

Made in Russia



Control system for process parameters of **air-cooled gas units** (ACU)



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The system is designed for continuous monitoring of vibration and temperature parameters of air cooled units (ACU) of gas



The appearance of the product may differ slightly from that shown in the brochure

Description

Control system for process parameters of air-cooled gas units (ACU) consists of a **TIK-PLC.991.11** controller and **DVA144.XXX** series vibration sensors connected to each other via **RS-485 interface** (Modbus RTU protocol). One **TIK-PLC.991.11** controller supports connection of up to 7 sensors (without additional power supply) via the **RS-485** digital interface.

The controller compares signal values received from sensors with set points, exchanges information with the superior system via **RS-485** interface and switches relay contacts when parameters exceed threshold values (EP). The controller has a discrete input, which can be used to change the operation mode or to acknowledge relay signals.

If it's necessary to control the temperature of fans, it's possible to connect thermal resistance sensors to the digital input of the controller with a Tair-1 converter manufactured by NPK VIP (or an analogue).

The vibration sensors are mounted on the bearing unit of the electric motor. The sensor cable is available as an unplugged cable or as a sealed connector with IP65/IP68 moisture and dust protection. There are terminal boxes on the racks of the ACU's to connect the sensor cables into one trunk cable. One terminal box allows the connection of up to 6 sensors. The system controller is located in the control cabinet.

System features:

- automatic measurement and monitoring of **vibration/temperature** of the air-cooled gas units (ACU);
- output of signals to the APCS to implement the functions of process protections and interlocks when the system is part of the APCS or to the executive relays during autonomous operation of the system;
- **self-monitoring**, which provides testing of the system's functionality without disassembly.

Specifications

Interface

Type	RS-485 (Modbus RTU Master / Slave)
No. of intrinsically safe channels for connecting sensors	1
No. of channels to receive information from the controller	1
No. of measuring intrinsically safe channels connected to one controller (without additional power supply):	
• RS 485 Modbus RTU (Master)	7
No. of input non-intrinsically safe channels:	
• discrete input	1
No. of output channels per controller:	
• 4-20 (0-20) mA	1
• relay output	2
• RS-485 Modbus RTU (Slave)	1
Power supply of the controller, V	+24±2

Metrological parameters

Operating frequency range, Hz	2/3/5/10-1000
Vibration velocity RMS measurement range, mm/s	0-100

Performance

Operating temperature range, °C :	
• DVA144.XXX vibration sensor	-40 (60) ...+80
• TIK-PLC.991.11 controller	-20 ...+65

Reliability and manufacturer's warranties

MTBF, hours, not less than	
• DVA144.XXX vibration sensor	100 000
• TIK-PLC.991.11 controller	150 000
Service life, years, not less than	
• DVA144.XXX vibration sensor	20
• TIK-PLC.991.11 controller	20
Warranty service life, months	24
Interval of verification, years	2

Sensor and controller design options

DVA144.104 vibration sensor

Triangular housing, 3 screw mounting, single cable connection

Specifications

Overall dimensions $\varnothing 39.25 \times 42.5$ mm

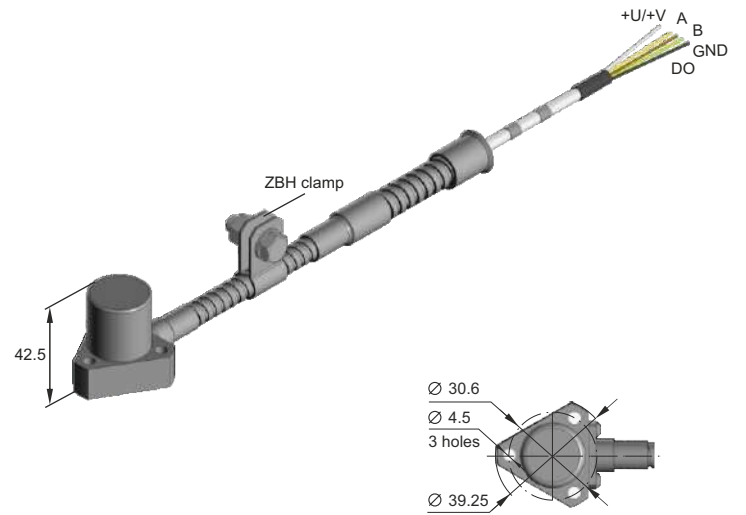
Weight 100 g

Protection class IP65/IP68

Explosion protection

- PO Ex ia I Ma X
- 0Ex ia IIC T6...T2 Ga X
- Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
- Ex ib IIIC T95°C ... T275°C Db X
- 2Ex nA IIC T6...T2 Gc X
- PO Ex ia I Ma X
- 0Ex ia IIC T6...T2 Ga X
- Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
- Ex ib IIIC T95°C ... T275°C Db X

Mount M4 screw 3 pcs.



DVA144.164 vibration sensor

Triangular housing, 3 screw mounting, TIK-KXX connector on the cable

Specifications

Overall dimensions $\varnothing 39.25 \times 42.5$ mm

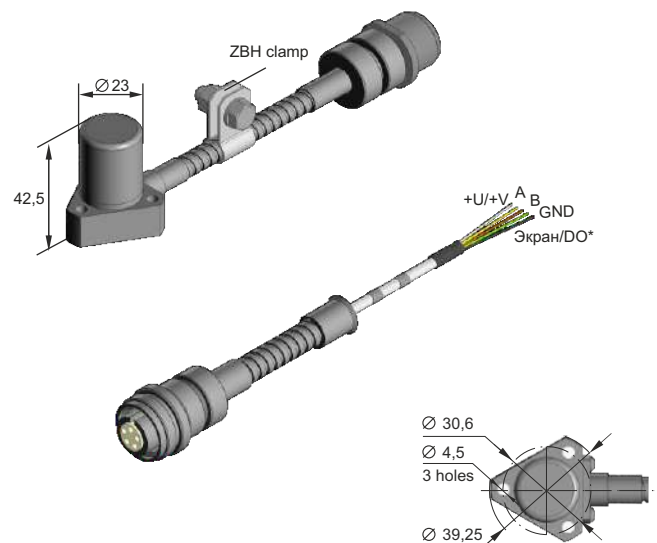
Weight 100 g

Protection class IP65/IP68

Explosion protection

- PO Ex ia I Ma X
- 0Ex ia IIC T6...T2 Ga X
- Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
- Ex ib IIIC T95°C ... T275°C Db X
- 2Ex nA IIC T6...T2 Gc X
- PO Ex ia I Ma X
- 0Ex ia IIC T6...T2 Ga X
- Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
- Ex ib IIIC T95°C ... T275°C Db X

Mount M4 screw 3 pcs.



*For version with discrete output



TIK-PLC.991.11 controller

Specifications

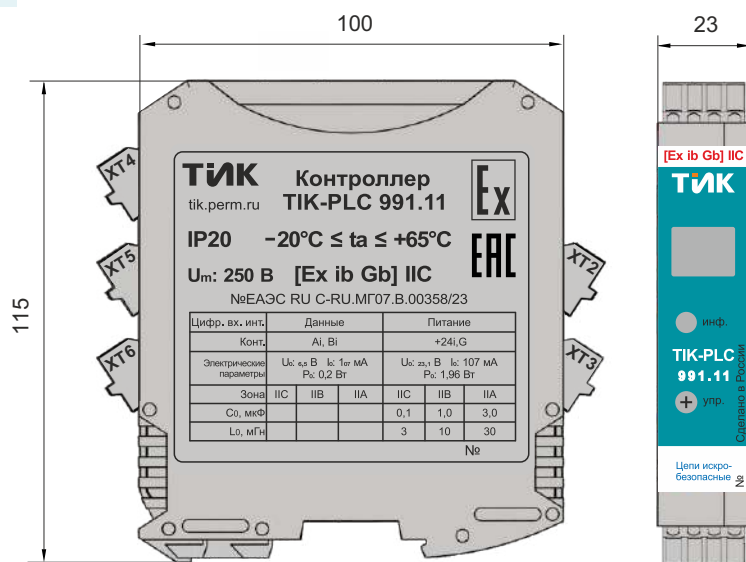
Overall dimensions 115x100x23 mm

Weight 200 g

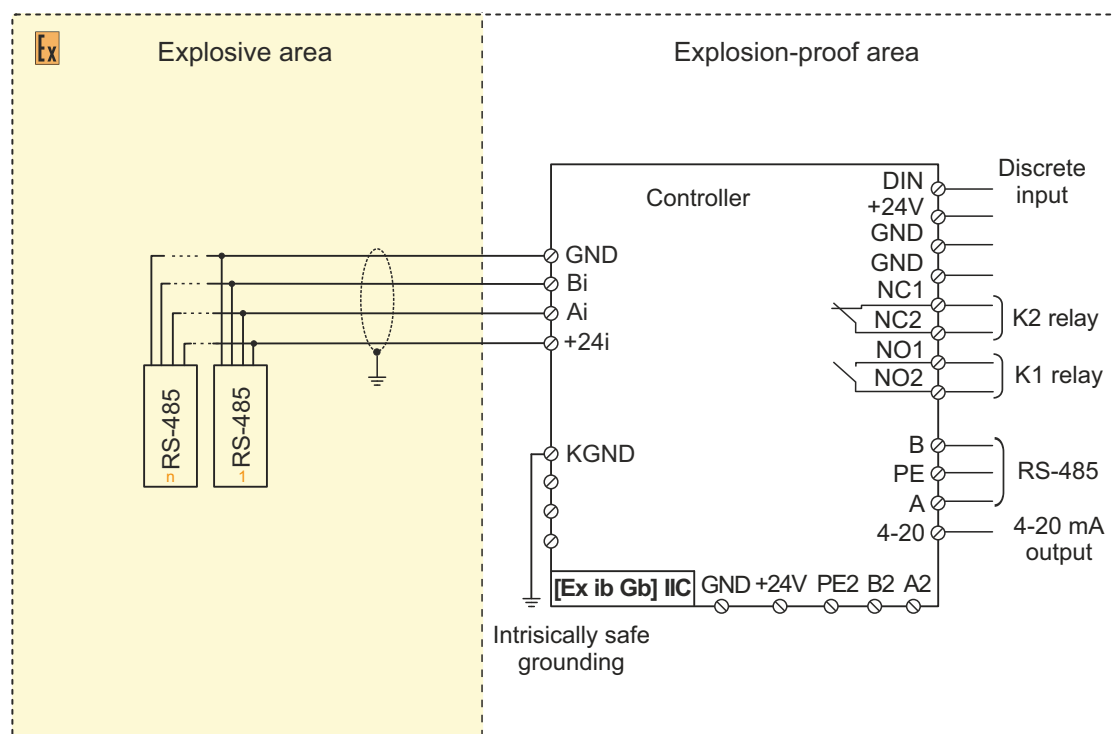
Protection class IP20

Explosion protection [Ex ib Gb] IIC

Mount on DIN rail



TIK-PLC.991.11 wiring diagram



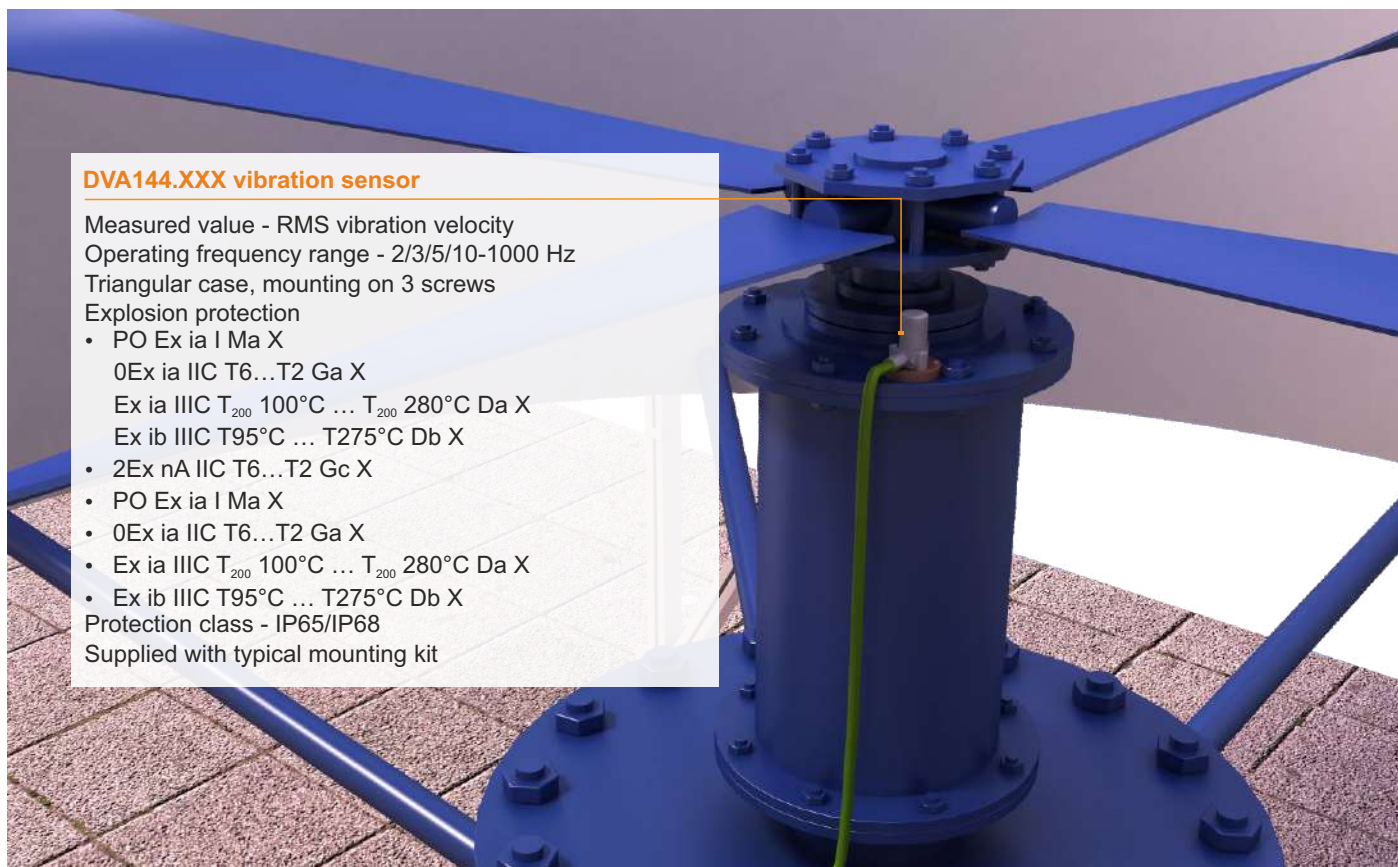
The maximum number **n** is limited in accordance with the manual

Typical scheme of vibration control of ACU No. 1 (3 vibration channels + 3 temp. channels)





Typical scheme of vibration control of ACU No. 2 (6 vibration channels)

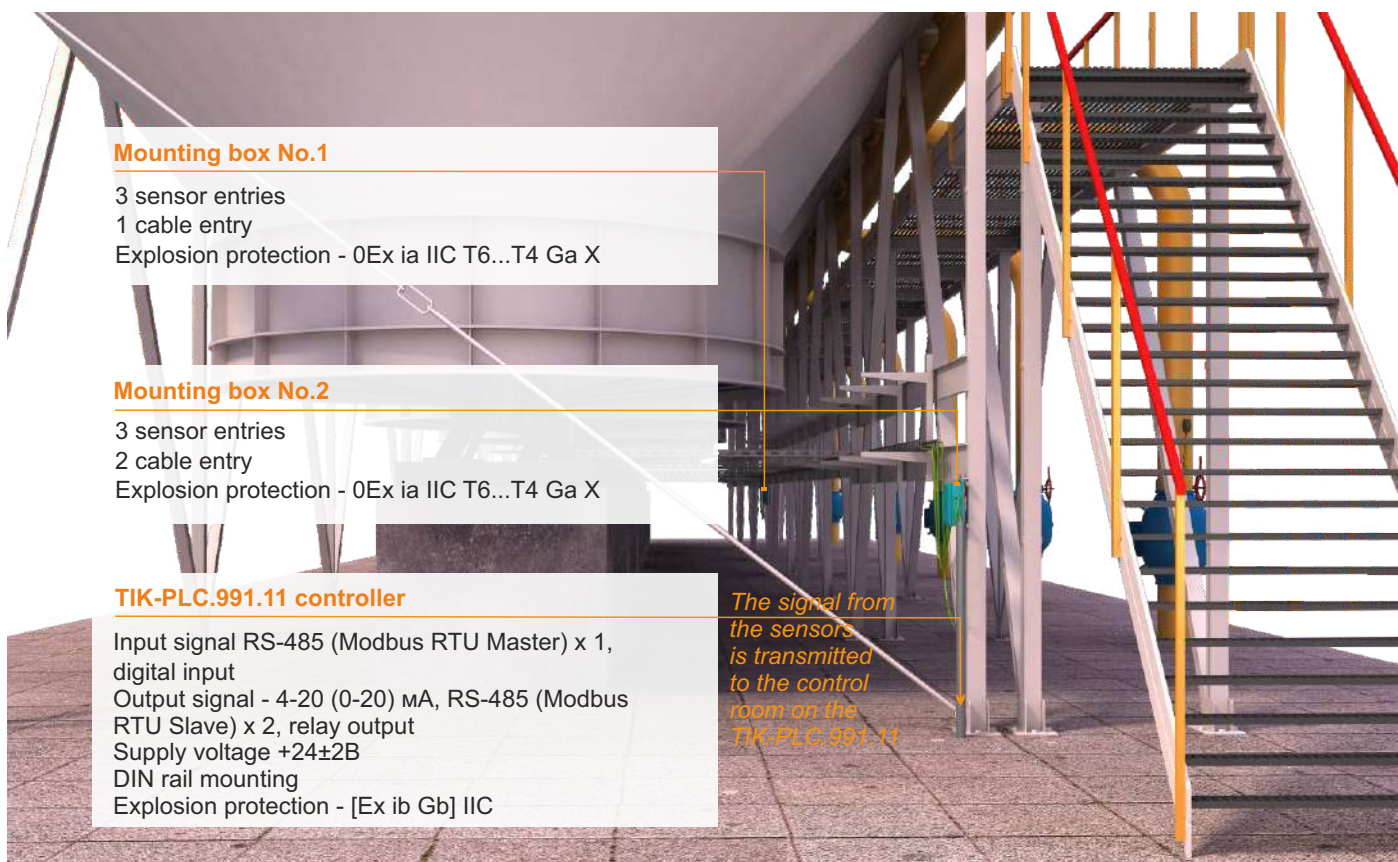


DVA144.XXX vibration sensor

Measured value - RMS vibration velocity
Operating frequency range - 2/3/5/10-1000 Hz
Triangular case, mounting on 3 screws
Explosion protection

- PO Ex ia I Ma X
0Ex ia IIC T6...T2 Ga X
Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
Ex ib IIIC T95°C ... T275°C Db X
- 2Ex nA IIC T6...T2 Gc X
- PO Ex ia I Ma X
0Ex ia IIC T6...T2 Ga X
Ex ia IIIC T₂₀₀ 100°C ... T₂₀₀ 280°C Da X
Ex ib IIIC T95°C ... T275°C Db X

Protection class - IP65/IP68
Supplied with typical mounting kit



Mounting box No.1

3 sensor entries
1 cable entry
Explosion protection - 0Ex ia IIC T6...T4 Ga X

Mounting box No.2

3 sensor entries
2 cable entry
Explosion protection - 0Ex ia IIC T6...T4 Ga X

TIK-PLC.991.11 controller

Input signal RS-485 (Modbus RTU Master) x 1, digital input
Output signal - 4-20 (0-20) mA, RS-485 (Modbus RTU Slave) x 2, relay output
Supply voltage +24±2B
DIN rail mounting
Explosion protection - [Ex ib Gb] IIC

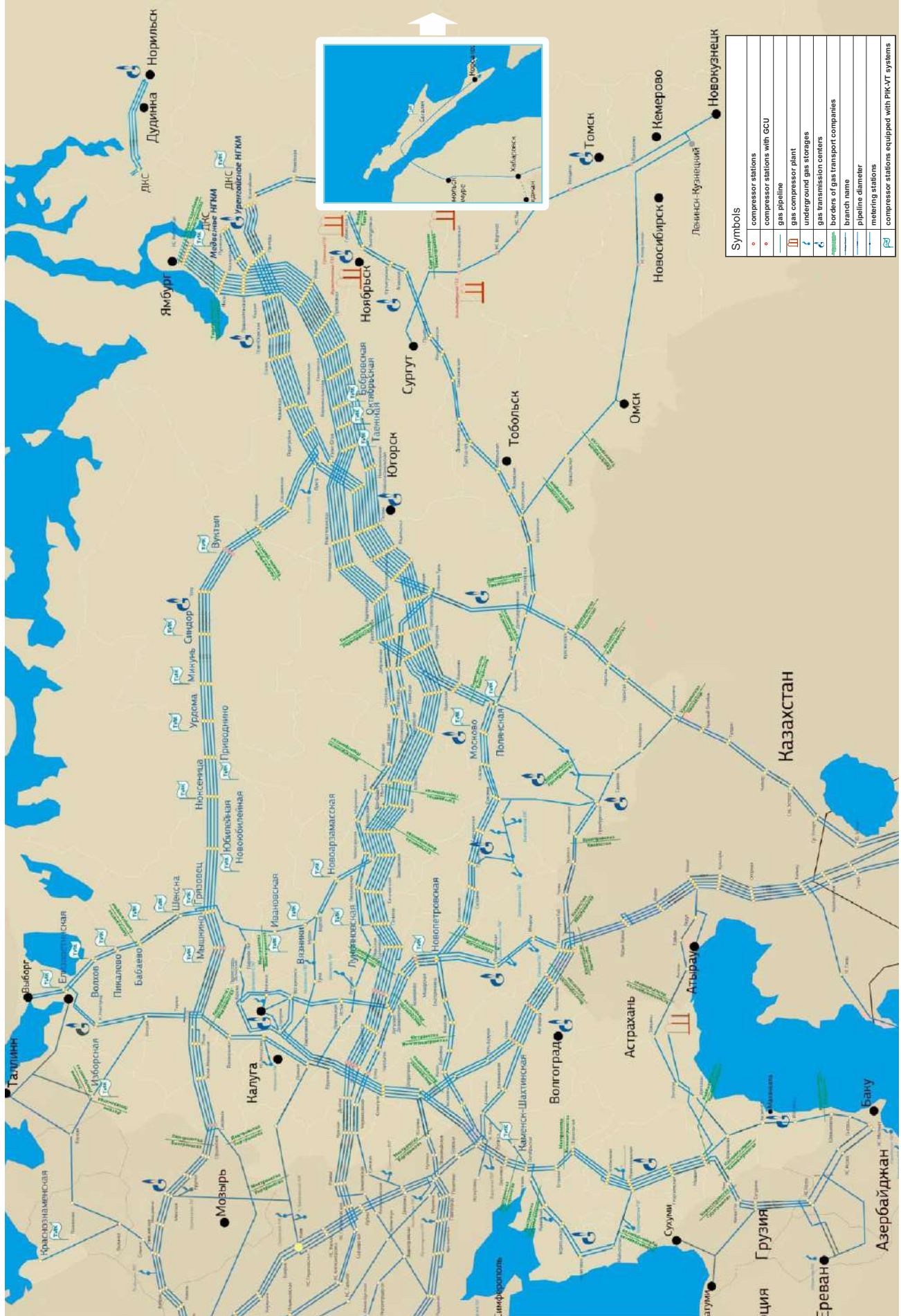
The signal from the sensors is transmitted to the control room on the TIK-PLC.991.11

Facility photos





Fragment of the scheme of gas pipelines of the Russian Federation



Approval documents

Certificate of Type Approval of Measuring Instruments No.69044-17 for the DVA vibration transducers



Certificate of conformity with TP TC 012/2011 "About safety of equipment for operation in explosive environments" for TIK-PLC equipment, EAEC registration number RU C-RU.MГ07.B.00358/23



Declaration of conformity of TP TC 020/2011 "Electromagnetic compatibility of technical devices" for TIK-PLC controllers, Registration number of EEU N RU D-RU.HB27.B.13862/20





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