АНАЛИТПРИБОР
СМОЛЕНСК

Stream gas chromatographs "ХРОМАТ-900-7"

Designed for continuous automatic measuring of mole fraction of nitrogen, oxygen, carbon dioxide, hydrocarbons C1 – C5 and C6 + higher contained in flammable natural gas according to ГОСТ 31371.7-2008 "Natural gas. Determination of composition with defined uncertainty by gas chromatography method. Measurement procedure of the mole fraction of components".

Application: departments of OAO «Gazprom» (gas-transport, gas mains, gas-production, gas-processing, gas-distribution and gas-consuming organizations), including business accounting between business entities.

Type of chromatograph - fixed
Mode of operation – continuous
Measurement mode – cyclic
Version – explosion-proof, explosion protection marking "1Exd[ib]IICT4X"
Depending on number of analytical information processing channels – single-channel
Types of used sensors: ДТП (heat conduction sensor), ЭХД (electrochemical sensor)
Chromatograph consists of: analytic unit (БА), gas preparation unit (БПГ), cylinder unit (ББ).

Basic technical characteristics

Characteristics	Value	Remarks
Maximum number of sensors	2	
Warm-up time, min, not more	120	
Carrier gas flow rate, ml/min, not more	2 – 40m	method of detection of carrier gas and analyzed gas flow rate -automatic
Analyzed gas flow rate, ml/min, not more	50	
Detection limits: through the channel with ДТП of propane, g/cm^3, not worse	$3x10^{-9}$	
Assumed value limit of ОСКО of output signal (chromatographic peak), %	± 0,5	
Ambient temperature, ^{0}C	от +1 до +50	
Supply voltage, V	230^{+23}_{-46}	frequency 50±1 Hz
Power consumption, VA, not more	170 60	in warm-up mode in nominal mode
Degree of protection against external influence	IP54	
Type of carrier gas	gaseous helium	
Overall dimensions, mm, not more: analytic unit (БА) gas preparation unit (БПГ)	 650x630x425 520x510x370	modular design
Weight, kg, not more analytic unit (БА) gas preparation unit (БПГ)	 60 30	
Communication line length between chromatograph and PC, m, not less: when connecting through interface RS-485 through Ethernet (electric cable)	 1000 80	
Communications protocol with external equipment	MODBUS RTU	

Chromatograph software allows on the basis of results of measuring of components mole fraction, converted to standard conditions, to carry out calculation of physicochemical parameters of natural liquefied gas – combustion heat, density, relative density and Wobbe index converted to standard combustion conditions of according to ГОСТ 31369-2008.

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Measuring rages of components mole fraction of natural liquefied gas and absolute error limits

Component	Measuring rage of mole fraction of natural liquefied gas component, mole fraction, %	Maximum permissible error $\Delta(x)$ [1], mole fraction, %
Methane	40 – 99,97	$-0{,}0187 \cdot x + 1{,}88$
Ethane	0,005 – 15,0	$0{,}04 \cdot x + 0{,}00026$
Propane	0,005 – 6,0	$0{,}06 \cdot x + 0{,}00024$
Isobutane	0,005 – 4,0	$0{,}06 \cdot x + 0{,}00024$
н–Butane	0,005 – 4,0	$0{,}06 \cdot x + 0{,}00024$
Isopentane	0,005 – 2,0	$0{,}06 \cdot x + 0{,}00024$
н–Pentane	0,005 – 2,0	$0{,}06 \cdot x + 0{,}00024$
Neopentane	0,005 – 0,05	$0{,}06 \cdot x + 0{,}00024$
Hexanes (C_{6+})	0,005 – 1,0	$0{,}06 \cdot x + 0{,}00024$
Carbon dioxide	0,005 – 10,00	$0{,}06 \cdot x + 0{,}0012$
Nitrogen	0,005 – 15,0	$0{,}04 \cdot x + 0{,}0013$
Oxygen	0,005 – 2,0	$0{,}06 \cdot x + 0{,}0012$

[1] bound of absolute error at confidence probability p=0,95, in percents corresponds to extended absolute uncertainty U(x) at coverage factor K=2
[2] hydrocarbons, more heavy than н-pentane, considered as a single «pseudocomponent » C6+higher, measured as one component with н-hexane characteristics
x – value of mole fraction of natural liquefied gas component, %

Advantages

- compliance with the new requirements for determination of natural gas component content (ГОСТ 31371 - 2008, ГОСТ 31369 - 2008);
- low flow rate of analyzed gas and carrier gas;
- explosion-proof version according to ГОСТ Р 51330.0-99, provided by explosion protection type - explosion-proof enclosure, intrinsically safe electric circuit;
- availability of control desk provided operational performance monitoring and operating modes setting at the place of chromatograph mounting and having explosion-proof version with explosion protection marking 1ExibIICT6, without the use of PC;
- chromatograph automatic calibration;
- capability of operation in field conditions in case of mounting in thermostated cabinet (supplied on special order);
- possibility of connection between chromatograph and PC up to 1000 m, in case of connection through interface RS485;
- possibility of storage in nonvolatile memory data about measurements and calibrations results for the last 35 days;
- processing of measurement and service data, adjustment and diagnostics of chromatograph operation is carried out by means of PC;
- certified software.

Delivery set

Chromatograph with БА and БПГ, software for PC, verification procedure, operation manual, operator's guide, set of mounting elements and accessories.
Supplied on special order:
- set of test gas mixtures;
- cylinders with carrier gas, assist gas;
- cylinder cabinet;
- control desk ИБЯЛ.422411.005-01;
- transport line of sample and sample preparation unit;
- PC;
- verification instruments (TGM-SSS);
- thermostated cabinet.

It is necessary to complete an application form for selection of stream gas chromatograph.

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