. %
Data output Interface	0-20 (4-20)mA, RS-232
Sample flow rate	2,0 ± 0,2 L/min
Sample temperature	100-800°C
Warm up time	30 min
Response time	3 min
Main error limits	See table OPTOGAS-500 modifications
Power consumption	60 W
Power supply	~ 220V, 50 Hz
Dimensions, weight	See table below

OPERATING CONDITIONS

Ambient air temperature	+5...+40°
Pressure	84–106,7 kPa
Humidity	Up to 95%

OPERATION PRINCIPLE

The unit is based on NDIR optical bench (CO, CO_2, CH_x) with electrochemical sensors for NO, NO_2 and O_2.
Integrated sample pump



DESCRIPTION

Gas analyzers OPTOGAS–500.1-series are assigned for diesel engines exhaust emission analysis.
Available in three types of housings:
OPTOGAS–500.1P is a portable analyzer
OPTOGAS–500.1S for a 19'' rack mounting
OPTOGAS–500.1H for wall mounting
The fixed models:
1. can include up to 6 sensors according to customer requirements
2. are equipped with an integrated condensate trap and particulate filters.
All analyzers come with a sample probe. It is recommended to use the conditioning sampling system THM-40 in case of extra hostile environments. (supplied by request).

FEATURES

High selectivity and quick response
Flexibility in number of components
Simultaneous multigas analysis
Built-in sample gas conditioning system (in fixed models)

ADDITIONAL

THM-40.2
Sample probe
Fluoroplastic

APPLICATION

Diesel engine emissions monitoring
Greenhouse gas (GHG) measurements
Certification and R&D of combustion engines

Dimensions, weight — *Table 17*

OPTOGAS-500.1C	485x450x135	10
OPTOGAS-500.1H	225x500x400	15

OPTOGAZ–500.3 (C,H) FIXED MULTICOMPONENT GAS ANALYZER

SPECIFICATIONS

Range of measuring concentrations	
Carbon oxide	0–5000 ppm
Carbon dioxide	0–20 vol. %
CH_x	0–10 000 ppm
Nitric oxide	0–2000 ppm
Oxygen	0–21,0 vol. %
Sample flow rate (built-in pump)	1,0 ± 0,2 l/min
Main error limits	See table
Data output Interface	0-20(4-20)mA, RS-232
Power consumption	60 W
Power voltage	~ 220V, 50 Hz
Dimensions	485x450x135mm
Weight	10 kg

OPERATING CONDITIONS

Ambient air temperature	+5...+40°
Pressure	84–106,7 kPa
Humidity	Up to 95%

DESCRIPTION

Gas analyzer «OPTOGAS–500.3C» is assigned for emissions analysis in non-hazardous areas.

To eliminate fouling and water content it is recommended to use the external sampling system (THM-40.2).

APPLICATION

Industrial processes monitoring
Greenhouse gas (GHG) measurements
Certification and R&D of combustion engines

OPERATION PRINCIPLE

The unit is based on NDIR method for determination CO, CO_2 and CH_x and electrochemical approach for NO and O_2. Integrated sample pump

FEATURES

High selectivity and quick response
Flexibility in number of components
Simultaneous multicomponent analysis
Auto zero setting

OPTOGAZ–500.8 PORTABLE CARBON DIOXIDE GAS ANALYZER

SPECIFICATIONS

Range	0–30 vol. %
Error	±5 %
Data output	RS-232
Sample flow rate	1,0 ± 0,2 L/min
Power consumption	60 W
Power supply	~230 V, 50 Hz/ 12V DC
Dimensions	270x390x145 mm
Weight	6 kg

OPERATING CONDITIONS

Ambient air temperature	+5...+40°
Pressure	84–106,7 kPa
Humidity	Up to 95%

DESCRIPTION

Gas analyzer «OPTOGAZ–500.8» is designed for CO_2 monitoring in technological mixtures.

Sampling system supplies by additional request

APPLICATION

Industrial processes monitoring

OPERATION PRINCIPLE

NDIR

FEATURES

High selectivity and quick response
Continuous measurements
Low cost maintenance

SPECIFICATIONS

Models and ranges	
Cyclone-5.11	0 – 2,0 g/m³ 2,0 – 99,9 g/m³
Cyclone-5.21	0 – 1,0 g/m³ 1,0 – 50,0 g/m³
Cyclone-5.31	0 – 0,5 g/m³ 0,5 – 5,0 g/m³
Cyclone-5.41	0 – 0,1 g/m³ 0,1 – 1,0 g/m³
Cyclone-5.51	0 - 10,0 mg/m³ 10,0 – 100,0 mg/m³
Calibration drift	<3% for 30 days
Linearity inaccuracy	2% of full scale
Warm up time	60 min
Response time	30 sec.
Data output	0-5mA (4-20 mA)
Interface	RS 232
Power consumption	20 W
Power supply	220V, 50 Hz
Dimensions	270x336x96 mm
Weight	not more 4 kg

OPERATING CONDITIONS

Ambient temperature	+10 ...+35°C
Pressure	630 – 800 mm Hg
Humidity	Up to 98%

DESCRIPTION

Gas analyzers Cyclone-5 series are intended for continuous ozone concentrations measurements in vary ranges.

APPLICATION

Industrial processes control
Occupational safety

Gas analysis research

OPERATION PRINCIPLE

UV absorption

FEATURES

Internal programmable auto zero (optional)
External sample pump
Fluoroplastic hose

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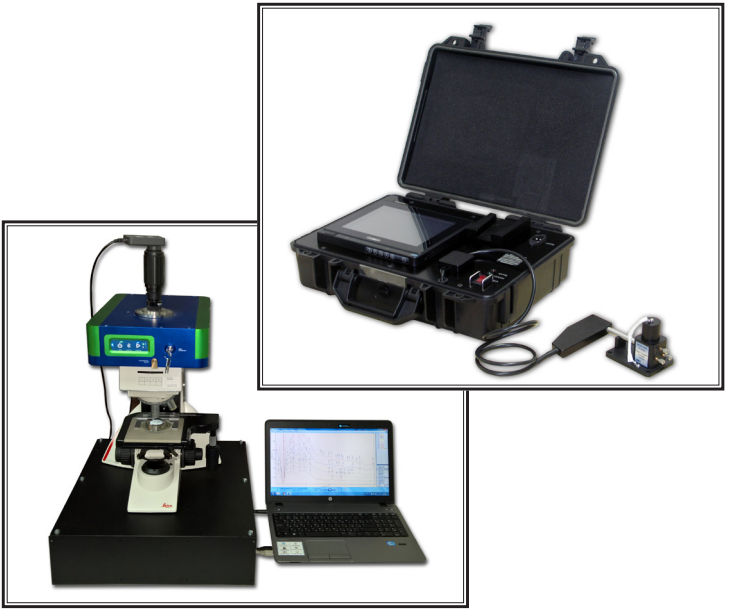
ANALYTICAL SYSTEMS
COMBINATION LIGHT SCATTERING

Section V



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RAMAN SPECTROSCOPY ANALYTICAL SYSTEM OPTEC-785-H

SPECIFICATIONS

Spectral range	500-2000 cm^{-1} (200...3000cm^{-1})
Laser wave length	785nm
Power of laser irradiation, tunable	0...360 mW
Spectral resolution	10 cm^{-1}
Signal to noise ratio at 20mW laser power	50
Standard deviation of output signal	2%
Type of detector	CCD array with high quantum efficiency
Pixel size	14x200 um
Pixel Number	2048
Exposure time	1...180 sec
Digitization Resolution	14 bit
Dimension	420x335x130mm
Mass	7kg
Power supply	220V, 50Hz or rechargeable battery 8,8Ah, 20W

OPERATING CONDITIONS

Ambient air temperature	+15...+35
Atmospheric pressure	630 – 800 mm Hg.

DESCRIPTION

Raman spectrometer OPTEC-785-H is intended for identification organic or non-organic solids, liquids and gels utilizing Raman spectroscopy. Installed Windows family operating system provides compatibility with available applications and spectral libraries. The instrument delivery set includes a confocal optic fiber probe and a video microscope adapter.

APPLICATION

Pharmaceutical industry
Forensic Analysis
Scientific research

Ecological research

FEATURES

Compact and lightweight design
Compatibility with available applications and spectral libraries
Easy to use GUI
Low power consumption (optional)
External sample pump
Fluoroplastic hose

RAMAN SPECTROSCOPY ANALYTICAL SYSTEM OPTEC-785VIDEO-M

SPECIFICATIONS

Spectral range	500-3000 cm^{-1} (200...3000cm^{-1})
Laser wave length	785 nm
Power of laser irradiation, tunable	0...360 mW
Spectral resolution	7-9 cm^{-1}
Signal to noise ratio at 20mW laser power	50
Standard deviation of output signal	2%
Type of detector	CCD with high quantum efficiency
Pixel size	14x200 um
Pixel Number	2048
Exposure time	1...180 sec
Digitization Resolution	14 bit
Dimension	420x335x130 mm
Mass	7 kg
Power supply	220V, 50Hz or rechargeable battery 8,8 Ah, 20W

OPERATING CONDITIONS

Ambient air temperature	+15...35
Atmospheric pressure	630 – 800 mm Hg.

DESCRIPTION

Portable Raman spectrometer OPTEC-785video-M has been developed for identification organic and non-organic origin solids, liquids and gels utilizing Raman spectroscopy. Installed Windows family operating system provides compatibility with available applications and spectral libraries.

The instrument delivery set includes:
Laser unit with a cooling system
Raman spectrometer
High quantum efficiency non cooled CCD array detector
Confocal optic fiber probe
Video microscope
Controller
Software
The standard set can be extended with surface-enhanced Raman scattering (SERS) substrates

APPLICATION

Pharmaceutical industry
Materials Science
Gemology and geology
Forensic Analysis
Scientific research
Environmental research
Art and Archaeology
Semiconductors
Biology and medicine

RAMAN SPECTROSCOPY ANALYTICAL SYSTEM OPTEC-785TRS-2700

SPECIFICATIONS

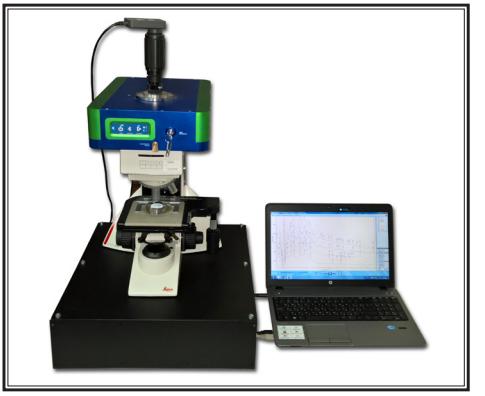
Raman frequency range	200-2700 cm^{-1}
THz frequency range	-49...10cm^{-1} (-1,48...-0,3THz) 10...200 cm^{-1} (0,3...6,0THz)
Laser wave length	785nm
Power of laser irradiation, tunable	0...100 mW
Spectral resolution	3,5 cm^{-1}
Type of detector	CCD with high quantum efficiency
Exposure time	1...60 s
Digitization Resolution	14 bit
Dimension	460x500x800mm
Mass	20kg
Power supply	220V, 50Hz
Power consumption	40 W

OPERATING CONDITIONS

Ambient air temperature	+15...+35
Atmospheric pressure	630 – 800 mm Hg.

FEATURES

Simultaneous determination of molecular structure and chemical composition
Excellent suppression of fluorescence
Superb optical efficiency
High mobility and usability
Compatibility with available applications and spectral libraries
Easy to use GUI



DESCRIPTION

Raman spectrometer OPTEC-785TRS-2700 combines traditional Raman and THz-frequency spectroscopy enabling advanced analysis of materials including its chemical composition and structure.

The instrument delivery set includes:

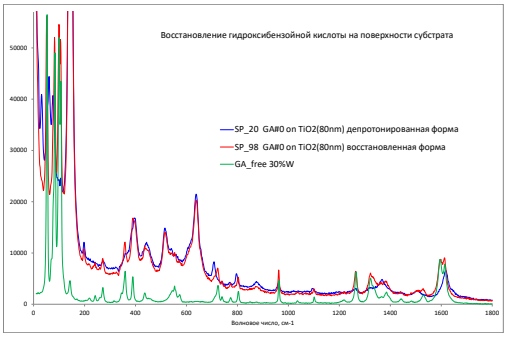
- Laser unit
- Raman spectrometer/ spectrograph
- High quantum efficiency CCD array detector
- Optical unit
- PC
- Software

APPLICATION

Pharmaceutical industry
Materials Science
Gemology and geology
Forensic Analysis
Scientific research
Environmental research
Art and Archaeology
Semiconductors
Biology and Medicine

DISTINCTIVE FEATURES

- the mobility of the system, allowing to conduct analyzes in different conditions;
- high luminosity of the system;
- excellent ability of instrumental suppression of possible luminescence bands on samples.



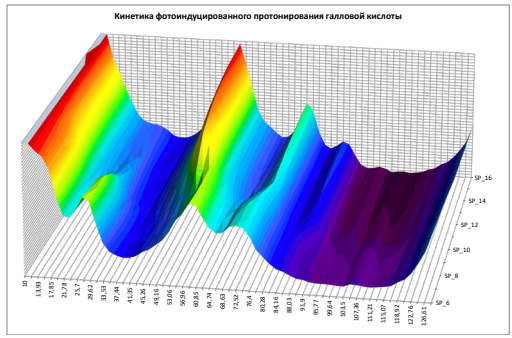


Photo-induced reduction of 3,4,5-trihydroxybenzoic acid from benzoquinone on the surface of a nanoscale substrate

RAMAN SPECTROSCOPY ANALYTICAL SYSTEM OPTEC-785TRS-3100

SPECIFICATIONS

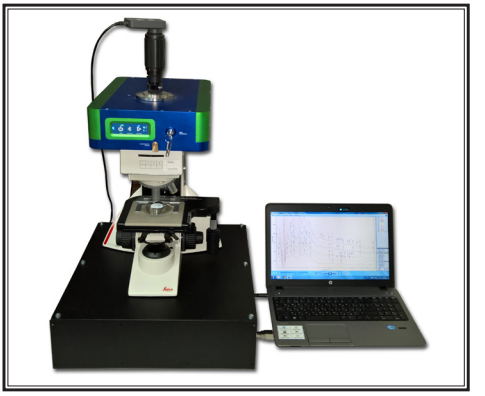
Raman frequency range	500-3100 cm^{-1}
THz frequency range	-500...-10cm^{-1} (-15...-0,3THz) 10...500 cm^{-1} (0,3...15,0THz)
Laser wave length	785nm
Power of laser irradiation, tunable	0...100 mW
Spectral resolution	7-9 cm^{-1}
Type of detector	CCD with high quantum efficiency
Exposure time	1...60 s
Digitization Resolution	14 bit
Dimension	460x500x800mm
Mass	20kg
Power supply	220V, 50Hz
Power consumption	40 W

OPERATING CONDITIONS

Ambient air temperature	+15...+35
Atmospheric pressure	630 – 800 mm Hg.

FEATURES

Simultaneous determination of molecular structure and chemical composition
Excellent fluorescence suppression
Superb optical efficiency
High mobility and usability
Compatibility with available applications and spectral libraries
Easy to use GUI



DESCRIPTION

Raman spectrometer OPTEC-785TRS-3100 combines traditional Raman and THz-frequency spectroscopy enabling advanced analysis of materials including its chemical composition and structure.

The instrument delivery set includes:

- Laser unit
- Raman spectrometer
- High quantum efficiency CCD array detector
- Optical unit
- Portable PC (laptop)
- Software

APPLICATION

Pharmaceutical industry
Materials Science
Gemology and geology
Forensic Analysis
Scientific research
Environmental research
Art and Archaeology
Semiconductors
Biology and Medicine

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AUTOMATIC AIR ASPIRATORS

Section VI

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Table 18

Model	Technical characteristics	
Mod. OP – 442 TC	220/12 V	2 channels 0,2 – 1,0 l/min 2 channels 5,0 – 20,0 l/min
Mod. OP – 824 TC	220/12 V	4 channels 0,2 – 1,0 l/min 4 channels 1,0 – 5,0 l/min
Mod. OP – 431 TC	220/12 V	1 channel 0,2 – 1,0 l/min 2 channels 1,0 – 5,0 l/min 1 channel 5,0 – 20,0 l/min
Mod. OP – 618 TC	220/12 V	3 channel 0,2 – 1,0 l/min 3 channel 1,0 – 5,0 l/min
Mod. OP – 412 TC	220/12 V	2 channels 1,0 – 5,0 l/min 2 channels 0,2 – 1,0 l/min
Mod. OP – 280 TC-S	220 V	2 channels 20,0 – 40,0 l/min
Mod. OP – 221 TC	220/12 V Portable, with a built-in rechargeable battery	1 channel 0,2 – 1,0 l/min 1 channel 5,0 – 20,0 l/min

Note:
OP Series devices (excepting OP – 280 TC) can be completed by off-line power supply ABP-05 with charger.

OP – 442 TC AIR SAMPLING DEVICE

SPECIFICATIONS

Ranges of flow rate:	
1, 2 channels	0,2 - 1,0 l/min
3, 4 channels	5,0 - 20,0 l/min
Flow rate scale resolution:	
0,2 –1 l/min	0,2 l/min
5 - 20 l/min	5,0 l/min
Sampling time	(1-59sec)(1-99 min)
Start time	0,00-23,59
Inaccuracy Allowed pressure drop	± 5%
for 1, 2 channel	15,0 kPa
for 3, 4 channel	2,0 kPa
Power supply	~ 220V 50Hz, 12V with power adapter
Power consumption	100 W
Dimensions	240x300x240 mm
Weight	7 kg

OPERATING CONDITIONS

Ambient air temperature	-10 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

ADDITIONAL

Power pack ABP-05 provides two hours of independent operation.

DESCRIPTION

Stationary air sampling device OP-442TC is four channels automatic device for pumping with a certain volume flow rate. The flow rate is manually adjusted via rotameters located on the front panel. Manually setting sample start time, duration or sampling.

APPLICATION

Ambient air inspection
Industrial perimeter air inspection
Atmospheric research
Workplace air inspection

FEATURES

Easy and precise performance
Four simultaneous samples at different flow rates
Manual or automatic operating modes
Real time clock
Auto delayed start and timed shutdown
Pausing and restarting without losses of parameters
Robust stainless steel case

OP – 824 TC AIR SAMPLING DEVICE

SPECIFICATIONS

Ranges of flow rate: 1, 2,3,4 channels	0,2 - 1,0 l/min
5,6,7,8 channels	1,0 - 5,0 l/min
Flow rate scale resolution: 0,2 –1 l/min	0,2 l/min
1 - 5 l/min	1,0 l/min
Sampling time	(1-59 sec)(1-99 min)
Start time	0,00-23,59
Inaccuracy	± 5%
Allowed pressure drop **for 1, 2 channel**	15,0 kPa
for 3, 4 channel	2,0 kPa
Power supply	~ 220V 50Hz, 12V with power adapter
Power consumption	100 W
Dimensions	240x385x240 mm

OPERATING CONDITIONS

Ambient air temperature	-10 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

DESCRIPTION

Air sampling device OP-824TC is eight channels automatic instrument for pumping with a certain volume flow rate. The flow rate of each channel is manually adjusted via rotameters located on the front panel. Manually setting sample start time, duration of sampling.

APPLICATION

Ambient air inspection
Industrial perimeter air inspection
Atmospheric research

FEATURES

Easy and precise performance
Eight simultaneous samples at different flow rates
Manual or automatic operating modes
Real time clock
Auto delayed start and timed shutdown
Pausing and restarting without loss
Robust stainless steel case

ADDITIONAL

Rechargeable power pack ABP-05 provides two hours of independent operation.

OP – 221 TC AIR SAMPLING DEVICE

SPECIFICATIONS

Volume flow rate,	
1 channel	0,2 - 1,0 l /min
2 channel	5,0 – 20,0 l /min
Display Timer Range	(1-59sec)(1-99 min)
Inaccuracy	±5%
Allowed pressure drop	
for 1 channel	15,0 kPa
for 2 channel	2,0 kPa
Power supply	~ 220V 50Hz, 12V with power adapter
Power consumption	100 W
Dimensions	240x280x240 mm
Weight	7 kg

OPERATING CONDITIONS

Ambient air temperature	-10 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

DESCRIPTION

Portable air sampling device OP-221TC is a compact and lightweight automatic device for pumping with certain volume flow rate. The flow rate is manually adjusted via rotameters located on the front panel. Manually setting sample start time, duration or sample delays. It is suitable for the independent battery operation and operation from main power.

APPLICATION

Ambient air inspection
Industrial perimeter air monitoring Atmospheric research
Workplace air inspection

FEATURES

Easy and precise performance
Two simultaneous samples at different flow rates
Manual or automatic operating modes
Real time clock
Auto delayed start and timed shutdown
Pausing and restarting without losses
Up to 5 hours of independent working
Battery status indicator
Built-in rotameters
Robust stainless steel case

AC-2A AIR SAMPLING DEVICE

SPECIFICATIONS

2 channel	0,2 - 1,0 l/min
Volume ranges 1 channel	2,0-20 l
2 channel	2,0-20 l
Sampling time	(1-59 sec)(1-99 min)
Start time	0,00-23,59
Inaccuracy	± 5%
Power supply	~220V 50Hz, Rechargeable battery
Run time with battery	5 hours
Power consumption	15 W
Dimensions	280x220x160 mm
Weight	4 kg

OPERATING CONDITIONS

Ambient air temperature	-10 …+40°C
Atmospheric pressure	630 – 800 mm Hg.
Relative humidity	Up to 95%

DESCRIPTION

Portable air sampling device AC-2A is designated for pumping with a user selectable sample flow rate and volume. Integrated flow sensor enables constant flow for accurate measurements. It is delivered in a protective portable case.

APPLICATION

Ambient air inspection
Industrial perimeter air inspection
Atmospheric research

FEATURES

Two simultaneous samples at different flow rates
Constant flow control
Manual or automatic operating modes
Real time clock
Auto delayed start and timed shutdown
Pausing and restarting without losses
Up to 5 hours of independent work
Battery status indicator
Low power consumption
Built in air filter
Lightweight ergonomic design

AC-2C AIR SAMPLING DEVICE

SPECIFICATIONS

Flow rate ranges:	
1 channel	0,2 - 1,0 l/min
2 channel	2 - 10 l/min
Volume ranges	
1 channel	2,0-20 l
2 channel	20-200 l
Sampling time	(1-59 sec)(1-99 min)
Start time	0,00-23,59
Inaccuracy	± 5%
Power supply	~ 220V 50Hz,
Power consumption	60 W
Dimensions	280x220x160mm
Weight	4kg

OPERATING CONDITIONS

Ambient air temperature	-10 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

DESCRIPTION

AC-2C is an air sampling device for precise continuous measurements. Parameters of sampling can be settled via 4 button keypad and display. Integrated pump compensation processor supports constant flow for accurate measurements. It is delivered in a protective portable case.

APPLICATION

Occupational safety
Industrial perimeter air inspection
Atmospheric research
Hygiene inspection

FEATURES

Two simultaneous samples at different flow rates
Constant flow control
Manual or automatic operating modes
Auto delayed start and timed shutdown
Pausing and restarting without losses
Low power consumption
Built in dust filter
Lightweight ergonomic design

AC-4C AIR SAMPLING DEVICE

SPECIFICATIONS

Flow rate ranges:	
1,2 channel	0,2 - 1,0 l/min
3,4 channel	2 - 10 l/min
Ranges of volume	
1,2 channel	2,0-20 l
3,4 channel	20-200 l
Duration	(1-59 sec)(1-99 min)
Inaccuracy	± 5%
Power supply	~220V 50Hz, Rechargeable battery
Power consumption	100 W
Dimensions	450x330x200 mm
Weight	6 kg

OPERATING CONDITIONS

Ambient air temperature	-10 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

DESCRIPTION

AC-4C is a four channel air sampling device for precise continuous measurements. Parameters of sampling can be settled via 4 button keypad and display. Integrated microprocessor stabilizes gas flow for accurate measurements. It is delivered with a protective portable case.

APPLICATION

Occupational safety
Industrial perimeter air inspection
Atmospheric research
Hygiene inspection

FEATURES

Four simultaneous samples at different flow rates
Constant flow control
Manual or automatic operating modes
Auto delayed start and timed shutdown
Pausing and restarting without loss of parameters
Built in air filter

OP-M AIR SAMPLING DEVICE

SPECIFICATIONS

Amount of channels, (selectable)	1-8
Ranges of flow rate, l/min (selectable):	0,1 - 1,0 0,5-5,0 2,0,-20,0
Total volume:	42 l/min
Operation from main power	
Integrated battery operation	25 l/min
Sampling time	2-99 min
Inaccuracy	± 5%
Power supply	~220V 50Hz, 12V with adapter, Rechargeable battery
Power consumption	80 W
Dimensions:	
1-4 channels	240x320x190mm
5-8 channels	240x450x190mm
Weight	4,5 or 6 kg respectively

OPERATING CONDITIONS

Ambient air temperature	-15 ...+40°C
Atmospheric pressure	630 – 800 mm Hg
Relative humidity	Up to 95%

DESCRIPTION

The OP-M is a highly stable and reliable sampling device. Parameters of sampling can be settled via 4 button keypad and display. Integrated controller stabilizes gas flow for accurate measurements. The device is delivered with a protective portable case.

APPLICATION

Occupational safety
Industrial perimeter air inspection
Atmospheric research
Hygiene inspection

FEATURES

Up to 8 simultaneous samples at different flow rates
Low flow and high flow applications
Constant flow control
Manual or automatic operating modes
Auto delayed start and timed shutdown
Pausing and restarting with saving of parameters
Operation from main power or battery power supply (optional)
Built in air filter

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DEVICES OF VERIFICATION AND CALIBRATION

Section VII

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GS-024-1M OZONE GENERATOR

SPECIFICATIONS

Ozone mixtures concentration range	15 – 500 ug/m^3
"zero" air, ozone content	<0,0003 mg/m^3
Relative inaccuracy	±5%
Amount of selectable concentrations of ozone	Up to 10^2
Warm up time	1 hour
Gas outflow	2,5 l/min
Data output	RS-232
Power supply	220 V, 50 Hz
Dimensions	482x405x132 mm
Weight	8 kg

OPERATING CONDITIONS

Temperature	+15...+25°
Atmospheric pressure	680 – 780 mm Hg.
Relative humidity	Up to 98%

DESCRIPTION

GS-024-1 generator is a source of highly pure concentrations of ozone as well as “Zero air”. Integrated software allows to output up to 100 individual ozone concentrations with step 5 ug/m^3

This model is suitable for periodic working in non-hazardous areas.

APPLICATION

Calibration and verification of gas measuring devices. Primary Reference Gas Mixtures preparation

FEATURES

Comprehensive range of ozone mixtures
Generator is controlled from the keyboard or remote PC.
Proven technology
Easy maintenance, no consumables
19’’ rack mounting housing

OPERATIONAL PRINCIPLE

The principle of operation is UV photolysis of molecular oxygen.

GS-024-1 OZONE GENERATOR

SPECIFICATIONS

Ozone mixtures concentration range	15 – 500 ug/m³
"Zero" air, ozone content	<0,0003 mg/m³
Relative inaccuracy	± 5%
Amount of selectable ozone concentrations	5
Warm up time	1 hour
Gas out flow	2,5 l/min
Power supply	220 V, 50 Hz
Dimensions	482x420x132 mm
Weight	8 kg

OPERATING CONDITIONS

Temperature	+15...+25°
Atmospheric pressure	680 – 780 mm Hg.
Relative humidity	Up to 98%

DESCRIPTION

GS-024-1 ozone generator is a source of highly pure concentrations of ozone as well as “Zero air”.

For periodic working in non-hazardous areas.

APPLICATION

Calibration and validation of gas measuring instruments

Primary Reference Gas Mixtures preparation

R&D, instrument testing

FEATURES

Easy-to-use rotary switch with 5 individual concentrations of ozone
Proven technology
Easy maintenance, no consumables
19’’ rack mounting housing

OPERATIONAL PRINCIPLE

The principle of operation is UV photolysis of molecular oxygen.

GS-2000 CALIBRATION GAS GENERATOR - DILUTER

SPECIFICATIONS

Mixtures blending range	10 – 1300
Inaccuracy	5 - 7 %
Mixture out flow	2,3±0,2 l/min
Warm-up time	30 min
Power supply	220 V, 50 Hz
Power consumption	40W
Dimensions, mm/ Weight, kg:	
19'' rack enclosure	420x485x145/10
Table enclosure	455x535x190/14

OPERATING CONDITIONS

Temperature	+15...+25°
Pressure	Atmospheric, 680 – 780 mm Hg
Humidity	Up to 95%

APPLICATION

Primary Reference Gas Mixtures preparation
Calibration and validation of gas monitoring systems
Generation of blended gas mixtures
R&D, laboratory use
Instrument testing

DESCRIPTION

The GS-2000 is a gas generator-diluter for calibration gases preparation. The device dilutes high concentration gases with diluting gas (purified air or nitrogen) to precise concentrations. Can be used for blending of high number of analytic compounds as NO, NO_2, N_2O, O_2, CS_2, CH_3SH, CH_3OH, C2H5OH, C2H4O, CH3OCH3, SO2, H2S, CO, CO2, H2, NH3, hydrocarbons, freons. Not suitable for HCl, Cl_2, HF, F_2.
The instrument can be delivered in two types of housing: for a 19''rack mounting or table standing.
For periodical use (up to 8 hours)

FEATURES

10 dilution lines and their combination High accuracy, reproducibility and stability
Quick and easy to set up
Low power consumption

OPERATIONAL PRINCIPLE

Dynamic volumetric technique

Metrological characteristics table 19

Determine the impurities in the zero air generator output.	**Volume fraction of the determined impurity in zero air, X, mln-1, not more than**
(SO_2)	0,0005
(H_2S)	0,0005
(NO)	0,0005
(NO_2)	0,0005
(O_3)	0,0005
(NH_3)	0,001
(CO)	0,1
(CO_2)	1,0 (mod. HB-2000-1)
(CH_4)	0,1 (mod. HB-2000-1)
(CH_2O)	0,0005
Sulfur-containing compounds (mercaptans, dimethyl sulfide, carbon disulfide, etc.)	0,0005

Notes:

1. X=Xchanged+ (Δo×Xchanged)/100 ,
Where: Xchanged the highest permissible value of the volume fraction of impurities in zero air at the output of the generator, million-1
Δo – limits of relative measurement error of the impurity volume fraction in zero air at the generator output (at P=0.99)

Purpose and area of application

Generators are working standards of the first category and are intended for reproduction of unit of mass concentration (volume share) of the defined impurity in zero air and its transfer to measuring instruments (gas analyzers of control of air of the working zone, atmospheric monitoring, etc.) at carrying out their checking and calibration.

GENERATORS ZERO AIR WORKING STANDARDS of the 1st CATEGORY HB – 2000

SPECIFICATIONS

Relative humidity of zero air at the outlet, not more than	80%
Zero output air flow	Up to 15 dm³/min
Outlet pressure of zero air	0,1- 0,25 MPa
Limits of absolute error maintain pressure for 8 hours of continuous operation	0,02 MPa
Supply voltage	230±23 V
Power consumption not more than	950 *VA*
Dimensions not more than:	
- length	270 mm
- height	770 mm
- width	500 mm
Weight	38 kg
Sensor life expectancy	6 years

OPERATING CONDITIONS

Temperature	20±5 °C
Atmospheric pressure	84 to 106,7 kPa
Relative humidity	Up to 95%

FEATURES

Stationary floor version of the generator mod. HB-2000-1 provides a large flow rate (up to 15 dm3/min) of zero air and is ideal for connecting multiple gas mixture generators. In addition to purification from the main impurities (see table. 19), HB-2000-1 provides gas purification from hydrocarbons (including methane) and carbon dioxide.

GENERATORS ZERO AIR WORKING STANDARDS of the 1st CATEGORY HB – 2000

SPECIFICATIONS

Relative humidity of zero air at the outlet, not more than	80%
Zero output air flow	Up to 5 dm^3/min
Outlet pressure of zero air	0,1- 0,22 MPa
Limits of absolute error maintain pressure for 8 hours of continuous operation	0,02 MPa
Supply voltage	230±23 V
Power consumption not more than	220 *VA*
Dimensions not more than:	
- length	560 mm
- height	140 mm
- width	490 mm
Weight	12 kg
Sensor life expectancy	6 years

OPERATING CONDITIONS

Temperature	20±5 °C
Atmospheric pressure	84 to 106,7 kPa
Relative humidity	Up to 95%

FEATURES

Stand version of the generator mod. HB-2000-2 is suitable for connection of one gas mixture generator, as well as for complex equipment of monitoring stations.

GENERATORS ZERO AIR WORKING STANDARDS of the 1st CATEGORY HB – 2000

SPECIFICATIONS

Relative humidity of zero air at the outlet, not more than	80%
Zero output air flow	Up to 5 dm^3/min
Outlet pressure of zero air	0,1- 0,25 MPa
Limits of absolute error maintain pressure for 8 hours of continuous operation	0,02 MPa
Supply voltage	230±23 V
Power consumption not more than	220 *VA*
Dimensions not more than:	
- length	450 mm
- height	240 mm
- width	530 mm
Weight	15 kg
Sensor life expectancy	6 years

OPERATING CONDITIONS

Temperature	20±5 °C
Atmospheric pressure	84 to 106,7 kPa
Relative humidity	Up to 95%

FEATURES

Compact size and comfortable impact-resistant case. This is a portable version of the mod generator. HB-2000-3 is suitable for its use on-site verification and calibration.

METROLOGICAL FEATURES

Component	Volume fraction of the determined impurity in zero air, X, million-1, not more than
Sulphur dioxide (SO_2)	0,0005
Hydrogen sulphide (H_2S)	0,0005
Nitrogen oxide (NO)	0,0005
Nitrogen dioxide (NO_2)	0,0005
Ozone (O_3)	0,0005
Ammonia (NH_3)	0,001
Carbon oxide (CO)	0,1
Carbon dioxide (CO_2)	1,0 (mod. HB-2000-1)
Hydrocarbons converted to methane(CH_4)	0,1 (mod. HB-2000-1)
Formaldehyde (CH_2O)	0,0005
Sulfur-containing compounds (mercaptans, dimethyl sulfide, carbon disulfide, etc.)	0,0005

GENERATOR OF SINGLET OXYGEN ($a^1\Delta g$) «GS-102»

SPECIFICATIONS

Singlet oxygen mixtures concentration range	1–200 ug/m³
"Zero" air, singlet oxygen content	0,01 mg/m³
Relative inaccuracy	± 10%
Amount of selectable singlet oxygen concentrations	5
Power supply	230 V, 50 Hz
Dimensions	485×420×145 mm
Weight	8 kg

DESCRIPTION

The generator of singlet oxygen "GS-102" is intended for production of gas mixtures (GS) O_2 ($a^1\Delta_g$) in air and "zero" air used for calibration of gas analyzers of singlet oxygen.

APPLICATION

Calibration of gas analyzers used to measure the concentration of O_2 ($a^1\Delta_g$) in the air

OPERATIONAL PRINCIPLE

The princple of operation of the generator is the photochemical production of O_2 ($a^1\Delta_g$). Singlet oxygen is formed by UV irradiation of the air flow containing ozone. The operation of the generator is controlled by a switch on the front panel.

OPERATING CONDITIONS

Temperature	(20±5)°C
Atmospheric pressure	680 – 780 mm Hg.
Relative humidity	30-90%

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INFORMATION

SECTION VIII

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Gas	mg/m³ 1 million⁻¹	g/m³ 1 об. %	$PDK_{р.з.}$, mg/m³	$PDK_{м.р.}$, mg/m³	$PDK_{с.с.}$, mg/m³
O_3	1,997	19,97	0,1	0,16	0,03
SO_2	2,66	26,6	10	0,5	0,05
NO_2	1,91	19,1	2	0,2	0,04
NO	1,26	12,6	3	0,4	0,06
NH_3	0,707	7,07	20	0,2	0,04
CO	1,16	11,6	20	5	3
CO_2	1,83	18,3	–	–	–
CH_4	0,66	6,66	300		
Cl_2	2,95	29,5	1	0,1	0,03
H_2S	1,41	14,1	10	0,008	
HCl	1,52	15,2	5	0,2	0,2
C_6H_{14}	3,58	35,8	300	60	–
O_2	1,498	14,98	–	–	–
C_3H_8	1,83	18,3	300	4	–
HCN	1,12	11,2	0,3	–	0,01
HF	0,83	8,3	recalculation of F 0,5/0,1	recalculation of F 0,03	recalculation of F 0,01
NF_3	2,95	29,5	–	recalculation of F 0,03	recalculation of F 0,01
C_1–C_5			300	50	
C_6–C_{12}				30	
Dust general				0,5	0,15
Dust PM10				0,3	0,06
DustPM2,5				0,16	0,035
HCOH	1,25	12,5	0,5	0,05	0,01

Component	Moidels			
	The air of the working area	Atmospheric monitoring	Industrial gas emissions	Technical gas mixtures
O_3	3.02P-R F-105	3.02P-A F-105 SKAT		CYCLONE-5 F-105
CO	MGL-19.1A MGL-19M-1 KASKAD-N	K-100 OPTOGAS-500.4 SKAT	OPTOGAS-500 KASKAD-N ADG	OPTOGAS-500
CO_2	OPTOGAS-500.4	SKAT OPTOGAS-500.4	OPTOGAS-500	OPTOGAS-500
O_2	MGL-19.8A MGL-19M-8		OPTOGAS-500 KASKAD-N ADG	OPTOGAS-500
SO_2	MGL-19.3A MGL-19M-3 KASKAD-N	SKAT CB-320A-1 C-310A	KASKAD-N ADG	
NO	MGL-19.4A MGL-19M-4 KASKAD-N	SKAT P-105 P-205 H-320A H-105	OPTOGAS-500 KASKAD-N ADG	
NO_2	MGL-19.5A MGL-19M-5 KASKAD-N	H-320A P-105 P-205 SKAT H-105	KASKAD-N ADG OPTOGAS-500	
NH_3	MGL-19.7A	H-320 H-105 H-320A SKAT		
CH_x			OPTOGAS-500	
Cl_2	МГЛ-19.6А МГЛ-19М-6			
H_2S	MGL-19.2A MGL-19M-2 KASKAD-N	CB-320-A1 C-105CV SKAT	KASKAD-N	
HCN	MGL-20			

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