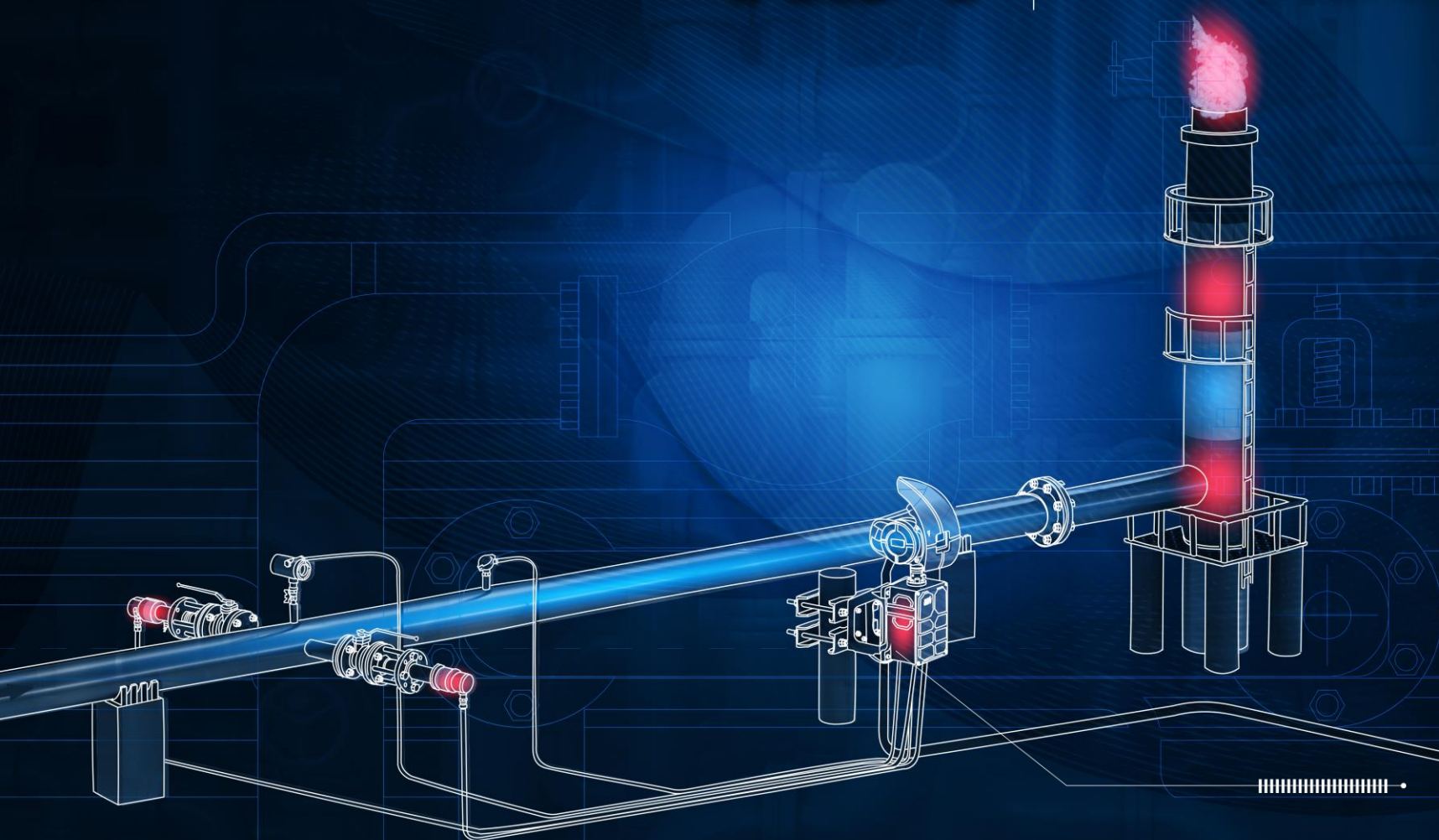




**KTM100 RUS**  
ULTRASONIC FLOW METER



FLARE GAS FLOW METER,  
CONTINUOUS PROCESSES



In the Register of Industrial products of Russian Federation in accordance with the Decree of the Russian Government №719 «On the recognition of the products of Russian Federation».



Software KTM Smart Stream of our own development is included in the register of Russian software (Note in the registry 11574 from 24.09.2021).



Accredited as the manufacturer of instrumentation & controls by the Federal Service for Technical and Export Control on the ability to use software and hardware on Key Information Infrastructures of fuel and power enterprises.





## FLARE GAS FLOW METER KTM100 RUS

### KTM100 RUS



#### PURPOSE:

Technological metering of flare gases, continuous processes.

#### ADVANTAGES:

- Gas velocity range from 0.03 to 120 m/s according to the Rostekhnadzor rules of safe operation of flare systems;
- Metering for cryogenic fluids down to  $-196^{\circ}\text{C}$ ;
- Metering at high temperatures up to  $+330^{\circ}\text{C}$ ;
- Replacement of sensors under working pressure;
- Simulation proving method;
- Working pressure up to 6.3MPa – mounting kit;
- Working pressure up to 25MPa – spool-piece version;
- Measurement accuracy of single-beam version 1.5-5%, two-beam version 1-3%;
- Self-diagnosis of beam logging and general flow meter condition;
- Remote display module, remote from the mounting point - up to 1000 m;
- Calculation of mass flow without a density meter using the «Hydrocarbon» method;



### GAS VELOCITY RANGE FROM 0.03 TO 120 M/S ACCORDING TO THE REGULATIONS:

- GOST R 53681-2009 oil and gas industry. Flare systems parts for general working processes at refineries;
- Order 450 On the safe operation of flare systems  
PB 03-591-03 (Resolution of the Federal Mining and Industrial Supervision of the Russian Federation N 83 «On approval of the Rules of safe operation of flare systems»);
- VNTP 3-85 «Standarts of technological design of objects of collection, transport, preparation of oil, gas and water of oil fields»;
- The automated process control system shall be equipped with a signaling system of a flow rate less than 0.05 m/s to prevent air entering into the flare system and possible explosion, and at more than 120m/s to avoid tearing off the flame and spreading heavy hydrocarbons around the flare line above ground.





**OPERATING FLUID TEMPERATURE UP TO +330°C ALLOWS TO USE THE FLOW METER IN PETROLEUM AND GAS PROCESSING.**

- Hydrocracking is produced under the influence of hydrogen at a temperature of +330°C;
- Hot air for burning of limestone kilns and industrial furnaces up to +330°C;
- Low temperature pyrolysis with process temperature up to +500°C and temperature discharge up to +330°C.



- Extraction of sensors under operating pressure up to 6.3MPa due to special safe design.
- Removal of sensors without stopping the process for simulation proving, cleaning and diagnostics.
- Tie-in works during the working process using hot tap equipment.



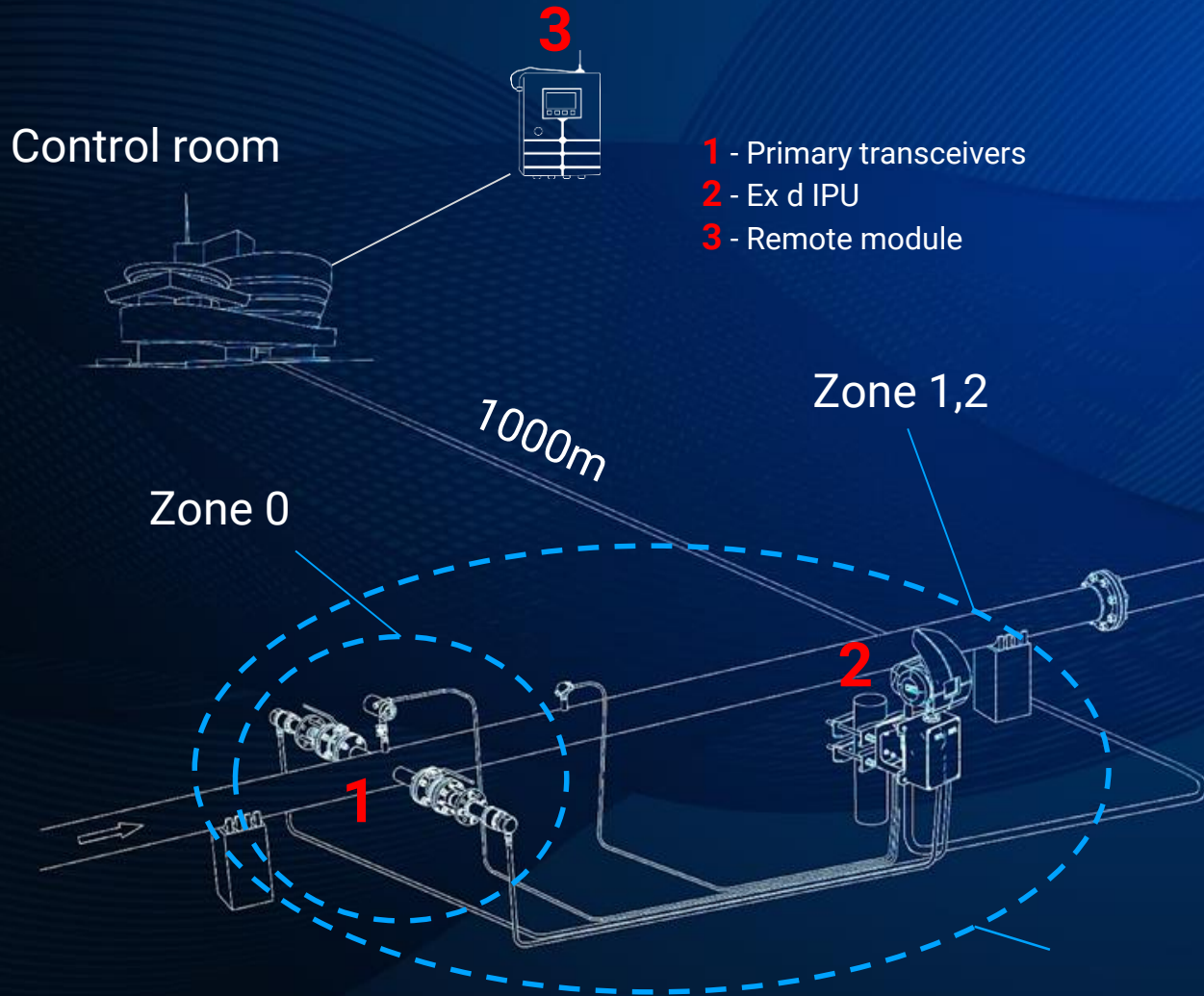


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## SIMULATION PROVING EVERY 4 YEARS USING ZERO FLOW CHAMBER



- No need to make “wet proving” at equipment of the CSM (Metrology and Standardization Center).
- Reduced time and cost of proving works.
- Zero flow chamber with necessary tools, positioners and supports to simplify and facilitate the proving process.
- Accuracy 2% - for 1-beam version, 1.5% for 2-beam version.



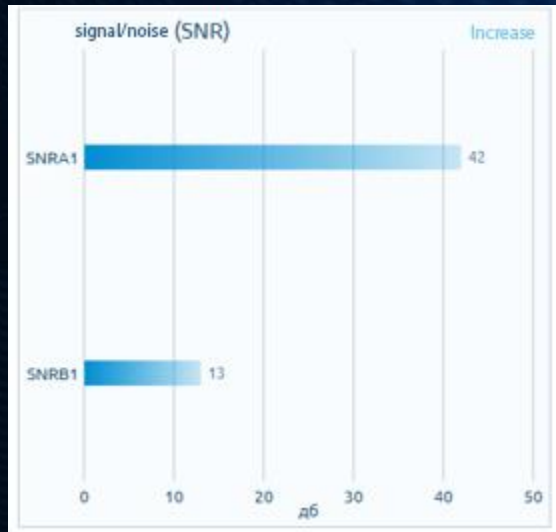
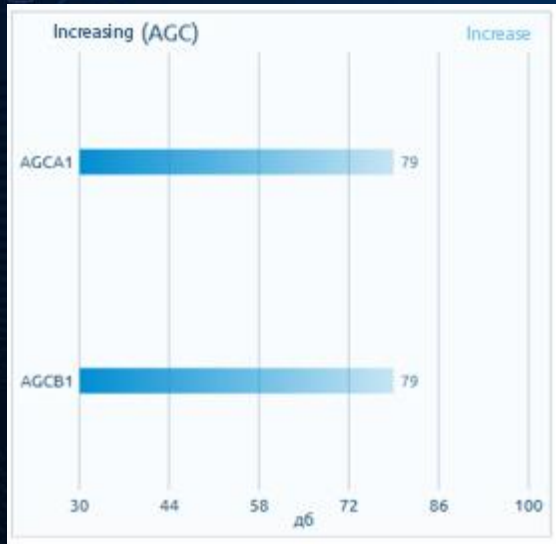
- 1 - Primary transceivers
- 2 - Ex d IPU
- 3 - Remote module

- Positioning up to 1000m from the information processing unit (IPU) to adjust and visualize the measured parameters data in the control room or other areas.
- To connect various types of equipment, interface converters, repeaters and spark protection units were used as part of the remote module.
- As part of the regulation, the manufacturers of the meters for custody transfer metering should provide the possibility of wireless communication, which is implemented in a remote module.





# SENSOR CONTAMINATION CONTROL



System

Warning

- ▲ Meter
- ▲ Interface board 1
- ▲ Interface board 2
- ▲ Beam 1
- ▲ Summer time settings are out of date
- ▲ Winter time settings are out of date
- ▲ Battery replacement is required
- ▲ Profile factor
- ▲ Flow asymmetry
- ▲ Swirls

Errors

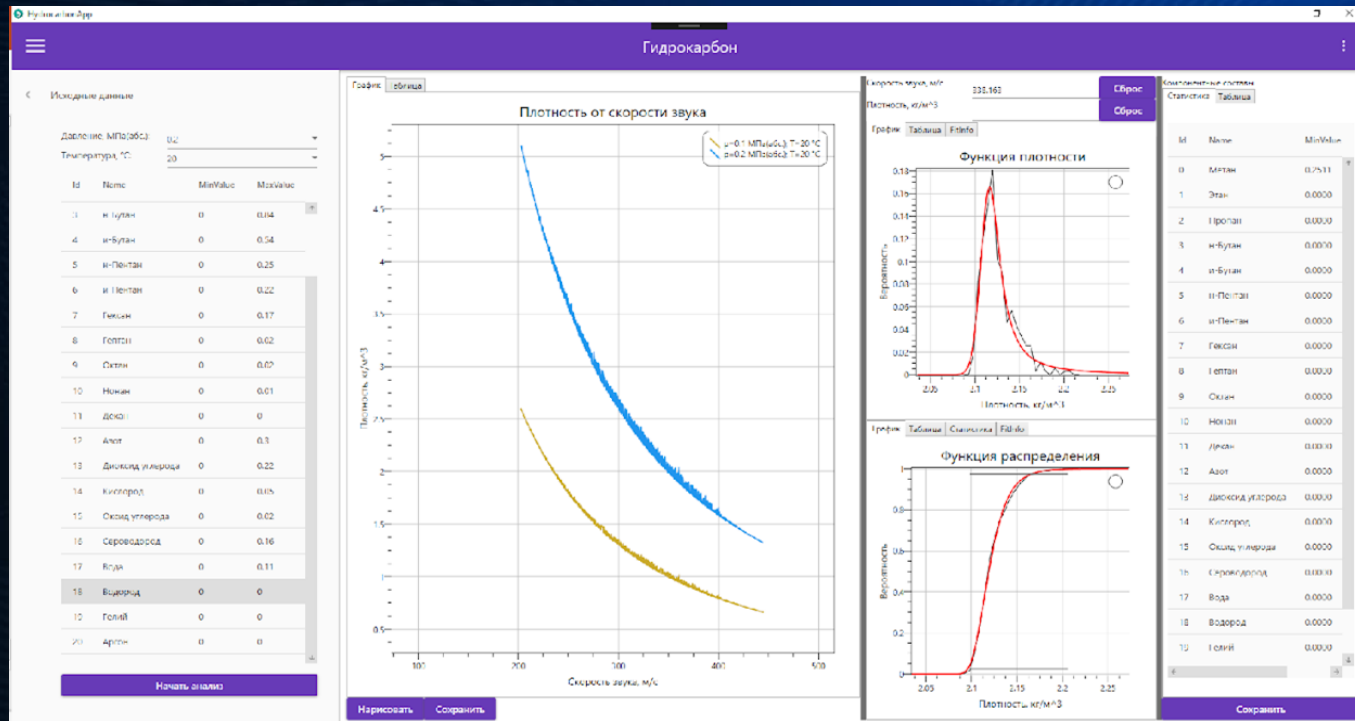
- ⚠ The metering is invalid
- ⚠ Meter
- ▲ Interface module 1
- ▲ Interface module 2
- ⚠ Beam 1
- ▲ Metering power supply is too close to the top level
- ▲ Metering power supply is too close to the lower level
- ▲ Device is outside of the target region
- ▲ Checksum of the meter
- ▲ Checksum of the meters
- ▲ Checksum of the interface board 1
- ▲ Checksum of the interface board 2

## INTEGRATED CONTROL ALGORITHMS OF INDICATORS FOR POLLUTION LEVEL EVALUATION

- Monitoring of signal/noise level on each beam;
- Enhancing control on each beam;
- 3 levels of automatic signal gain at reduction of signal reception level with informing of operator with alerts.



CALCULATION OF THE MOLECULAR MASS OF THE GAS OF DIFFERENT COMPOSITIONS BASED ON CALCULATION OF THE SOUND VELOCITY IN THE FLUID BY THE FLOW METER, AND ALSO THE TEMPERATURE AND PRESSURE FROM THE CORRESPONDING SENSORS.



- Calculation of mass flow of gas without density meter;
- No gas composition is required;
- Reduction of the cost of the measuring unit;
- It is possible to compile a measuring methodology for a unit from Russian Research Institute of Metrology (VNIIR) or other organizations (from 6 months);
- 3% accuracy, if gas molar mass greater than 25 g/mol and pressure between 0.1 and 3.5 MPa;
- 5% accuracy, if gas molar mass greater than 25 g/mol and pressure between 3.5 and 4.0 MPa.





# THANK YOU FOR YOUR ATTENTION!

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