FEDERAL AGENCY ON TECHNICAL REGULATION AND METROLOGY

CERTIFICATE

for pattern approval

RU.C.29.006.A No. 51610

Validity term to July 23, 2018

TYPE OF MEASURING INSTRUMENT
Rotary gas meters RSG SIGNAL

MANUFACTURED BY
Engels Instrument Manufacturing Association Signal Limited Liability Company (Signal LLC); Engels, Saratov Region

SERIAL NUMBER **41453-13**

DOCUMENT FOR VERIFICATION
СЯМИ 407273-561 МП

VERIFICATION TESTING INTERVAL **6 years**

Type of measuring equipment has been approved by order No. **838** of the Federal Agency on Technical Regulation and Metrology dd. **July 23, 2013**

Description of the measuring instrument type is a normative annex hereto.

Deputy Head
of the Federal Agency F.V. Bulygin

Official seal: FEDERAL AGENCY ON TECHNICAL REGULATION AND METROLOGY* OGRN 1047706034232

"....." July 2013

Series **СИ** **No. 010823**

DESCRIPTION OF THE MEASURING INSTRUMENT TYPE

Rotary gas meters RSG SIGNAL

Application

Rotary gas meters **RSG** SIGNAL are designed to measure the operating volume of natural gas according to GOST 5542-87, free oil gas according to GOST P 8.615-2005, nitrogen, air and other compatible, pure, dry gases.

Description of the measuring instrument

The meters operate by using kinetic energy of gas flow for rotors spinning that shut off some volume of gas and transfer it from meter input to its output. Rotor speed is commensurate with gas volume passed through the meter.

The meters consist of the following parts

a) casing, including measurement chamber, defined by the walls with front and rare lids;

b) two rotors, counterrotating one against the other due to two gear wheels;

c) transfer device with magnetic transmission;

d) leakproof counting mechanism with roller summator, calibration gear-wheels equipped with two connectors Binder and rotating needle indicator to generate pulses by Cyble Sensor. The counting mechanism may rotate the entire circle may rotate 350 degrees for more convenient reading angle;

e) two nozzles for pressure tapoff at inlet and outlet of the meter;

f) two dial-operated weights for temperature transducers at the meter input;

g) lubrication system with plug for oil filling oil-level indicator.

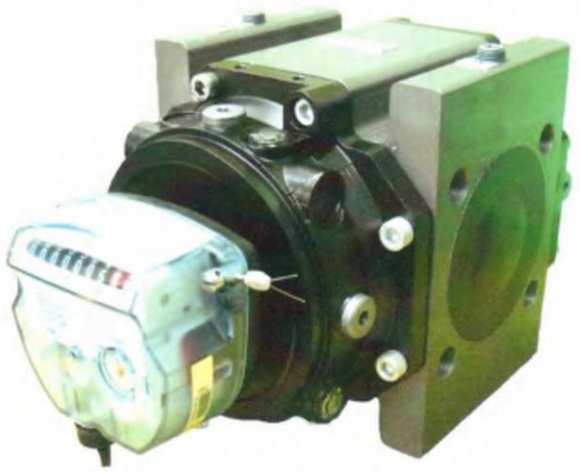

Figure 1 - RSG SIGNAL general drawing

The meters are flanged with the pipe. The meters may be installed on the horizontal and vertical pipelines; no straight sections at input-output of the meter are required.

The following types of transducers are installed on the meters for handling with the correctors, as well as for calibration and verification:

- LF pulse sensors and transducers of unauthorized tampering НВМП ФТ (included in the standard design of all meters);
- MF inductive transducers;
- HF inductive transducers;
- MF optical sensors;
- Cyble Sensors for telecommunication to the remote recording devices.

The meters have several modifications depending upon inside diameter Ду and standard size according to the flow rate G.

There are three design variants of the meters based on measuring error of operating flow rate.

The design of meters restricts an access to some of its parts to avoid unauthorized settings and tampering of the instrument which can result in measurements distortion.

The meters provide for 12 seals application.

6 seals are installed on measurement chamber casing to prevent access to the sockets of pressure and temperature measuring instruments (in threes from the upper and bottom side of the casing).Either of the two lids of the casing has 2 seals in order to prevent access to the measurement chamber. Two mounted seals preventing access to the counting mechanism and calibration gear wheels are applied on the head of the counting mechanism.

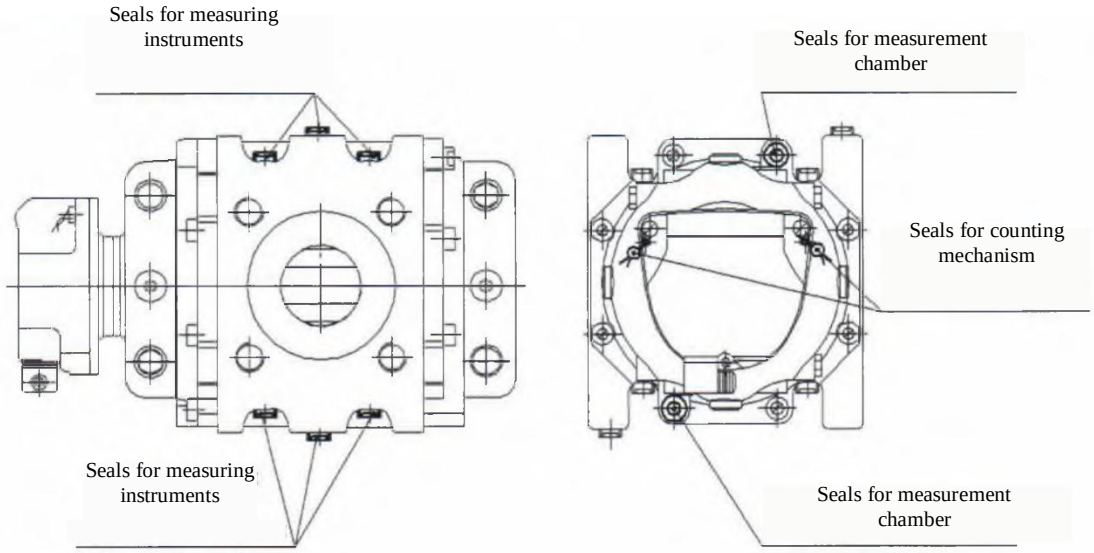

Figure 2 – Meter sealing circuit

Metrological and technical specifications

Table 1

Parameter	Parameter value for standard size										
	G10	G16		G25		G40		G65	G100	G160	G250
Measured medium	Natural gas according to GOST 5542-87, free oil gas according to GOST P 5.615-2005, nitrogen, air and other compatible, pure, dry gases										
Inside diameter, Ду, mm	40	40	50	40	50	40	50	50	80	80	100
Maximum flow, Q_{max}, m^3/hr	16	25		40		65		100	160	250	400
Measuring range Q_{max} / Q_{min}*	from 1:20 to 1:50	from 1:20 to 1:100	from 1:20 to 1:50	from 1:20 to 1:160	from 1:20 to 1:100	from 1:20 to 1:200	from 1:20 to 1:160	from 1:20 to 1:200			from 1:20 to 1:160
Permissible relative accuracy limits, %, • version 1 - within flow range from $Q_{min.}$ to 0,05 $Q_{max.}$ - within flow range from 0,05 $Q_{max.}$ to $Q_{max.}$ • version 2 - within flow range from Q_{min} to 0,05 Q_{max}, - within flow range from 0,05 $Q_{max.}$ to Q_{max} • version 3 (custom-made) - within flow range from 0,05 $Q_{max.}$ to Q_{max}	±1,7 ±0,75 ±2,0 ±1,0 ±0,75										
Threshold, m^3/hr, max.	0,03	0,03; 0,05**		0,05		0,05		0,05	0,07	0,15	0,2
Cyclic volume, dm^3	0,14	0,14; 0,59**		0,19; 0,59**		0,19; 0,59**		0,59	0,94	1,78	3,65
Counting mechanism capacity, m^3	99999,999	9999999,99									99999999,9
Number of bits of counting mechanism	8	9									9
Division value of the least significant bit, dm^3	0,2	2									20
1 LF pulse Cyble Sensor, m^3 /pulse	0,01- for Ду 40 0,1- for Ду 50								0,1	0,1	1
Operating pressure, MPa, max.	1,2	1,6									

Table 1 continued

Parameter	Parameter value for standard size							
	G10	G16	G25	G40	G65	G100	G160	G250
Pressure loss, Pa, max.	27	67; 10***	111; 27***	268; 71**	168	140	220	212
Type of explosion protection	lExibIIAT6/T5 X							
Overall dimensions, mm, max.:		Ду 40 G16,25,40		Ду50				
length,	186	G16,25,40			311	387	435	615
width,	171	186		311	171	171	171	241
height	126	171		171	182	182	182	235
		126		182				
Weight, kg, max.	6	6		11	11	15	17	43
Average life, years, at least	12							
MTBF, hr., at least	100000							
Operating conditions. - ambient temperature, °C - relative air humidity, % at 35 °C, max. - air pressure	from minus 40 to plus 60 °C to 95% at 35 °C from 84 to 106,7 kPa							

Note:
1 «*» - values of the measuring range Qmax/Qmin are provided for the versions 1 and 2.
Minimum flows of meters of version 3 (custom-made) are 0,05 Qmax.;
2 «**» - for meters Ду 50;
3 «***»-design by order

Pattern approval mark
is placed on the nameplate of the counting mechanism by flat photoprinting and on the front page of the Operational Manual typographically.

Completeness of measuring instrument
Completeness of the unit is given in the Table 2.

Table 2

Item	Marking	Quantity	Note
Rotary gas meter **RSG** SIGNAL	СЯМИ. 407273-561 СП	1	

Table 2 continued

Item	Marking	Quantity	Note
Operational Manual	СЯМИ. 407273-561 РЭ	1	
Verification method	СЯМИ. 407273-561 МП	1	On separate order
Oil container		1	
Flow sensor harness	478 -СБ7 СП	1	
Packing	СЯМИ. 407273-561 УЧ СП	1	
Starting filter		1 2	Horizon. RSG installation Vertical, RSG installation
Cyble Sensor		1	On separate order
HF transducer		1	On separate order
Optical sensor		1	On separate order
MF sensor		1	On separate order
Filter ФГ with ИПД		1	On separate order
Nozzle PETE'S PLUG		1	On separate order
Kit of adaptors from Ду40 to Ду50		1	On separate order
Assembly kit for corrector connection	СЯМИ 407229-478 Д1 СП	1	On separate order (specify the corrector type at order)
Differential pressure transducer on the meter		1	On separate order
Assembly kit of tapered reducers for installation of meters on the pipeline	СЯМИ 407273-561 Д14СП	1	On separate order

Verification

is carried out according to СЯМИ 407273-561 МП "Instruction. . State system of industrial automation equipment. Rotary gas meters RSG SIGNAL" approved by the State Center for Testing Measuring Instruments of Federal State Unitary Enterprise VNIIR dated March 5, 2013.

Verification instruments:

- verification unit for gas meters, flow range from 0,03 to 1600 m^3/hr, error ±0,25%; ±0,33%;
- psychometric hygrometer, ВИТ-1, ВИТ-2, measuring range of relative humidity from 20 to 90 %, temperature measuring range from 15 to 40 °C, temperature error ±2 °C, humidity error ±5 %, ТУ 25-11.1645-84;
- aneroid barometer М 67, measuring range from 81130 to 105320 Pa, error ±106 Pa, ТУ 2504-1797-75;
- stop clock СОС пр-2б-2, measuring range from 0 to 3600 с, accuracy class 2, ТУ 25-1894.003-90
- pressure-vacuum gage (double-tube fluid manometer), measuring range from 0 to 6000 Pa, error ± 40Pa, ТУ92-891.026-91.

Regulatory and technical documents specifying the requirements to the Rotary gas meters RSG SIGNAL
СЯМИ. 407273-561 ТУ. Rotary gas meters RSG SIGNAL. Specification.

Recommendations on application areas in the field of state control for measurement uniformity assurance:
Performance for conformity evaluation of the industrial products and products of other types, as well as other facilities with the mandatory requirements established by the Russian Federation.

Manufacturer
Engels Instrument Manufacturing Association Signal Limited Liability Company (Signal LLC); Engels-19, Saratov Region, 413119,
phone.: (8453) 75-04-72. fax: (8453) 75-17-00. e-mail: office@eposignal.ru

Testing Center
Federal State Unitary Enterprise "All-Russian Research Institute for Flow Metering" (FSUI VNIIR), registration No. 30006-09; 2nd Azinskaya Street-7A, Kazan, RT, 420088, phone: (843) 272-70-62, fax: (843) 272-00-32, e-mail: vniirpr@bk.ru

Deputy Head of
the Federal Agency
on Technical Regulation
and Metrology

F. Bulygin

July «25» _____ 2013

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