



Český metrologický institut

Parts Certificate

Number: ZR 143/20 - 0213

Issued by: **Czech metrology institute
Okružní 31
638 00 Brno
Czech Republic**

Notified body: **1383**

In accordance with: **Welmec Guide 8.8,
OIML R140:2007,
WELMEC 7.2:2018.**

Issued to: **OOO NTF BACS
Kirova ave., 10
Samara, 443022
Russia**

In respect of: **A model of a calorific value determining device (CVDD), intended to be as a part of a measuring system for gaseous fuel**

Type: **Process Gas Chromatograph MAG - model KC 50.310-000**

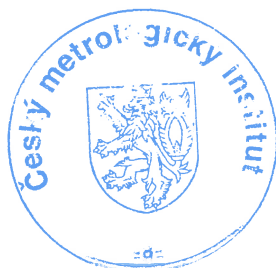
Manufacturer: **OOO NTF BACS, Russia**

Characteristics:	Range of calorific value (15/15 °C, 101,325 kPa):	4,1 – 15,5 kWh/m ³
	The temperature range:	-25°C / +60 °C

Document number: **0511-ZR-A006-20**

Description: **The calorific value determining device (CVDD) MAG KC 50.310-000 is described in the descriptive annex.
Summary of test involved: see descriptive annex. Certificate contains 5 pages.**

Date of issue: 17 December 2020




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**RNDr. Pavel Klenovský
Director General**

Descriptive annex**1 General information and basic characteristics**

The **calorific value determining device (CVDD)** is the device, which is able to sampling and analyse a natural gas.

The device evaluate these compounds: nitrogen, carbon dioxide, methane, ethane, propane, 2-methylpropane, butane, 2,2-dimethylpropane, 2-methylbutane, n-pentane, hexane (hydrocarbons above hexane are evaluate as a sum and express as a value of hexane).

The measuring principle is based on the separation analytical method, which is able to separate compound of natural gas on chromatograph column (in accordance with ISO 6974).

The thermal conductivity detector is used for detection. The results are evaluated according to the current calibration table which is part of the analytical software.

After the determination of the chemical composition of nature gas the calorific value and the relative density according to ISO 6976 is calculated.

The communication ports for external devices: 10/100 Mbps Ethernet, RS-232/485. Outputs are configurable by Modbus protocol. Additional options: current loop 4 - 20 mA.

1.1 Essential parts are described in the following documentation

Description	Document/Drawing number
MAG KC 50.310-000	OPERATOR'S MANUAL, KC 50.310-000 RE, V 3.0

1.2 Metrological characteristics**Specification of instrument:**

Range of calorific value (15/15 °C, 101,325 kPa):	4,1 – 15,5 kWh/m ³
Temperature of environment for analytical part of MAG KC 50.310-000:	-25 °C / +60 °C
Temperature of environment for internal calibration gas and sampling system of MAG KC 50.310-000:	must be situated in controlled environment to avoid condensation of gas compounds on cylinder's and pipe's wall
Carrier gas:	helium
Time of analysis:	approx. 300 s
Number of compounds:	11
Accuracy class (OIML R140):	A (mpes ±0,5%)

Range of measured compounds:

	compound:	range (10 ⁻² mol/mol)
1	methane	50 – 100
2	ethane	0,05 – 15
3	propane	0,05 – 10
4	2-methylpropane (i-butane)	0,01 – 4
5	butane (n-butane)	0,01 – 4
6	2,2-dimethylpropane (neo-pentane)	0,001 – 0,1
7	2-methylbutane (i-pentane)	0,005 – 2
8	pentane (n-pentane)	0,005 – 2
9	hexane (C ₆₊)	0,005 - 1
10	nitrogen (+ oxygen)	0,05 – 15
11	carbon dioxide	0,01 - 10

1.3 Devices and functions

- sampling and analysis a natural gas,
- automatic measurement evaluation (peak integration, component identification, composition calculation)
- calculate calorific value (is possible calculate additional properties from chemical composition - accordance with ISO 6976),
- automatic calibration measurement (including evaluation),
- front communication panel (optional),
- accountable alarms will be generated if a defect arises or extreme values are measured by the gas chromatograph (user set limits can be applied).

1.3.1 Connections

Power supply:	220 V with frequency 50 Hz
RS 232/485:	ModbusRTU – 2 pcs
Ethernet:	ModbusTCP – 1 pc.,
Discrete inputs (NAMUR):	4 pcs. (optionally extendable)

1.3.1.1 Optional connections

Current loop:	4 - 20 mA
RS 232/485:	1 pc
Discrete outputs:	optical Ethernet, GSM/GPRS

2 Data plate

The data plate shall be secured against removal by sealing or will be destroyed when removed.

Following information shall be on data plate:

- number of the Parts Certificate
- manufactures name or mark
- temperature range
- accuracy class
- serial number
- year of production device

3 Software and securing

3.1 Software

The device contains firmware, which is responsible for the control user part, the sampling part and the evaluation measured data.

Approved firmware with checksums (legally relevant software - Type P, Risk Class: C):

Main SW core: (CRC-32):	0x6528D89A
Main SW gui: (CRC-32):	0xB51F590A
AnalizCalc.dll: (CRC-32):	0x1BFEB1EF
RegressCacl.dll: (CRC-32):	0xF2532F35
DewPoint.dll: (CRC-32):	0x7F06F760
AddFunct.dll: (CRC-32):	0x18B1811B
Integral settings (CRC-32):	0xEB2841D9
Component parameters (CRC-32):	0x954ADCD6
Embedded formulas (CRC-32):	0xF5D47CE2
Additional formulas (CRC-32):	0x6CBA8755
Functions (CRC-32):	0x12A7AF65

The program "Verifier" is used to check checksum for CVDD without Local operation interface:

Legally relevant software- Type U, Risk Class C: v1.0.0, CRC-32: 0x865CE475



CVDD is possible controlled by software ANALYZ. This software allows to user set up the communication channel, the calibration table and the run analysis.

3.2 Securing

Components that may not be dismantled or adjusted by the user shall be secured by suitable manner on the locations indicated in drawings (see Figure 1).

4 Tests and evaluation

Tests and evaluation carried out are in compliance with OIML R140:2007, 0111-OOP-C018-10 and WELMEC 7.2:2018

Tests are described in Test Report No.: 1014-PT-T0100-20,
P-VZLUTEST-280/19,
8551-PT-E231-19,
6011-PT-SW004-20.

Tests carried out

OOP nr.: 0111-OOP-C018-10: 5.3.1 5.3.2 Test of accuracy and repeatability
OIML R140:2007 10.2.7.4 adjustment interval and drift
OIML R140:2007 10.2.7.5 influence of the gas composition
OIML R140:2007 10.2.7.6 response time
OIML R140:2007 10.2.7.7 influence of gas supply
OIML R140 A.4.1 Dry heat
OIML R140 A.4.2 Cold
OIML R140 A.4.3.a Damp heat steady state
OIML R140 A.4.3.b Damp heat cyclic test
OIML R140 A.4.4'Vibration (random)
OIML R140 A.4.5 Radiated radio-frequency electromagnetic field
OIML R140 A.4.6 Conducted disturbances induced by radio-frequency field
OIML R140 A.4.7 Electrostatic discharge:
OIML R140 A.4.8 Surges on signal, data and control lines
OIML R140 A.4.10 AC mains voltage variation
OIML R140 A.4.11 AC mains voltage dips, short interruptions and voltage variations
OIML R140 A.4.12 Bursts on AC and DC mains and on signal lines
OIML R140 A.4.13 Surges on AC and DC mains power lines
853-MP-C001, WELMEC 7.2, 2018

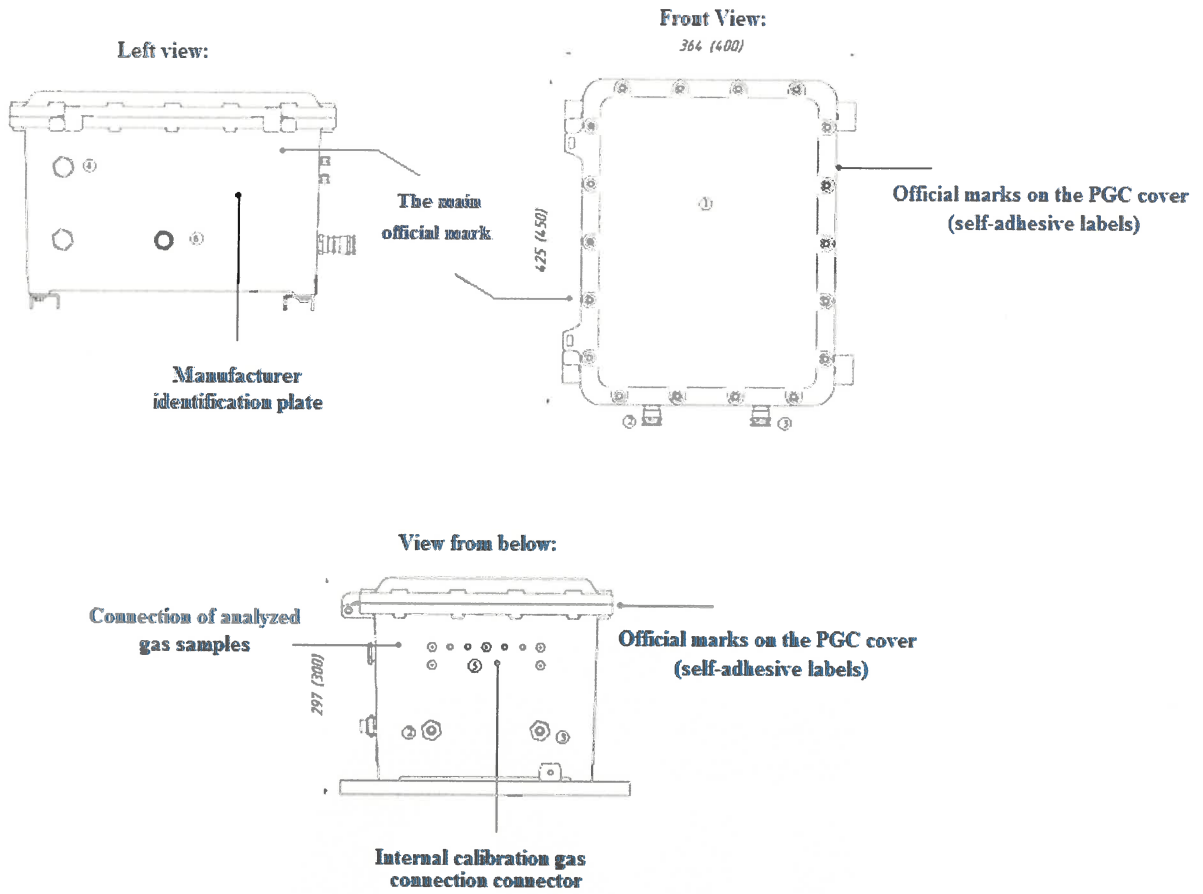


Figure 1 The marking of measuring instrument with official marks