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Limited Liability Company
Research and Production Enterprise "TIK"

TIK-DSA CONVERTERS

Operation Manual

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CONTENTS

1 PURPOSE AND APPLICATION SCOPE

1.1 TIK-DSA converters (further - the converters) are designed to measure vibration displacement, gap, rotation speed on a controlled object and convert them into unified signals. They can also be used as a marker of control marks.

1.2 The converters include: eddy current sensor DS0, DS1, DS2, DS3 and transmitter DSAxxxx with explosion protection marking 0Ex ia IIC T6…T1 Ga X / PO Ex ia I Ma X.

1.3 Converters marked with explosion protection 0Ex ia IIC T6…T1 Ga X / PO Ex ia I Ma X can be used in accordance with GOST 31610.0-2014, GOST 31610.11-2014, GOST IEC 60079-14-2011, Order No. 507 On approval of Federal standards and regulations in industrial safety "Safety rules in coal mines in explosive areas, in which explosive mixtures of categories IIA, IIB, IIC, temperature classes T1, T2, T3, T4, T5, T6 according to GOST R IEC 60079-20-1-2011 classification may appear, as well as in underground workings of coal mines dangerous as for gas (methane) and coal dust. The field of application of converters is technological and operational control of vibration parameters of various industrial units and facilities.

1.4 The converters can be used in multi-channel measuring systems (for example, "TIK-RVM").

Example of designation of TIK-DSA converter

TIK-	DSA	X	X	X	X	D	S	X	X	X	X	X	X
		1	2	3	4			5	6	7		8	

where:

1 – Number of inputs

1 One
2 Two

2 – Measured value

1 Measurement of the gap in the plane
2 Maximum value of the gap measurement
3 The span of vibration displacement
4 Gap
5 Rotation speed
6 Vibration displacement span/gap/rotation speed
7 Instantaneous gap/frequency output

3 – Type of output signal

1 Current loop, two-wire **4-20 mA**
3 Voltage **(0...+10 V)**
4 Voltage **(-1...-17 V), (-1.6...-17.6 V)**
5 Combined with separate power supply **(4-20 mA)** / **(0...+10 V)**
7 **RS-485**

4 – Transmitter housing type

1 Mounting of the transmitter housing on a DIN rail (plastic)
2 Mounting of the transmitter housing on a DIN rail (plastic with display)
3 Transmitter in a metal housing
4 Mounting of the transmitter housing on the mounting panel
5 Mounting the transmitter on the sensor/cable assembly

5 – diameter of measuring part of the sensor

0 Up to 6.8 mm
1 8.5 mm
2 14.5 mm
3 22.5 mm

6 – Sensor design

Y Rod
N Cylindrical

7 – Cable type

11 Without coupling, without metal hose
12 Without coupling, one-piece metal hose
21 With coupling, without metal hose
22 With coupling, one-piece metal hose
23 Metal hose before the coupling
24 Metal hose after the coupling

8 – Connector type

11 Without connector
23 TIK-KXX connector on the sensor
24 Weipu connector on the sensor
32 SMA connector on the cable
33 TIK-KXX connector on the cable
34 Weipu connector on the cable
35 2PM connector on the cable

2 MAIN SPECIFICATIONS

2.1 Designs and versions of TIK-DSA converters

Table 1. Designs and versions of TIK-DSA converters

Design of TIK-DSA converter		**DSAxx1x DSxxxxxx**	**DSAxx4x DSxxxxxx**	**DSAxx5x DSxxxxxx**	**DSAxx7x DSxxxxxx**
Output signal type (3rd digit)		4 -20 mA	-1...-17 V	4 -20 mA and 0-10 V	RS-485
Versions of TIK-DSA converters according to the type of measured value					
Group by type of measured value	Measured value (2nd digit)	Converter versions			
TIK-DSAx3xx DSxxxxxx	Span of vibration displacement	TIK-DSAx31x DSxxxxxx	-	TIK-DSAx35x DSxxxxxx	TIK-DSAx37x DSxxxxxx
TIK-DSAx4xx DSxxxxxx	Gap (axial shift)	TIK-DSAx41x DSxxxxxx	-	TIK-DSAx45x DSxxxxxx	TIK-DSAx47x DSxxxxxx
TIK-DSAx5xx DSxxxxxx	Rotation speed	TIK-DSAx51x DSxxxxxx	-	TIK-DSAx55x DSxxxxxx	TIK-DSAx57x DSxxxxxx
TIK-DSAx6xx DSxxxxxx	Span, Gap, Frequency	-	-	TIK-DSAx65x DSxxxxxx	TIK-DSAx67x DSxxxxxx
TIK-DSAx7xx DSxxxxxx	Instantaneous gap / frequency output	TIK-DSAx71x DSxxxxxx	TIK-DSAx74x DSxxxxxx	TIK-DSAx75x DSxxxxxx	-
Versions of TIK-DSA converters by type of housing					
Group by type of housing	Transmitter housing type (4th digit)	Converter versions			
TIK-DSAxxx1 DSxxxxxx	Transmitter on DIN rail (plastic)	TIK-DSAxx11 DSxxxxxx	TIK-DSAxx41 DSxxxxxx	-	TIK-DSAxx71 DSxxxxxx
TIK-DSAxxx2 DSxxxxxx	Transmitter on a DIN rail (plastic with display)	-	-	TIK-DSAxx52 DSxxxxxx	-
TIK-DSAxxx3 DSxxxxxx	Transmitter in a metal housing	TIK-DSAxx13 DSxxxxxx	TIK-DSAxx43 DSxxxxxx	-	TIK-DSAxx73 DSxxxxxx
TIK-DSAxxx4 DSxxxxxx	Transmitter on the mounting panel	TIK-DSAxx14 DSxxxxxx	-	-	TIK-DSAxx74 DSxxxxxx
TIK-DSAxxx5 DSxxxxxx	Transmitter for sensor/cable assembly	TIK-DSAxx15 DSxxxxxx	-	-	TIK-DSA1x75 DSxxxxxx

Designs of the converters have versions (modifications) that differ by the type of the measured value and by the type of the transmitter housing. The designs and their versions are listed in Table 1.

The interpretation of designations of the designs/ versions of converters is indicated in section 1 in the example of the converter designation.

The converters of TIK-DSAx6xxDSxxxxxx group measure the vibration displacement span, gap and rotation speed simultaneously and allow the specified values to be sent to the outputs in various combinations. Technical data and characteristics for each measured value are described in the appropriate subsections:

Span of vibration displacement - par. 2.3.

Gap (axial shift) – par. 2.4.

Rotation speed – par. 2.5.

The following converters support digital communication: **TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx TIK-DSAxx1xDSxxxxxx** – TWD interface (digital current loop communication), **TIK-DSAxx7xDSxxxxxx, DSAxx1xDSxxxxxx** – RS-485 interface. For more information, see par. 4.1.5.

All designs of the converters support operation with any sensors: DS0, DS1, DS2, DS3.

Versions of converters designed for operation in cryogenic environment are marked "design K".

Versions of converters designed to operate at temperatures above 135 °C (up to 180 °C) are marked "design B".

Eddy current sensors DSx, which are part of TIK-DSA converter, have non-standardized conversion coefficients. The converter is adjusted and verified in the set: transmitter, sensor, extension cable (if any). DSAxxxx transmitter contains the serial number of the eddy current sensor, together with which the adjustment was made. It is allowed to replace the extension cable with a cable of the same length. Changing the length of the cable from the sensor or extension cable is not allowed.

2.2 Main technical characteristics of TIK-DSA converters (summary table)

Table 2. Technical characteristics of TIK-DSA converters

Parameter	Values
1	2
Operating conditions: sensor operating temperature range, ºC: - standard design - design K - design B Operating temperature range of transmitter, ºC:	 -60 to +135 -196 to +80 -60 to +180 -60 to +80
Supply voltage, V:	
- DSAxx1xDSxxxxxx - output (4-20) mA	12 to 24
- DSAxx4xDSxxxxxx - output (-1...-17) V, (-1.6...-17.6) V	-22.8 to -25.2
- DSAxx5xDSxxxxxx - 2 outputs (4-20) mA and (0-10) V	12 to 24
- DSAxx7xDSxxxxxx - RS-485 output	12 to 24
Electrical insulation resistance between the electrical circuits of the sensor and the housing, MOhm, at least: - at a temperature of (25 ± 10) °C and relative humidity of no more than 80% without condensation of moisture - at a temperature of 35 °C and relative humidity of (95 ± 3) %	 40 1
Electrical insulation strength between electrical circuits and eddy current sensor housing	500 V at a frequency of 50 Hz for 1 min.
Measurement cycle time, s:	
- when measuring the gap (axial shift)	1
- when measuring the instantaneous gap	0.0005
Overall dimensions of the eddy current sensor DS0, DS1, DS2, DS3, mm, max	in Annex A
Overall dimensions of the measuring head of the eddy current sensor (diameter× height), mm, max:	
- DS0 sensor	6.8×10.5
- DS1 sensor	8.5×10.5
- DS2 sensor	14.5×12
- DS3 sensor	22.5×20
Weight of the eddy current sensor DS0, DS1, DS2, DS3, kg, max	1
Overall dimensions of transmitter DSAxxxx, mm, max	in Annex B
Weight of DSAxxxx converter, kg, max	2

2.3 Main technical data and characteristics of converters measuring the vibration displacement span (TIK-DSAx3xxDSxxxxxx group)

Table 3. Technical characteristics of TIK-DSAx3xxDSxxxxxx converters

Parameter	Values					
1	2	3	4	5	6	7
Range of readings of the vibration displacement span, microns	0-100	0-125	0-250	0-500	0-1000	0-2000
Range of measurements of the vibration displacement span, microns	3-100	4-125	10-250	20-500	40-1000	80-2000
Nominal values of conversion coefficients when measuring the vibration displacement span at a base frequency of 40 Hz:						
- for the output signal (4-20) mA, mA/microns	0.16	0.128	0.064	0.032	0.016	0.008
- for the output signal (-1...-17) V, (-1.6...-17.6) V, V/microns	0.16	0.128	0.064	0.032	0.016	0.008
- for the output signal (0-10) V, V/microns	0.1	0.08	0.04	0.02	0.01	0.005
Nominal conversion coefficient when measuring the vibration displacement span at a base frequency of 40 Hz for a digital output signal (RS -485, display)	1					
Limits of the permissible basic reduced error to the upper limit of measurements when measuring vibration displacement at a base frequency of 40 Hz, %	± 3					
Limits of permissible additional error caused by deviation of ambient temperature from normal measurement conditions, %/ºC	± 0.014					
Operating frequency range, Hz	2-500					
Unevenness of the amplitude-frequency response (relative to the frequency of 40 Hz) when measuring the span of vibration displacement in the frequency range, %, max:						
- 2.0 to 5.0 Hz and over 320 to 500 Hz	± 20					
- over 5.0 to 320 Hz	± 10					

2.4 Basic technical data and characteristics of converters measuring the Gap and Instantaneous gap (group TIK-DSAx4xxDSxxxxxx, TIK-DSAx7xxDSxxxxxx when measuring instantaneous gap)

Table 4. Technical characteristics of converters TIK-DSAx4xxDSxxxxxx, TIK-DSAx7xxDSxxxxxx when measuring the instantaneous gap

Parameter	Values												
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Gap measurement range, mm	0.15-2.15	0.2-2.2	0.25-2.25	0.25-2.30	0.25-2.50	0.25-2.75	0.5-2.5	0.3-4.3	0.5-4.5	0.5-5.5	0.75-12.75	5.5-9.5	1.0-9.0
Supported sensor types for this range	DS0 DS1	DS0 DS1	DS0 DS1	DS0 DS1	DS0 DS1	DS0 DS1	DS0 DS1	DS1 DS2	DS2	DS2	DS3	DS3	DS3
Nominal values of conversion coefficients when measuring the gap:													
- for output signal (4 -20) mA, mA/mm	8	8	8	7.8	7.11	6.4	8	4	4	3.2	1.33	4	2
- for output signal (-1...-17) V, (-1.6...-17.6) V, V/mm	8	8	8	7.8	7.11	6.4	8	4	4	3.2	1.33	4	2
- for output signal (0 -10) V, V/mm	5	5	5	4.88	4.44	4	5	2.5	2.5	2	0.83	2.5	1.25
Nominal conversion coefficient when measuring the gap for the digital output signal (RS -485, display)	1												
Limits of the permissible basic absolute error of the gap measurement, microns	± 50	± 50	± 50	± 50	± 50	± 50	± 50	± 100	± 100	± 100	± 200	± 200	± 200
The limits of the permissible additional error in measuring the gap caused by deviation of the ambient temperature from the normal measurement conditions, microns / ºC	± 0.75	± 0.75	± 0.75	± 0.75	± 0.75	± 0.75	± 0.75	± 1	± 1	± 1	± 2	± 2	± 2
Measurement cycle time, s	in table 2												

2.5 Basic technical data and characteristics of converters that measure the speed of rotation (group TIK-DSAx5xxDSxxxxxx)

Table 5. Technical characteristics of TIK-DSAx5xxDSxxxxxx converters

Parameter	Values
1	2
Maximum value of the measuring range of rotation speed, rpm	100000
Minimum value of the measuring range of rotation speed, rpm	5
Range of conversion coefficients when measuring the speed of rotation:	
- for output signal (4 -20) mA, mA/(rpm)	0.00016 – 0.16
- for output signal (-1...-17) V, (-1.6...-17.6) V, V/(rpm)	0.00016 – 0.16
- for output signal (0 -10) V, V/(rpm)	0.0001 – 0.1
Conversion coefficient when measuring the speed of rotation for the digital output signal (RS -485, display)	1
Limits of the permissible basic relative error of measuring the speed of rotation, %:	
- over 10% of the maximum frequency value	± 1
- 3% to 10% of the maximum frequency value	± 2
- below 3% of the maximum frequency value	Not standardized
Limits of the permissible additional error in measuring the speed of rotation caused by the deviation of the ambient temperature from the normal measurement conditions, % /ºC	± 0.004

2.6 Degrees of protection of sensors and transmitter

Eddy current sensors correspond to IP65/IP68 or IP65 (depending on the design of the converter), DSAxxxx transmitters correspond to IP20 or IP54 in terms of protection from sand, dust, water and are resistant to humid air with a temperature of 35 °C and relative humidity of (95 ±3)%. To increase the overall level of protection of the converter, need to place the DSAxxxx transmitter in a box with appropriate level of protection.

3 SCOPE OF SUPPLY

3.1 The scope of supply of TIK-DSA converters is according to Table 6.

Table 6. Scope of supply of TIK-DSA converters

Components	Quantity
TIK-DSAxx1xDSxxxxxx converters	*
TIK-DSAxx4xDSxxxxxx converters	*
TIK-DSAxx5xDSxxxxxx converters	*
TIK-DSAxx7xDSxxxxxx converters	*
Data sheet	1
Operation Manual (in case of group delivery: 1 copy per batch)	1
Declaration of Conformity TR CU 020/2011**	Copy in OM
Certificate of Conformity TR CU 012/2011**	

*TIK-DSAxxxxDSxxxxxx converter includes an eddy current sensor(s) DS0 (DS1, DS2, DS3) and transmitter DSAxxxx. The scope of supply and qty of TIK-DSA converters are determined by the delivery statement when ordering.
**Certification documentation for the products of the manufacturer can be found on the official website of RPE "TIK". To obtain the scanned document with attachments, follow the link: https://www.tik.perm.ru/download/ in "DOWNLOAD" section.

4 DESIGN AND PRINCIPLE OF OPERATION

4.1 Design and principle of operation of TIK-DSA converters.

4.1.1 Purpose and composition of TIK-DSA converters

TIK-DSA converters are designed:

- to measure the span of vibration displacement;
- to measure the gap (axial shift);
- to measure the speed of rotation;
- to measure the instantaneous gap;
- for use as a mark detector and output of the phase meter signal (frequency output).

TIK-DSA converter includes:

- eddy current sensor DS0 (DS1, DS2, DS3);
- Transmitter (converter) DSAxxxx.

4.1.2 Principle of operation of TIK-DSA converters

TIK-DSA converters operate on the principle of changing the Q-factor of the oscillatory circuit when shielding the coil of the eddy current sensor. The coil of the eddy current sensor DS0 (DS1, DS2, DS3), the capacitance of the coaxial cable and the capacitance located in TIK-DSA converter form an oscillatory circuit with a resonant frequency of about 750 kHz. The approach of the metal surface to the coil of the eddy current sensor causes the effect of increase in active losses in the circuit and decrease in inductance of the coil, which leads to a decrease in the Q-factor and a change in the resonant frequency of the circuit.

TIK-DSA converter converts the Q-factor change of the oscillating circuit into an electrical signal, the value of which is proportional to the gap between the eddy current sensor coil and the metal surface. The received signal is measured by the ADC of TIK-DSA converter and converted into digital form (further - the ADC quanta).

Since the dependence of change in the Q-factor of the circuit on the size of the gap between the eddy current sensor coil and the metal surface is nonlinear, TIK-DSA converter reduces the measured value of the ADC quanta (proportional to the gap) to a linear form by piecewise linear approximation. Thus, the value of the ADC quanta is converted into a linearized value used to calculate the gap, span and instantaneous gap.

4.1.3 Calculation of values measured by TIK-DSA converters

The values measured by TIK-DSA converters are calculated as follows (based on the measured value of ADC quanta):

- Vibration displacement span - the converter calculates the maximum and minimum values of the ADC quanta for a set time, linearizes the obtained values, and calculates the difference between the maximum and minimum. After that, several calculated values are averaged.
- Gap (axial shift) - the converter calculates the average value of the ADC quanta for a set time, and then linearizes the resulting value.
- Instantaneous gap - the converter performs linearization of the current value of the ADC quanta for each measurement cycle.
- Rotation frequency - the converter counts the number of passes of the mark near the eddy current converter during a set time, and averages several calculated values.
- When using the converter as a mark detector and issuing a phase meter signal (frequency output), the converter detects the presence of the mark near the eddy current converter. If there is a convex mark, high level is sent to the analog output (10V; - 17V; 20mA), otherwise low level is sent to the analog output (0V; -1V; 4mA).

The measurement time, the operating frequency range and the values of the conversion coefficients are indicated in section 2, as well as in the data sheet for TIK-DSA converter.

4.1.4 Operating modes of TIK-DSA converters

4.1.4.1 Switching the measured value using a jumper

TIK-DSA converters support rapid change of the measured value using a jumper.

Jumper is a connection of contacts SW and GND of the converter (SW1 and SW2 for TIK-DSAxx1xDSxxxxxx design). The jumper is on, if the specified contacts are connected, otherwise it is off.

Connecting the jumper changes the measured value sent to the output(s) of the converter. Also, on some versions, the jumper allows you to switch the converter to service mode (see the next paragraph).

Switching the measured value using a jumper for each version is described in detail in the following paragraphs:

TIK-DSAxx1xDSxxxxxx – par. 4.2.1.2.

TIK-DSAxx4xDSxxxxxx – not supported.

TIK-DSAxx5xDSxxxxxx – par. 4.2.3.2.

TIK-DSAxx7xDSxxxxxx – not supported.

4.1.4.2 Standard and service modes

TIK-DSA converters support 2 operating modes:

- Standard mode is the default mode of operation of the converter, the entire description of the converter operation is related to the standard mode.

- Service mode is a special mode of operation of the converter, in which the digital communication parameters are usually reset, additional settings become available and operation of the converter outputs can be changed.

The converter enters the service mode only when certain actions are performed when the power is turned on, otherwise, with a simple power-on, the converter turns on in standard mode.

The service mode for each version is described in more detail in the following paragraphs:

TIK-DSAxx1xDSxxxxxx – not supported.

TIK-DSAxx4xDSxxxxxx – not supported.

TIK-DSAxx5xDSxxxxxx – par. 4.2.3.2.

TIK-DSAxx7xDSxxxxxx – par. 4.2.4.2.

4.1.5 Description of digital communication of TIK-DSA converters

Converter versions **TIK-DSAxx1xDSxxxxxx**, **TIK-DSAxx5xDSxxxxxx** and **TIK-DSAxx7xDSxxxxxx** support digital communication using the following interfaces:

TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx – TWD interface (digital current loop communication). Communication is carried out through the output (4-20) mA using an interface converter that supports TWD.

TIK-DSAxx7xDSxxxxxx – RS-485 interface. Communication is provided via RS -485 output using an interface converter that supports RS-485.

Note. The TWD interface is not a standardized communication interface and is supported only by "TIK" products, for example: TIK-PLC controller, TIK-BIS safety barrier, USB-TWD interface converter, and others. Check with the manufacturer for details.

For more information about connecting to converters via digital communication: for **TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx** – see par. 4.1.6, for **TIK-DSAxx7xDSxxxxxx** – see par. 4.1.7.

4.1.6 Connection to converters with output (4-20) mA via TWD interface (versions TIK-DSAxx1xDSxxxxxx and TIK-DSAxx5xDSxxxxxx)

Important! For correct operation of communication via TWD interface (digital current loop communication), it is recommended to disable sending the measured value to the output (4-20) mA or to send a fixed value to this output (to reduce interference during data transmission).

4.1.6.1 Connect TIK-DSA converter to the interface converter with TWD support according to the connection diagram. The connection diagram, as well as a list of equipment that supports communication via TWD interface, can be requested from the manufacturer.

4.1.6.2 Run any Modbus -client on the PC.

4.1.6.3 Set the following connection parameters in the Modbus -client:

Protocol: Modbus-RTU (communication via COM port)

COM port connections:	COM port of TWD converter
Port speed (baud):	1200
Parity:	None
Stop bits:	2
Word length:	8
Device address:	1
Read and record timeouts:	3000 ms

4.1.6.4 Connect to the COM port.

TIK-DSAxx1xDSxxxxxx register chart– par. 0.

TIK-DSAxx5xDSxxxxxx register chart – par. 4.2.3.4.

If it is not possible to receive data via the Modbus protocol, see par. 4.1.8.

4.1.7 Connection to converters with RS-485 output (version TIK-DSAxx7xDSxxxxxx)

4.1.7.1 Connect contacts A and B of TIK-DSA converter to the interface converter with RS-485 support, according to the connection diagram (par. 4.2.4.3).

4.1.7.2 Run any Modbus -client on the PC.

4.1.7.3 Set the following connection parameters in the Modbus -client:

Protocol: Modbus-RTU (communication via COM port)
COM port connections: RS-485 converter COM port
Port speed (baud): 115200
Parity: None
Stop bits: 1
Word length: 8
Device address: 1
Read and record timeouts: 1000 ms

4.1.7.4 Connect to the COM port.

TIK-DSAxx7xDSxxxxxx register chart – par. 4.2.4.4.

If it is not possible to receive data via the Modbus protocol, see par. 4.1.8.

4.1.7.5 To record registers, first remove record protection – write the value after "–" (in Hex format) to the specified register:

For TIK-DSAxx7xDSxxxxxx: Holding Register 1 "Password" is 1111.

Registers of the Holding Register type specified in the register chart are available for recording.

4.1.8 Possible faults and their elimination

Table 7. Faults and their elimination

Fault	Methods of elimination
1	2
TIK-DSA converter does not turn on	Make sure that the connection diagram is assembled correctly and power is supplied to the devices.
	Make sure that polarity of connection of the power supply source is correct.
	Make sure that voltage of the power supply source is within the permissible limits (see Table 2).
Only for versions TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx:	
Current at output (4-20) mA ≤ 3.9 mA	This means that the eddy current sensor is not connected to the transmitter, is connected incorrectly, or is faulty. To fix the problem, connect the sensor to the transmitter according to the connection diagram.

Table 7 (continued)

1	2
	If connecting the sensor did not help to eliminate the malfunction, then the sensor is faulty. In this case, contact the manufacturer to clarify the possibility of replacing the converter (transmitter + sensor).
Only for version TIK-DSAxx5xDSxxxxxx:	
The display shows the message "No sensor"	see above the fault "Current at output (4-20) mA ≤ 3.9 mA"
Only for versions TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx, TIK-DSAxx7xDSxxxxxx:	
Unable to receive data from the converter via Modbus protocol (via TWD/ RS -485)	Make sure that procedure of connection to the converter is followed correctly, the connection diagram is assembled correctly and that power is supplied to the devices (par. 4.1.6/ 4.1.7).
	Make sure that TWD/RS-485 interface converter is connected to TIK-DSA and to the data acquisition system (or PC).
	Make sure that the COM port of TWD/RS-485 interface converter is selected correctly.
	Make sure that the device address and other Modbus connection parameters are set correctly (par. 4.1.6.3/ 4.1.7.3).
	If the previous methods did not help to fix the problem, switch the TIK-DSA to service mode (see par. 4.1.4.2) and try to connect again. In the service mode, the communication parameters will be reset to the default values (par. 4.1.6.3/ 4.1.7.3). After connecting, set the desired device address (register "Address") on TIK-DSA to connect successfully after exiting service mode.
Unable to record to Modbus register	Remove record protection (see par. 4.1.7.5).
	Make sure that recording to this register is supported – it should be specified in the register chart. Recording is only available in registers of the Holding Register type. Input Register is read–only.

4.2 Working with converters of various versions

There are 4 versions of TIK-DSA converters: **TIK-DSAxx1xDSxxxxxx, TIK-DSAxx4xDSxxxxxx, TIK-DSAxx5xDSxxxxxx, TIK-DSAxx7xDSxxxxxx** (for more information, see par. 2.1).

The following paragraph describes the features and methods of working with each version of TIK-DSA.

4.2.1 TIK-DSAxx1xDSxxxxxx is a converter with output (4-20) mA

4.2.1.1 Description and versions of TIK-DSAxx1xDSxxxxxx

TIK-DSAxx1xDSxxxxxx converter measures one measured value and sends the measured value to 4-20 mA output.

Versions of TIK-DSAxx1xDSxxxxxx differ in the measured value:

TIK-DSAx31xDSxxxxxx - Vibration displacement span

TIK-DSAx41xDSxxxxxx - Gap
TIK-DSAx51xDSxxxxxx - Rotation speed
TIK-DSAx71xDSxxxxxx - Instantaneous gap/frequency output and the type of housing:

TIK-DSAxx11DSxxxxxx - Mounting of the transmitter housing on a DIN rail (plastic)
TIK-DSAxx13DSxxxxxx - Transmitter in a metal housing
TIK-DSAxx14DSxxxxxx -Mounting of the transmitter housing on the mounting panel
TIK-DSAxx15DSxxxxxx - Mounting the transmitter on the sensor/cable assembly

TIK-DSAxx1xDSxxxxxx converter supports TWD communication interface at the output (4-20) mA (digital current loop communication). For more information, see par. 4.1.6.

4.2.1.2 Operating modes of TIK-DSAxx1xDSxxxxxx

Switching the measured value using a jumper

When connecting the jumper, the measured value, which is sent to the output (4-20) mA, changes. At that, the new measured value depends on the original measured value of the converter (converter version). When the jumper is disconnected, the measured value returns to its original value.

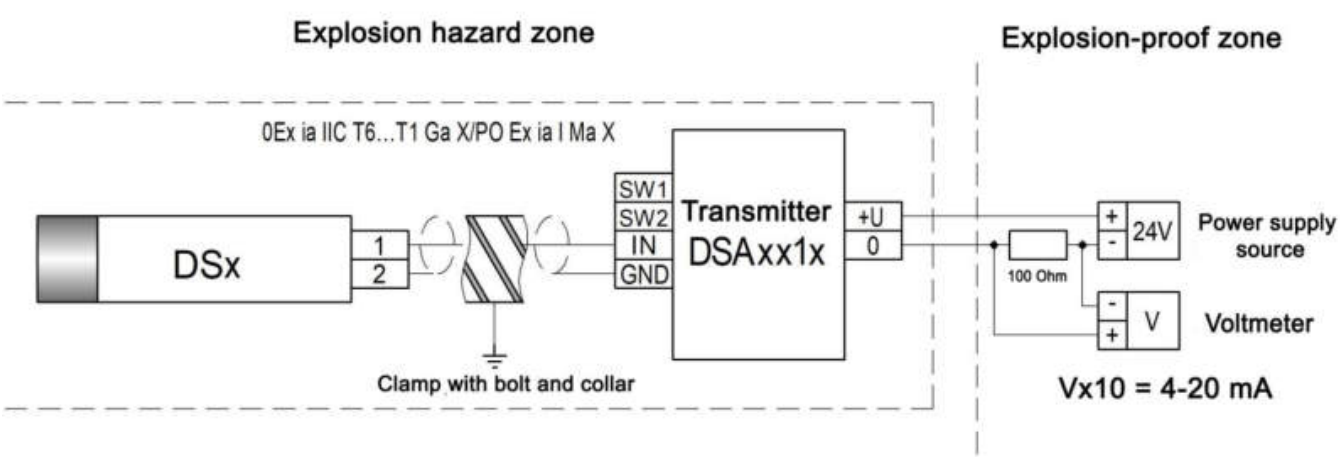
Without a jumper		With a jumper	
Converter version	Measured value	Measured value	Converter version
TIK-DSAx31x DSxxxxxx	Span	Instantaneous gap	TIK-DSAx71x DSxxxxxx
TIK-DSAx41x DSxxxxxx	Gap	Instantaneous gap	TIK-DSAx71x DSxxxxxx
TIK-DSAx51x DSxxxxxx	Rotation speed	Phase meter	TIK-DSAx71x DSxxxxxx

To switch on the jumper, connect the contacts of converter SW1 and SW2, to switch off, disconnect them. The changes are applied a few seconds after the jumper state changes.

Service mode

Not supported.

4.2.1.3 TIK-DSAxx1xDSxxxxxx connection diagram



4.2.1.4 TIK-DSAxx1xDSxxxxxx register chart

Input Registers					
Address	Format	Name	Coef.A	Coef.B	Unit
5	Int	Gap	0.001	0	mm
6	swFloat	Rotation speed			rpm
8	Dec	Span	0.01	0	microns
13	Dec	Sensor status (0 - disconnected, 1 - connected)			
16	Dec	Sensor serial number			
29	Int	Application version	0.01	0	
Note: if "Coef.A" and "Coef.B" are specified for the register, the register value, taking into account the coefficients, is calculated using the formula: (A * value) + B; where: A, B are the specified coefficients; value is the register value.					

4.2.2 TIK-DSAxx4xDSxxxxxx – converter with output (-1...-17) V

4.2.2.1 Description and versions of TIK-DSAxx4xDSxxxxxx

TIK-DSAxx4xDSxxxxxx converter measures the instantaneous gap and sends the measured value to the output (-1...-17) V or (-1.6...-17.6) V, the output range used is specified in the converter data sheet.

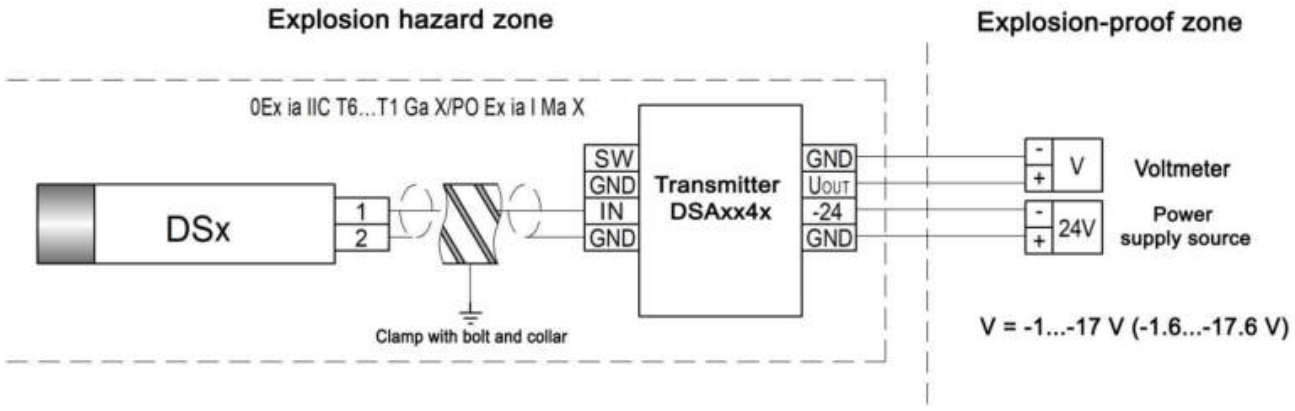
Versions of TIK-DSAxx4xDSxxxxxx differ only in the type of housing:

TIK-DSAx741DSxxxxxx - Mounting of the transmitter housing on a DIN rail (plastic)
TIK-DSAx743DSxxxxxx - transmitter in a metal housing

4.2.2.2 Operating modes of TIK-DSAxx4xDSxxxxxx

Switching the measured value using a jumper and the service mode are not supported.

4.2.2.3 TIK-DSAxx4xDSxxxxxx connection diagram



4.2.3 TIK-DSAxx5xDSxxxxxx is a converter with two outputs (4-20) mA and (-0-10) V, separate power supply and display

4.2.3.1 Description and versions of TIK-DSAxx5xDSxxxxxx

TIK-DSAxx5xDSxxxxxx converter measures several measured values and can send the measured values to the display, to the output (4-20) mA and to the output (0-10) V.

Housing type TIK-DSAxx5xDSxxxxxx: Transmitter on a DIN rail (plastic with display).

Versions of TIK-DSAxx5xDSxxxxxx differ only in the measured value:

TIK-DSAx352DSxxxxxx - Vibration displacement span
TIK-DSAx452DSxxxxxx - Gap
TIK-DSAx552DSxxxxxx - Rotation speed
TIK-DSAx652DSxxxxxx - Vibration displacement span/gap/rotation speed
TIK-DSAx752DSxxxxxx - Instantaneous gap/frequency output

TIK-DSAxx5xDSxxxxxx converter supports TWD communication interface at the output (4-20) mA (digital current loop communication). For more information, see par. 4.1.6.

4.2.3.2 Operating modes of TIK-DSAxx5xDSxxxxxx

Switching the measured value using a jumper

When connecting the jumper, the measured value, which is sent to the output (4-20) mA, changes to "Instantaneous gap". When the jumper is disconnected, the measured value returns to its original value (determined by the converter version or user settings).

To switch on the jumper, connect the contacts of converter SW and GNDI, to switch off, disconnect them. The changes are applied a few seconds after the jumper state changes.

Service mode

In the service mode, the best communication is provided via TWD interface: the output (4-20) mA is turned off and a fixed value of 4 mA is output to it. The device's Modbus address becomes = 1. Additional information on the display also becomes available.

Pressing "упр." (control) button in the service mode cyclically switches the screens of the service mode:

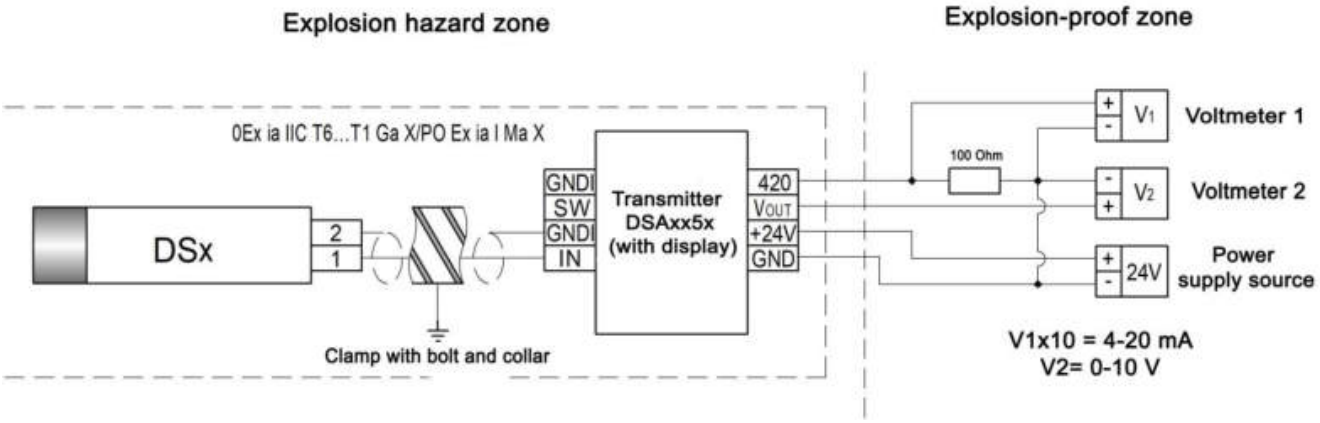
- Measured parameters displayed
- Software version
- Modbus address of the device
- No. of sensor to which the converter is configured
- The measured value sent to the output (4-20) mA
- The measured value sent to the output (0-10) V

To enter the service mode: turn off power, press and hold "упр." (control) button, turn on power, wait for the red "инф." (inf.) indicator to turn on and release "упр." (control) button.

If the converter is in service mode, the "инф." (inf.) indicator is red; if in standard mode, "инф." (inf.) indicator is blue or disabled.

To exit the service mode: turn off and turn on the power.

4.2.3.3 TIK-DSAxx5xDSxxxxxx connection diagram



4.2.3.4 TIK-DSAxx5xDSxxxxxx register chart

Input Registers					
Address	Format	Name	Coef.A	Coef.B	Unit
5	Int	Gap	0.001	0	mm
6	Int	Span			microns
8	swFloat	Rotation speed			rpm
10	swFloat	Rotation frequency in Hz	0.01	0	Hz
14	Int	Sensor status (0 - disconnected, 1 - connected)			
18	Int	Application version	0.1	0	
Holding Registers					
24	Dec	Sensor serial number			
Note: if "Coef.A" and "Coef.B" are specified for the register, the register value, taking into account the coefficients, is calculated using the formula: (A * value) + B; where: A, B are the specified coefficients; value is the register value.					

4.2.4 TIK-DSAxx7xDSxxxxxx is a converter with RS–485 output

4.2.4.1 Description and versions of TIK-DSAxx7xDSxxxxxx

TIK-DSAxx7xDSxxxxxx converter measures several measured values and sends the measured values digitally to RS-485 output.

Versions of TIK-DSAxx7xDSxxxxxx differ in the measured value:

TIK-DSAx37xDSxxxxxx - Vibration displacement span
TIK-DSAx47xDSxxxxxx - Gap
TIK-DSAx57xDSxxxxxx - Rotation speed
TIK-DSAx67xDSxxxxxx - Vibration displacement span/gap/rotation speed and the type of housing:

TIK-DSAxx71DSxxxxxx - Mounting of the transmitter housing on a DIN rail (plastic)
TIK-DSAxx73DSxxxxxx - Transmitter in a metal housing
TIK-DSAxx74DSxxxxxx -Mounting of the transmitter housing on the mounting panel
TIK-DSAxx75DSxxxxxx - Mounting the transmitter on the sensor/cable assembly

To read the measured values from the converter, it is necessary to connect to it via RS-485 interface – see par. 4.1.7.

4.2.4.2 Operating modes of TIK-DSAxx7xDSxxxxxx

Switching the measured value using a jumper

Not supported.

Service mode

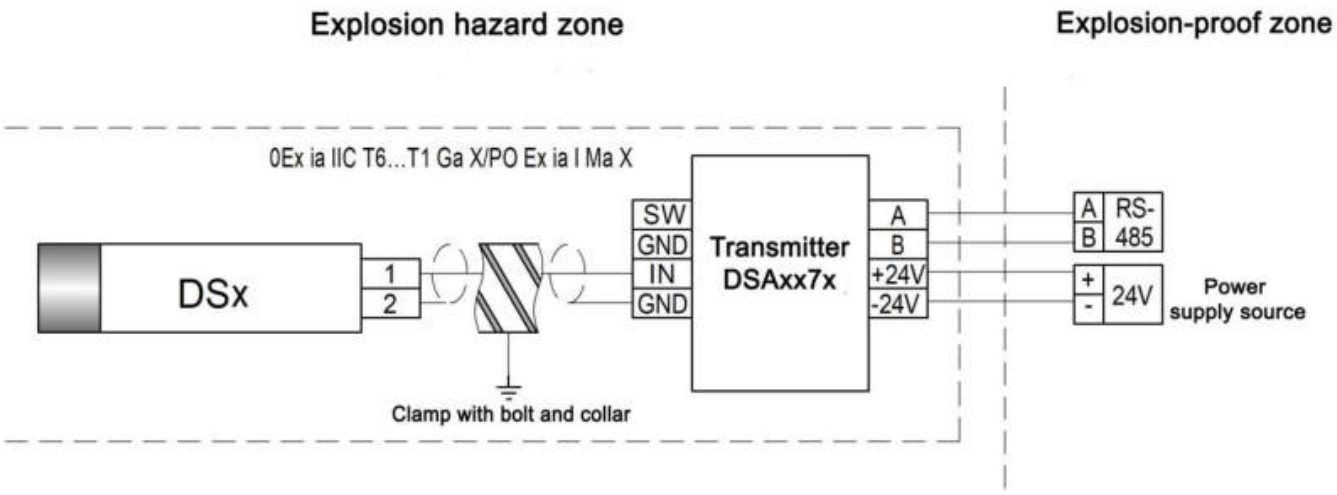
In the service mode, the RS-485 parameters are reset to the default values: Modbus address = 1, interface speed = 115200 baud.

To enter the service mode: turn off the power, connect the jumper, turn on the power, after 3 seconds turn off the jumper.

If the converter is in service mode, Modbus -address = 1, interface speed = 115200 baud.

To exit the service mode: turn off and turn on the power.

4.2.4.3 TIK-DSAxx7xDSxxxxxx connection diagram



4.2.4.4 TIK-DSAxx7xDSxxxxxx register chart

Input Registers					
Address	Format	Name	Coef.A	Coef.B	Unit
1	Int	Gap	0.001	0	mm
2	Int	Span	0.1	0	microns
3	swFloat	Rotation speed			rpm
14	Int	Application version			
Holding Registers					
Address	Format	Name	Coef.A	Coef.B	Unit
1	Int	Password			
11	Int	Address			
12	Int	Speed	100	0	baud
Note: if "Coef.A" and "Coef.B" are specified for the register, the register value, taking into account the coefficients, is calculated using the formula: (A * value) + B; where: A, B are the specified coefficients; value is the register value.					

5 ASSEMBLY AND INSTALLATION OF PRODUCTS ON SITE

5.1 Installation of the eddy current sensor DS0 (DS1, DS2, DS3) on the unit

5.1.1 Install the eddy current sensor on the unit as shown in the figure, depending on the value to be measured:

Span of vibration displacement - see

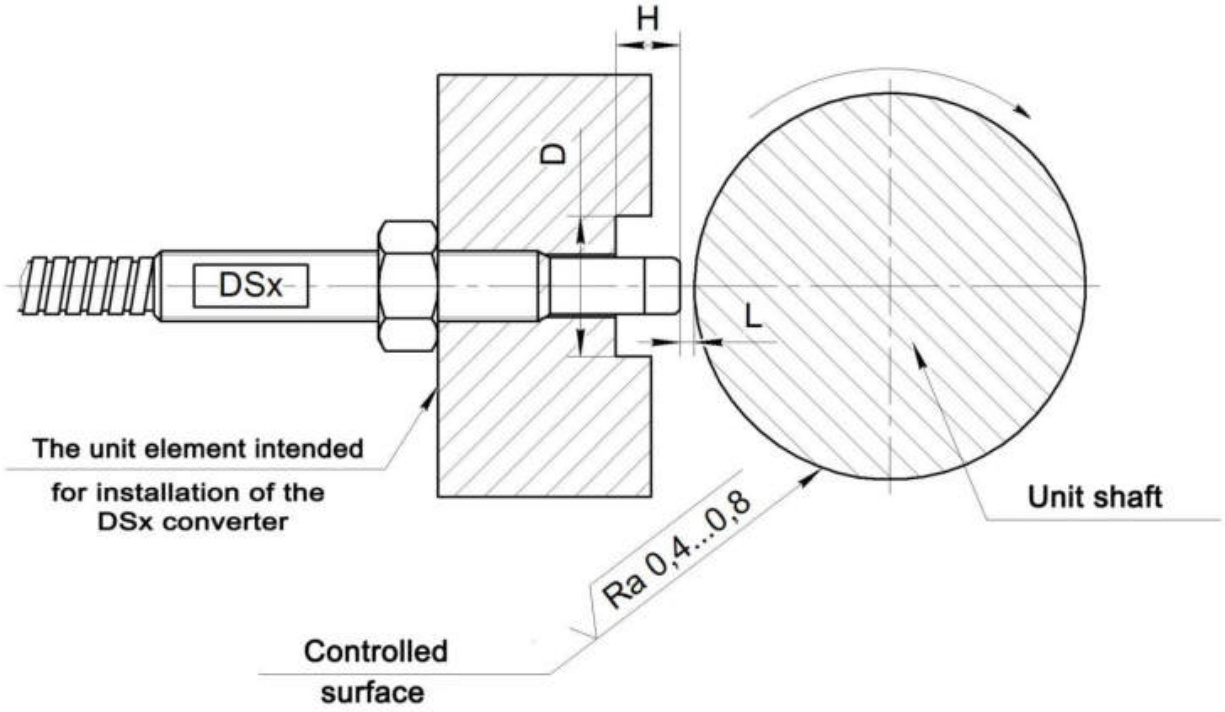


Figure 1.

Gap (axial shift), Instantaneous gap – see

Figure 2.

Rotation speed, Phase meter (frequency output) – see Figure 3.

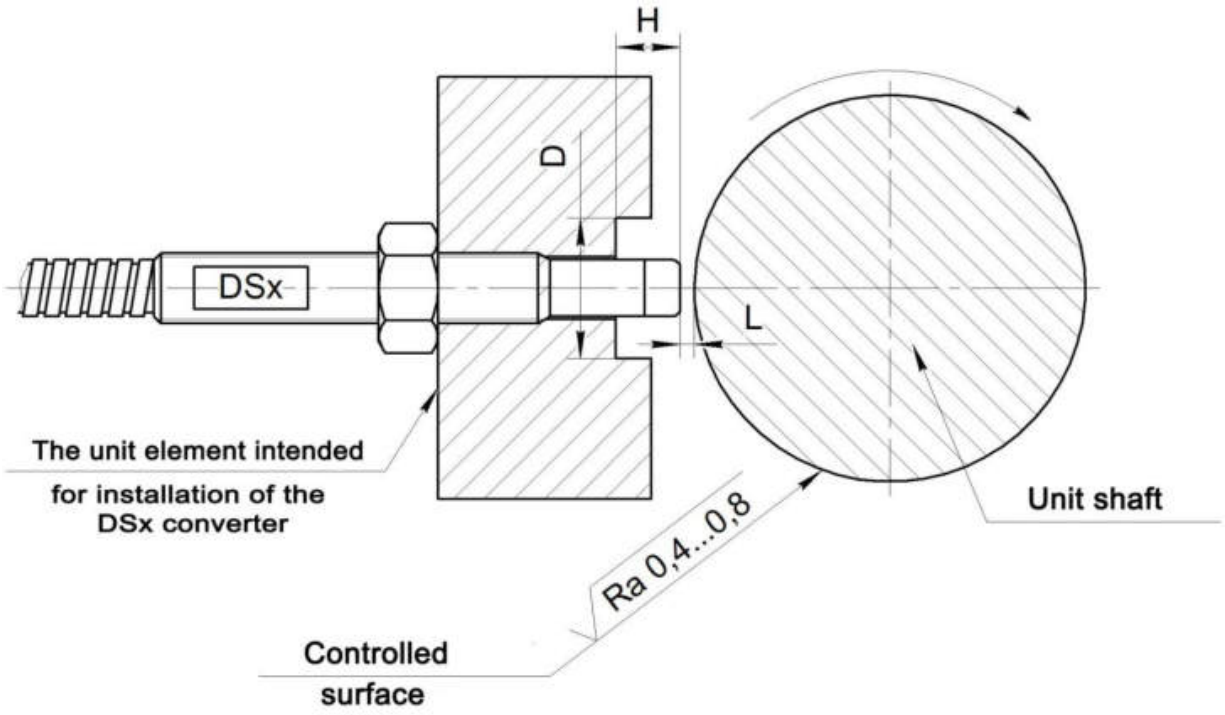


Figure 1. Installation of a sensor for measuring vibration displacement span.

Table 8. Setting parameters for eddy current sensors

Sensor type	Installation gap L, mm (for measuring the span, speed of rotation)	Installation gap S, mm (for measuring the gap, instantaneous gap)	min D, mm	min H, mm	min d, mm	min h, mm
DS0	1.5 ± 0.2	The middle of the measurement range *	20	8	12 **	3
DS1	1.5 ± 0.2		20	8	15 **	3
DS2	3.0 ± 0.2		40	16	20 **	5
DS3	5.0 ± 0.2		55	24	25 **	7

* When measuring the gap (axial shift), instantaneous gap, it is allowed to set any installation gap within the measuring range of the converter. Please note that when the gap changes due to operation of the unit, the installation gap must remain within the measurement range.
** Depends on max. rotation speed – par. 5.1.5.

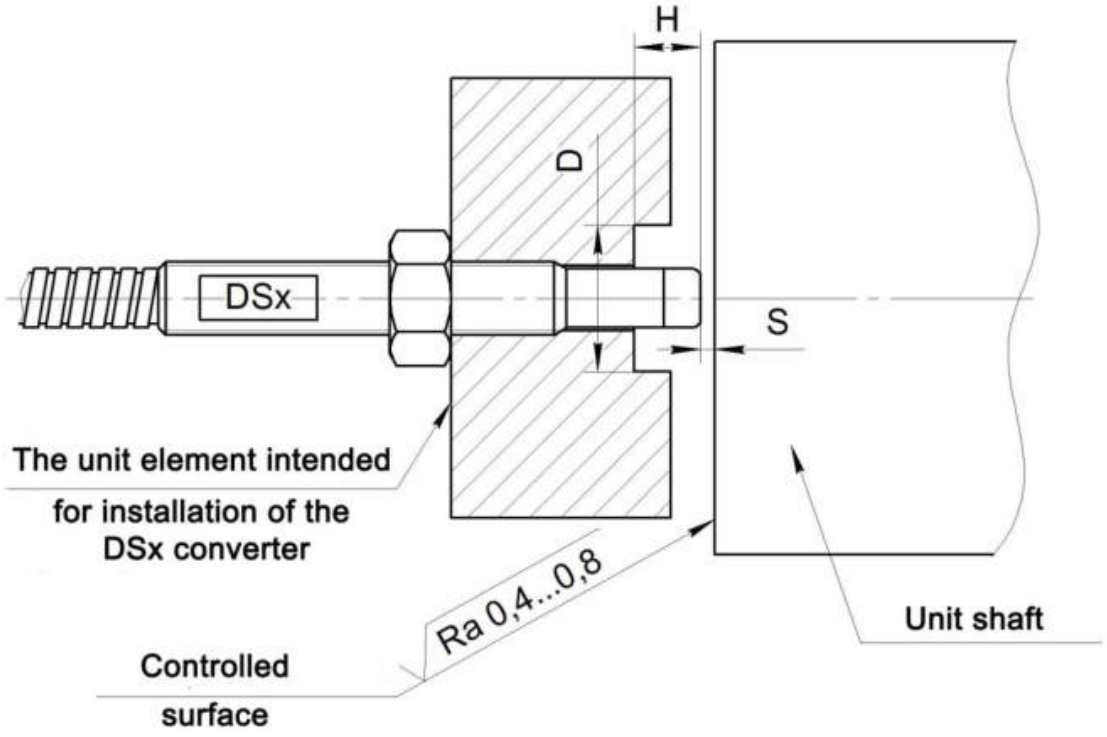


Figure 2. Installation of a sensor for measuring the Gap (axial shift) and Instantaneous gap.

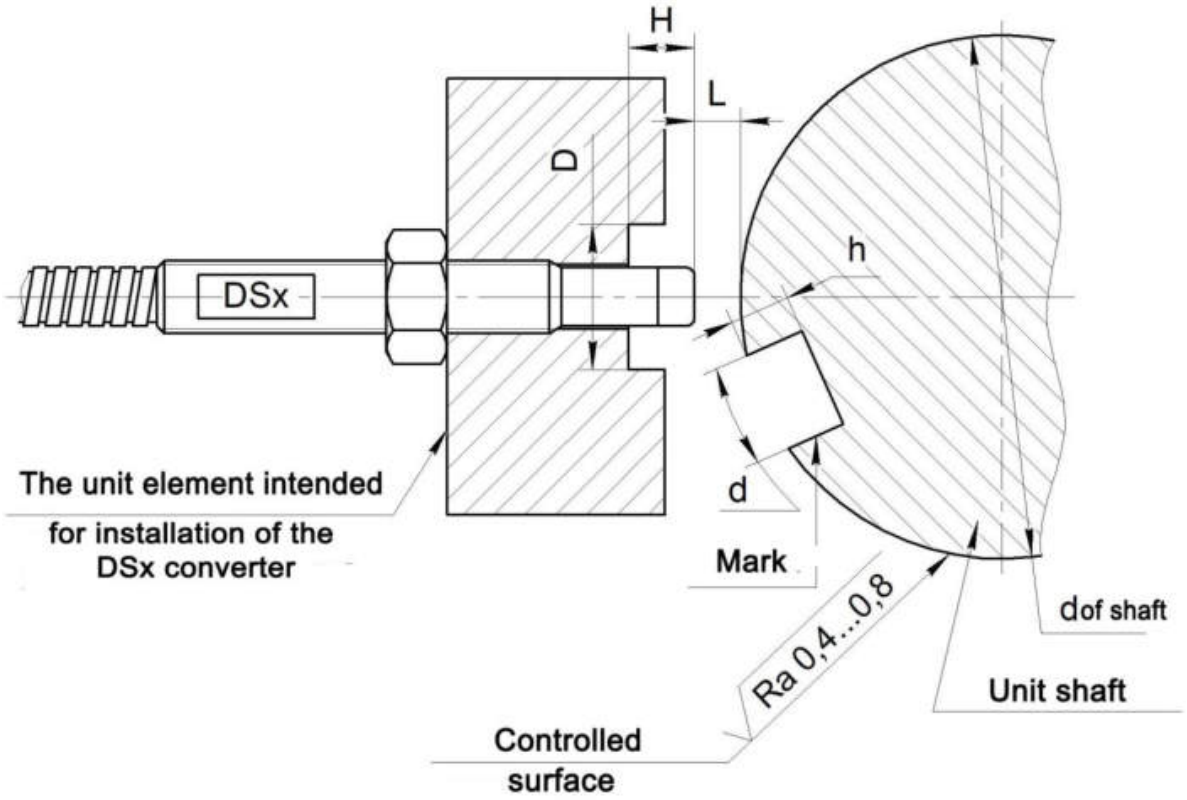


Figure 3. Installation of a sensor for measuring the speed of rotation and for operation in the Phase Meter mode (frequency output).

5.1.2 Set the installation gap according to Table 8. Please note that when measuring the Vibration Displacement Span, Rotation speed and when operating in the Phase Meter mode (frequency output), the setting gap "L" is used; when

measuring the Gap (axial shift) and Instantaneous gap, the gap "S" is used, depending on the measuring range of the converter (see note to Table 8).

Important! If there are marks on the shaft, the gap between the sensor and the surface is set in such a position of the rotor when the gap from the converter to the surface is the smallest of all possible positions of the rotor. After installing the rotor in this position, set the gap according to Table 8.

To control accuracy of the gap setting, it is recommended to control the gap according to the readings of the converter. For this, please do the following, depending on the design of the converter:

TIK-DSAxx1xDSxxxxxx – if the converter measures the Span or Gap (TIK-DSAx31xDSxxxxxx or TIK-DSAx41xDSxxxxxx) - connect the jumper, set the gap according to the output gap readings (4-20) mA, disconnect the jumper. If the converter measures the Speed of rotation (TIK-DSAx51xDSxxxxxx) – set the gap mechanically (for example, using probes for measuring gaps).

TIK-DSAxx4xDSxxxxxx – set the gap according to the output gap readings (-1...-17) V.

TIK-DSAxx5xDSxxxxxx – connect the jumper, set the gap according to the output gap readings (4-20) mA, disconnect the jumper.

TIK-DSAxx7xDSxxxxxx – connect to the converter via Modbus (see par. 4.1.7), set the gap according to the gap readings in the Modbus register "Gap" (Input Register 1).

Note: Coefficients of converting the values of outputs (4 -20) mA and (-1...-17) V in a gap – see par. 2.4.

5.1.3 Make sure that the minimum dimensions D, H, d, h in the figures are observed in accordance with Table 8.

Important! In the area limited by the dimensions "D", "H", "L" and "S", any structural elements are not allowed.

5.1.4 To avoid cross talks when measuring the vibration displacement span by several DSx eddy current sensors, they should be installed so that the distance between the ends of the converters is at least three sensor diameters (sensor diameters are indicated in Table 2).

5.1.5 When measuring the Speed of rotation and when operating in the Phase Meter mode (frequency output), the minimum size of the mark depends on the maximum speed of the shaft.

Calculate the minimum size of the mark d_{min} (arc length, mm) using the formula:

$$d_{min} = (f_{max} * \pi * d_{shaft}) / (2 * 200000)$$

where: f_{max} is the maximum shaft speed (max 100,000), rpm;

π is the number of π; d_{shaft} is diameter of the shaft, mm.

Make sure that the actual size of the mark d is not less than the value d_{min} calculated by the formula above, as well as not less than the value min d specified in Table 8.

When using multiple marks, the specified rules should be applied to each mark.

6 VERIFICATION OF SOFTWARE IDENTIFICATION DATA

6.1 The identification data of software of converter versions TIK-DSAxx1xDSxxxxxx, TIK-DSAxx5xDSxxxxxx and TIK-DSAxx7xDSxxxxxx are displayed in the Modbus register with the name "Application version".

7 ENSURING EXPLOSION PROTECTION

7.1 Explosion protection of TIK-DSA converters with explosion protection marking 0Ex ia IIC T6...T1 Ga X / PO Ex ia I Ma X is ensured by compliance with the general technical requirements according to GOST 31610.0-2014 - mine explosion-proof electrical equipment intended for use in underground workings of mines and in their ground structures dangerous as for mine gas and/or combustible dust, GOST 31610.11-2014 and GOST 24754.

7.2 Intrinsically safe electrical circuits of eddy current sensors DS0, DS1, DS2, DS3 belong to the "ia" level. The type of explosion protection according to GOST 31610.0-2014 is "especially explosion-proof".

7.3 TIK-DSA converter should be connected through a safety barrier having an explosion protection certificate. The safety barrier should be located outside the explosive zone and have the following technical characteristics:

-for TIK-DSAxx1xDSxxxxxx, TIK-DSAxx3xDSxxxxxx, TIK-DSAxx5xDSxxxxxx, TIK-DSAxx7xDSxxxxxx: Uo ≤24 V, Io ≤120 mA, Co≥C cable+0.05 μF, Lo≥ L cable+0.1 mH;

-for TIK-DSAxx4xDSxxxxxx: Uo ≤28 V, Io ≤140 mA, Co≥C cable+0.01 μF, Lo≥ L cable+0.01 mH.

7.4 To ensure protection from external influences, the transmitters located in the explosion-proof zone must be installed in connection boxes marked "0Ex ia IIC T6...T1 Ga X / PO Ex ia I Ma X".

7.5 To prevent the capacitors of DSAxxxx converters from charging to dangerous values (in case of failure of the internal voltage stabilizer), the power supply circuits are shunted by zener diodes located in non-removable transmitter shells. The current through the zener diodes in emergency mode does not exceed 2/3 of the nominal value.

7.6 The thermal conditions of the elements of intrinsically safe electrical circuits located in an explosive zone are calculated so that their surface temperature in normal and emergency modes does not exceed the value specified in Table 6 at the maximum ambient temperature.

7.7 A special explosion safety mark  is applied in the data sheet and the OM in accordance with the Technical Regulations of the Customs Union (TR CU 012/2011) "On safety of equipment for working in explosive environments".

7.8 The requirements for leakage paths, electrical gaps and electrical insulation strength are met according to GOST 30852.10; shells of eddy current sensors DS0, DS1, DS2, DS3 must have a degree of protection of IP65 (IP65/IP68), transmitter DSAxxxx - IP 20 and IP54 according to GOST 14254.

7.9 The frictional intrinsic safety of eddy current sensors DS0, DS1, DS2, DS3 is ensured by the manufacture of shells and armored hoses made of stainless steels. Junction boxes and amplifier housings are made of aluminum alloy with magnesium content of less than 7.5%, XS1 and XP1 connector housings are made of silumin alloy with magnesium content of less than 7.5% in accordance with GOST 31610.0.

7.10 The electrostatic intrinsic safety of the eddy current sensor DS0, DS1, DS2, DS3 is ensured by the absence of plastic shell parts. The area of the plastic tip

of the eddy current sensor DS0, DS1 does not exceed 3.2 cm ^{2}, for DS2 - does not exceed 7 cm ^{2}, and for DS3 - does not exceed 15.1 cm ^{2}.

7.11 Overvoltage protection on the piezoelectric elements of the eddy current sensor DS0, DS1, DS2, DS3 is provided by shunting the piezoelectric elements with zener diodes with a stabilization voltage of 51 V.

7.12 Solid design of the transmitter and eddy current sensors is ensured by gluing the lid and the housing with K-400 glue.

7.13 Temperature classes of sensors DS0, DS1, DS2, DS3 and transmitter DSAxxxx.

Eddy current sensors DS0, DS1, DS2, DS3 and transmitter DSAxxxx, depending on the temperature classes of the zones in which they are used, must be operated at ambient temperatures in accordance with Table 9.

Table 9. Temperature classes of sensors and transmitters

Components	Upper value for temperature groups, °C						The lower value of ambient temperature of the channel components, °C
	T1 (+450)	T2 (+300)	T3 (+200)	T4 (+135)	T5 (+100)	T6 (+85)	
Eddy current sensors DS0, DS1, DS2, DS3	+135	+135	+135	+120	+85	+70	-60
Eddy current sensors DS0, DS1, DS2, DS3 design B	+180	+180	+180	+120	+85	+70	-60
Eddy current sensors DS0, DS1, DS2, DS3 design K	+80	+80	+80	+80	+80	+70	-196
Transmitter DSAxxxx (all modifications)	+80	+80	+80	+80	+80	+70	-60

8 ENSURING SECURITY MEASURES

8.1 TIK-DSA converters comply with the general safety requirements according to GOST 12.2.003-91.

8.2 As for the method of protecting people from electric shock, TIK-DSA converters correspond to Class III according to GOST 12.2.007.0-75.

8.3 During maintenance and testing of TIK-DSA converters, the "Rules of technical operation of consumer electrical installations" approved by the Ministry of Energy of Russia should be observed.

8.4 TIK-DSA converters comply with fire safety requirements according to GOST 12.1.004-91.

9 MAINTENANCE

9.1 Maintenance of TIK-DSA converters includes:

- visual preventive inspection;
- scheduled periodic verification of metrological characteristics of TIK-DSA converters.

9.2 Preventive inspection of the converters should be carried out at least once a month. At that, appearance of the converter and serviceability of the connecting cable are to be checked.

Any attempt to open the housing of the transmitter and the eddy current sensor and (or) repair terminates the warranty.

9.3 Verification of metrological characteristics of the converters should be carried out at least once every two years in accordance with the approved verification procedure MP 204/3-28-2021. Information about the conducted verifications should be given in the data sheet and confirmed by signature of the responsible person.

9.4 Repair, inspection and maintenance of converters must be carried out in accordance with GOST IEC 60079-14-2013.

10 OPERATING LIFE, SERVICE LIFE AND STORAGE PERIOD. MANUFACTURER'S WARRANTY

10.1 The average service life is at least ten years. The specified operating life of the devices is 80,000 hours.

10.2 Mean time between failures for a converter is at least 40,000 hours.

10.3 The manufacturer guarantees the compliance of TIK-DSA converters with the requirements of the technical specifications provided that the consumer complies with the operating, transportation and storage conditions established by the operating manual.

10.4 The warranty period of operation is 24 months from the date of shipment of the converter from the manufacturer, and 12 months for TIK-DSA converter design K. The manufacturer is obliged free of charge to replace or repair the converters, in which, within the specified period, the parameters do not meet the requirements of the technical specifications.

10.5 The manufacturer is not responsible for defects, breakdowns and mechanical damage caused by non-compliance with the rules of storage, transportation and operation by the consumer. Repair of converters after the warranty period is carried out by the manufacturer for a certain fee. Shipping costs are to be paid by the consumer sending the device.

10.6 If malfunctions are detected in the converters, complaints should be sent to the manufacturer's address **(RPE "TIK", 614067 Perm, Marii Zagumennykh str., 14 "A").** When making a complaint, need to specify the following:

- converter serial number, date of manufacture, time of purchase;
- service life and operating time in hours;
- whether the device was in repair, and what was fixed in it;
- full name of the organization that purchased the devices and its address;
- position, full name of the person drawing up the complaint, phone number;
- the nature of the defect (or incompleteness);
- the date of complaint.

11 TRANSPORTATION AND STORAGE

11.1 The converters can be stored in the manufacturer's packaging for 6 months from the date of shipment from the manufacturer.

11.2 Storage conditions of converters in terms of exposure to climatic factors of external environment should correspond to the group "Л" of storage conditions in GOST 15150.

11.3 Mercury vapors, alkalis and other chemicals that cause corrosion are not allowed in storage areas.

11.4 Storage of converters without packaging is not allowed.

11.5 The converters must be transported in covered vehicles of any type (by air, provided the device is placed in a sealed compartment) at a temperature from minus 50 to plus 50 C °according to GOST R 52931-2008.

11.6 Transportation is carried out in accordance with the rules applicable to the corresponding type of transport.

11.7 After transportation at negative temperatures, it is necessary to keep the converters for at least 8 hours at room temperature, under which they will be operated.

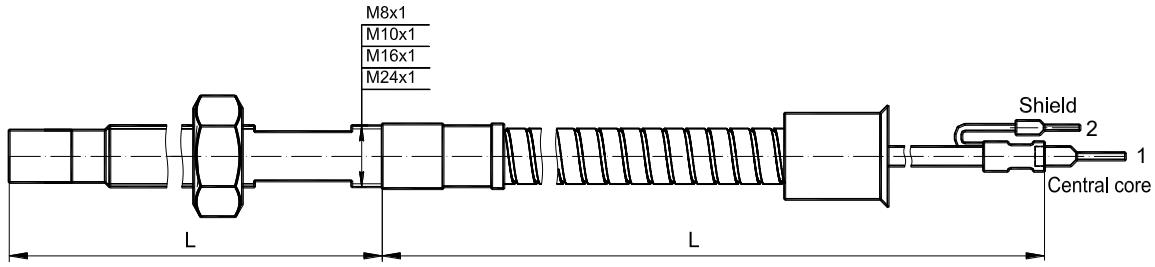
12 PERSONNEL REQUIREMENTS

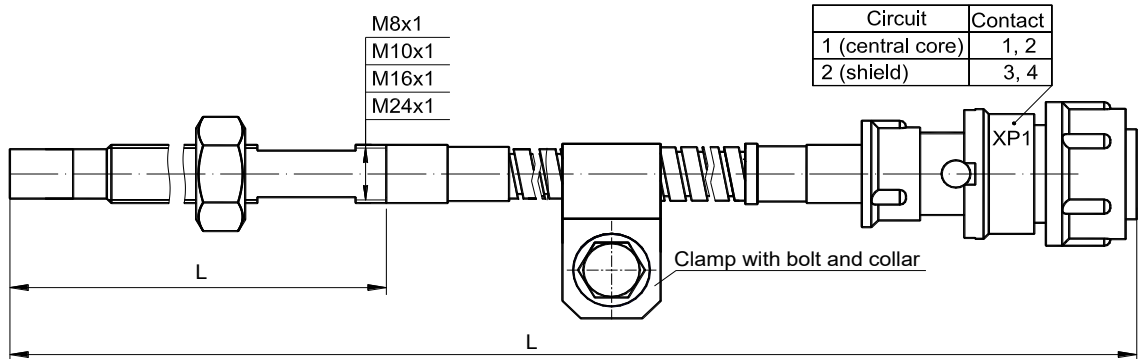
12.1 Only persons at least 18 years old who know: the design of the converter, the rules for working with it, methods and techniques for safe work, safety instructions, fire safety, who are aware of the danger of electric current and electrical safety measures when working with converters should be allowed to work with the converters, as well as to provide maintenance.

13 DISPOSAL

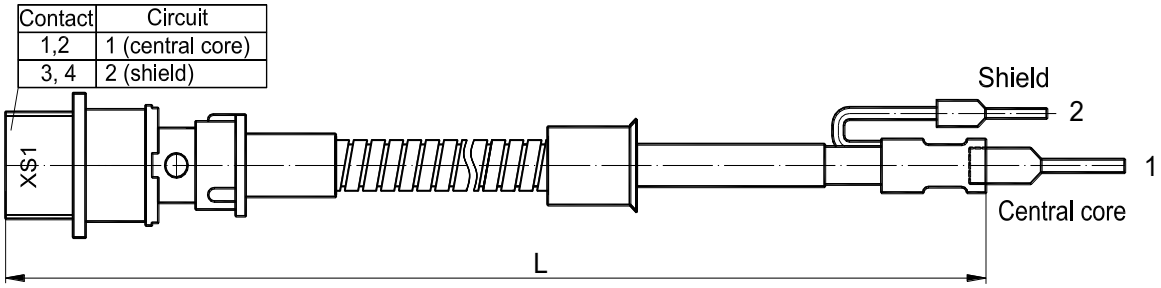
13.1 The converters are environmentally safe and do not emit harmful and dangerous substances and radiation during operation. When disposing of converters, it is forbidden to burn its structural elements in order to avoid the release of harmful substances.

Annex A. Overall and installation dimensions of eddy current sensors DS0, DS1, DS2, DS3

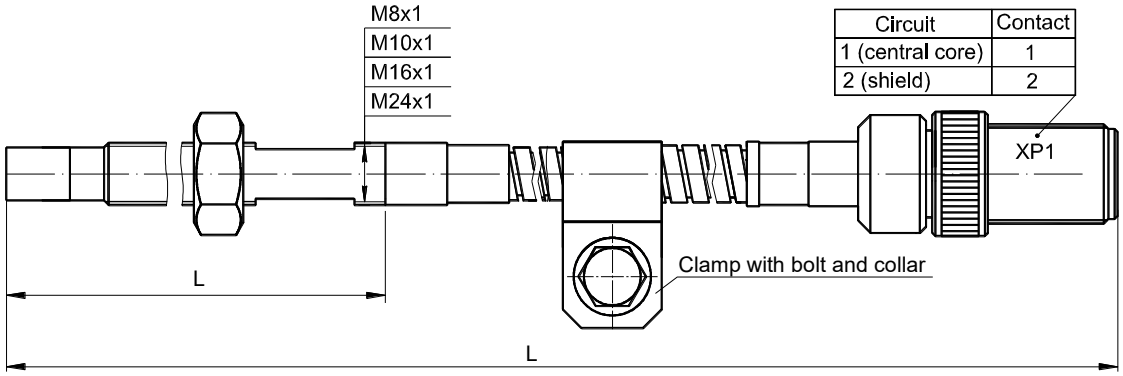




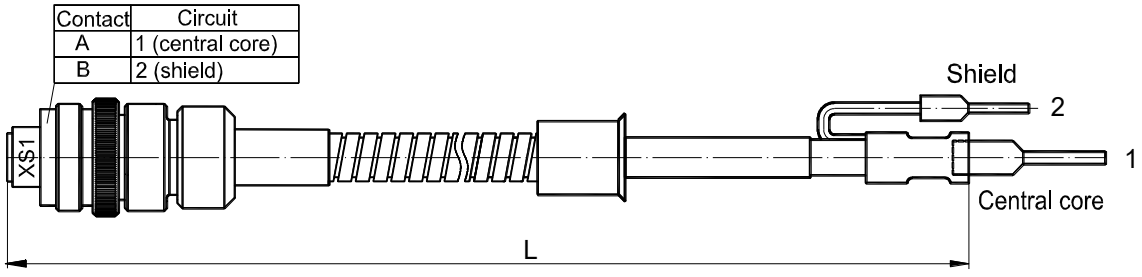
Connecting cable

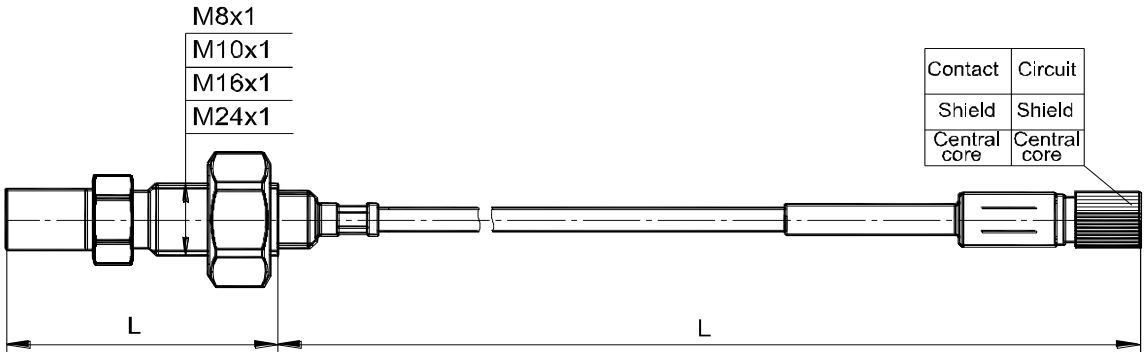


Connecting cable

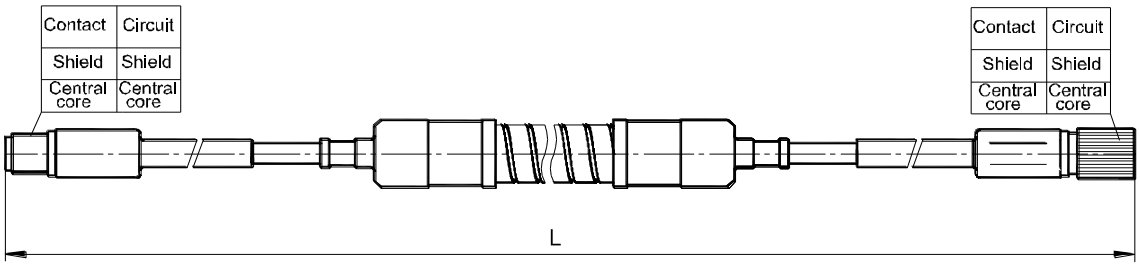


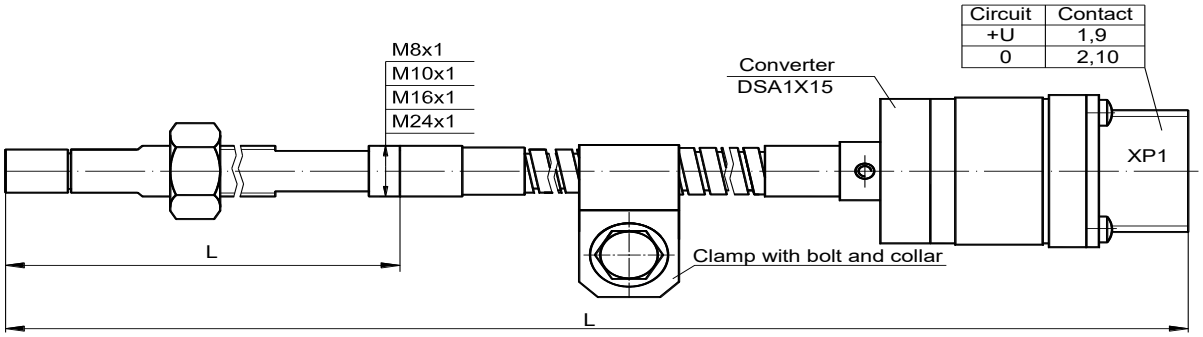
Connecting cable



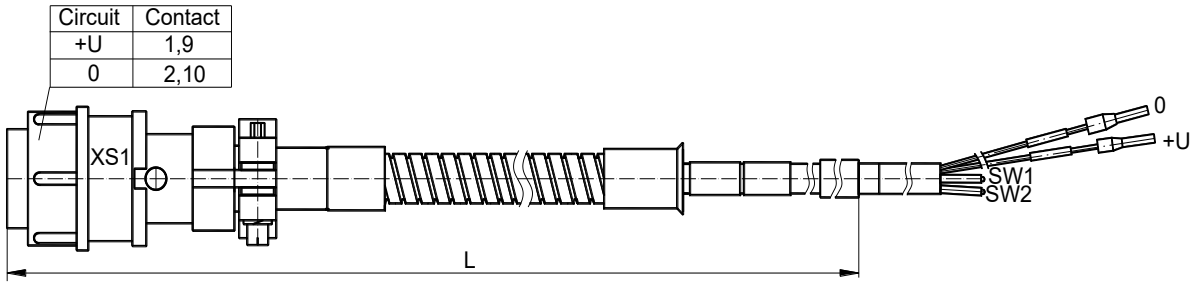


Connecting cable

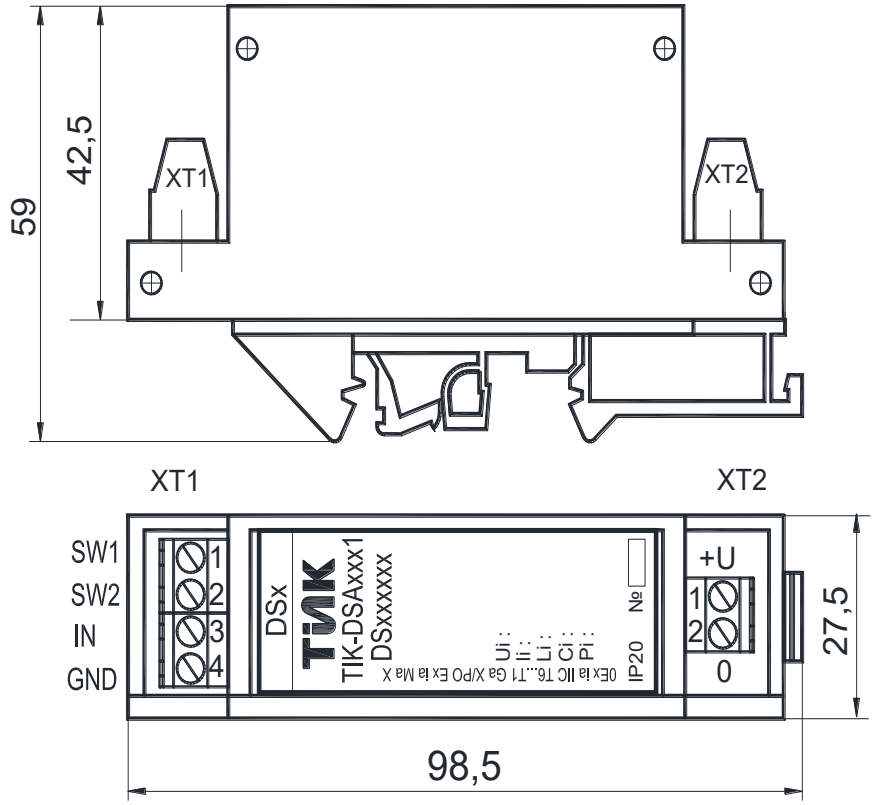




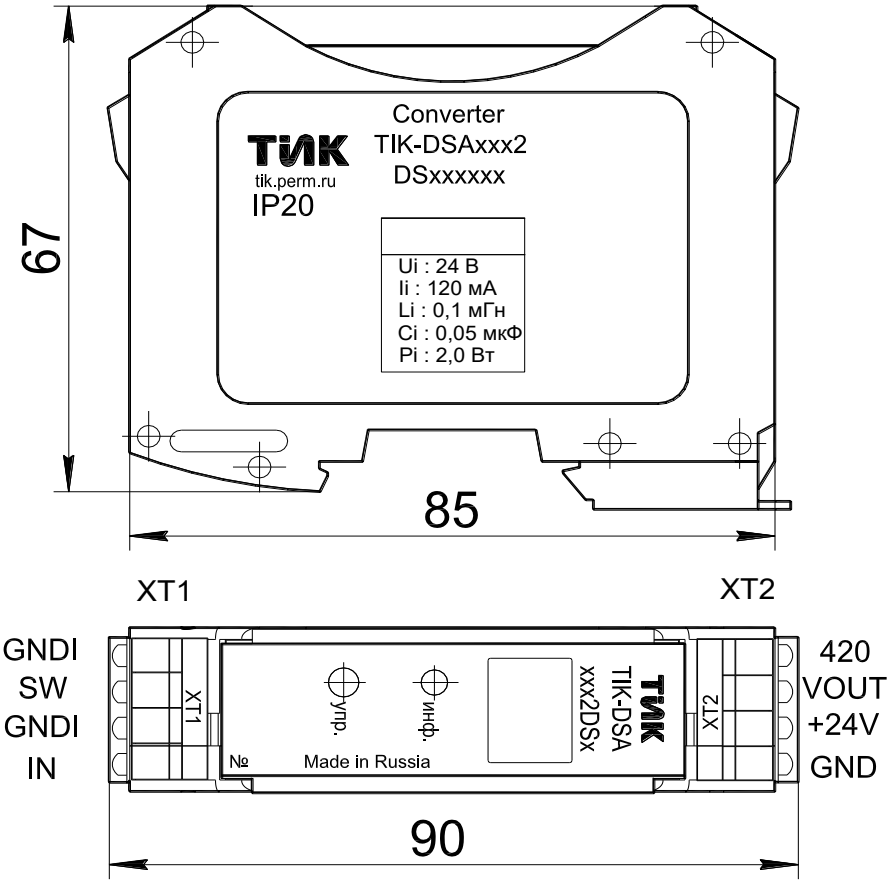
Connecting cable



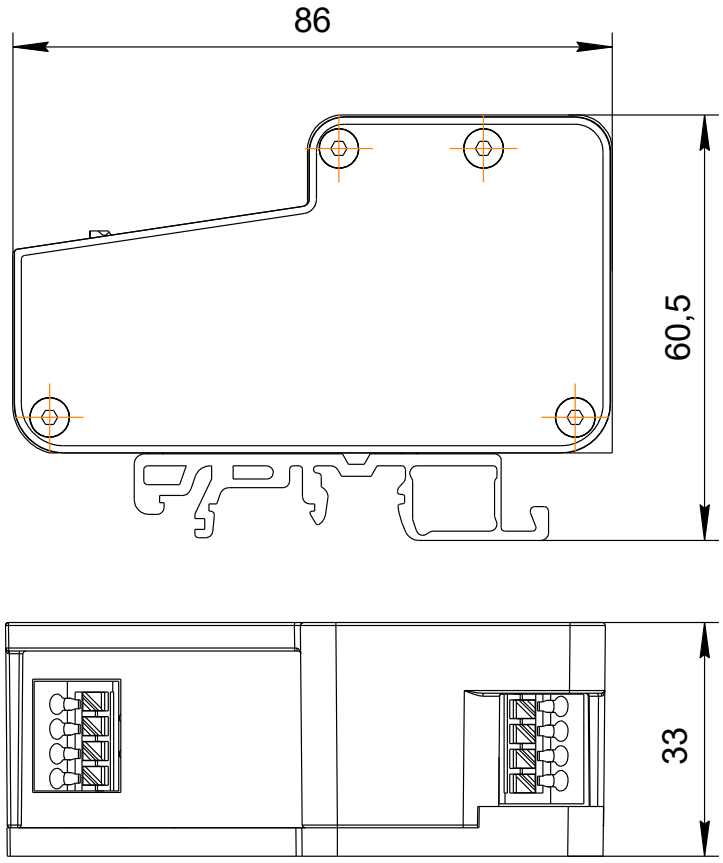
Annex B. Overall and connecting dimensions of transmitter DSA xxxx



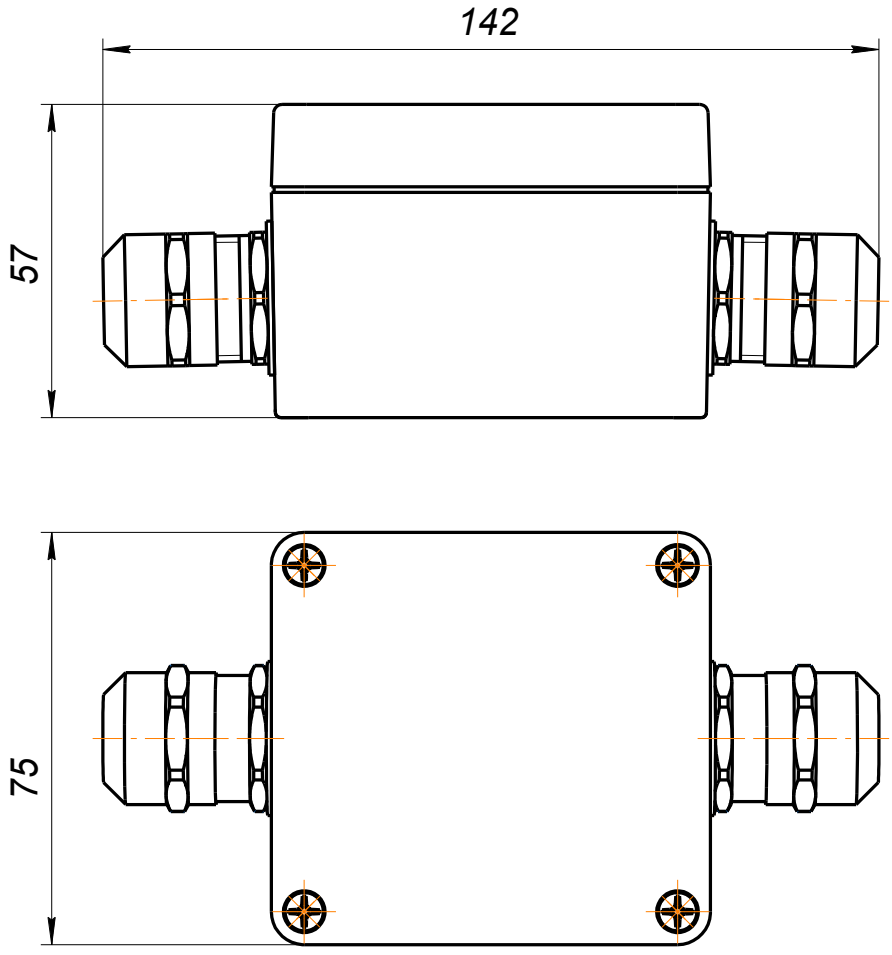
Transmitter DSAxxx2



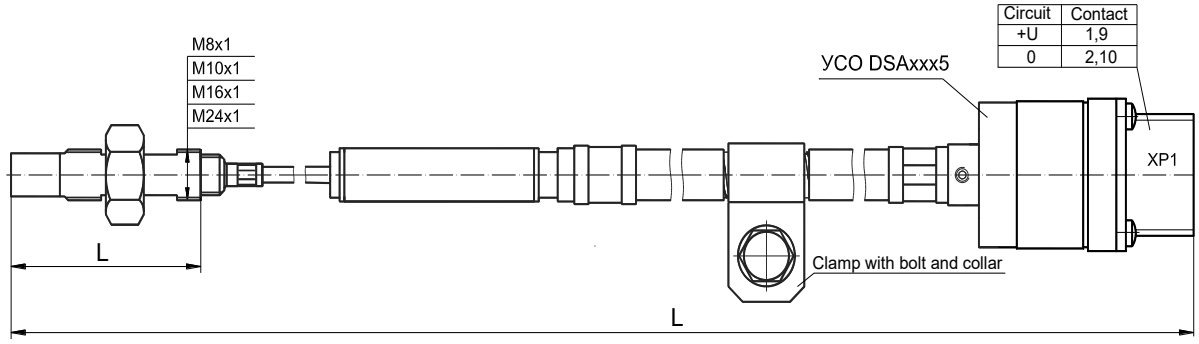
Transmitter DSAxxx3

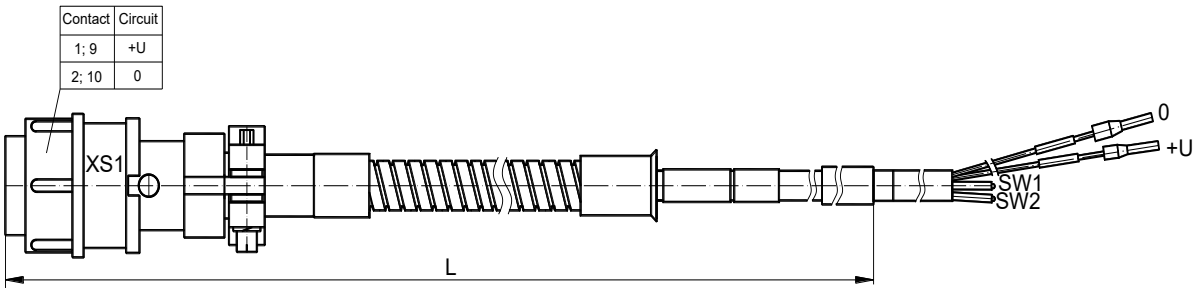


Transmitter DSAxxx4



Transmitter DSAxxx5





Annex C. DECLARATION OF CONFORMITY TR CU 020/2011

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель: ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ НАУЧНО-ПРОИЗВОДСТВЕННОЕ ПРЕДПРИЯТИЕ "ТИК", Место нахождения: 614067, РОССИЯ, КРАЙ ПЕРМСКИЙ, ГОРОД ПЕРМЬ, УЛИЦА МАРИИ ЗАГУМЕННЫХ, 14, А, ОГРН: 1025900509799, Номер телефона: +7 3422147575, Адрес электронной почты: tik@perm.ru
В лице: ГЕНЕРАЛЬНЫЙ ДИРЕКТОР САЛИМОВА АННА ВЛАДИМИРОВНА

заявляет, что Преобразователи TIK-DSA
Изготовитель: ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ НАУЧНО-ПРОИЗВОДСТВЕННОЕ ПРЕДПРИЯТИЕ "ТИК", Место нахождения: 614067, РОССИЯ, КРАЙ ПЕРМСКИЙ, ГОРОД ПЕРМЬ, УЛИЦА МАРИИ ЗАГУМЕННЫХ, 14, А, Адрес места осуществления деятельности по изготовлению продукции: 614067, РОССИЯ, Пермский край, г Пермь, ул. Марии Загуменных, дом 14а
Документ, в соответствии с которым изготовлена продукция: Технические условия "Преобразователи TIK-DSA", номер: ТУ 26.51.66-051-12036948-2021
Коды ТН ВЭД ЕАЭС: 9031803800
Серийный выпуск,
Соответствует требованиям ТР ТС 020/2011 Электромагнитная совместимость технических средств

Декларация о соответствии принята на основании протокола 18537А выдан 02.03.2022 испытательной лабораторией "«Экспресс-Тест»"; Схема декларирования: 1д;

Дополнительная информация Стандарты и иные нормативные документы: 12.2.003-91, "Система стандартов безопасности труда. Изделия электротехнические. Общие требования безопасности"; Стандарты и иные нормативные документы: ГОСТ 30804.6.2-2013 (IEC 61000-6-2:2005), "Совместимость технических средств электромагнитная. Устойчивость к электромагнитным помехам технических средств, применяемых в промышленных зонах. Требования и методы испытаний"; Стандарты и иные нормативные документы: ГОСТ 30804.6.4-2013 (IEC 61000-6-4:2006), "Совместимость технических средств электромагнитная. Электромагнитные помехи от технических средств, применяемых в промышленных зонах. Нормы и методы испытаний"; Срок хранения (службы, годности) указан в прилагаемой к продукции товаросопроводительной и/или эксплуатационной документации

Декларация о соответствии действительна с даты регистрации по 04.04.2027 **включительно**

М.П. САЛИМОВА АННА ВЛАДИМИРОВНА
(подпись) (Ф. И. О. заявителя)

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-RU.PA02.B.34726/22
Дата регистрации декларации о соответствии: 05.04.2022

Annex D. CERTIFICATE OF CONFORMITY TR CU 012/2011

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ЕАЭС RU C-RU.HA65.B.01454/22

Серия RU № 0387603

ОРГАН ПО СЕРТИФИКАЦИИ продукции Общества с ограниченной ответственностью «ТехБезопасность». Место нахождения (адрес юридического лица): 127486, Россия, город Москва, улица Дегунинская, дом 1, корпус 2, этаж 3, помещение 1, комната 19. Адреса мест осуществления деятельности в области аккредитации: 105066, Россия, город Москва, улица Нижняя Красносельская, дом 35, строение 64, комната 22 "в"; 301668, Россия, Тульская область, город Новомосковск, улица Орджоникидзе, дом 8 пристроенное нежилое здание – пристройка к цеху № 3, 3 этаж, помещение 4 и помещение 10. Номер аттестата аккредитации (регистрационный номер) RA.RU.11HA65. Дата внесения в реестр сведений об аккредитованном лице - 10.08.2018. Телефон: +74952081646, адрес электронной почты: teh-bez@inbox.ru.

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью Научно-производственное предприятие «ТИК». Основной государственный регистрационный номер 1025900509799. Место нахождения (адрес юридического лица) и адрес места осуществления деятельности: 614067, Россия, Пермский край, город Пермь, улица Марии Загуменных, дом 14, А. Телефон: +73422147575. Адрес электронной почты: tik@perm.ru.

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью Научно-производственное предприятие «ТИК». Место нахождения (адрес юридического лица) и адрес места осуществления деятельности по изготовлению продукции: 614067, Россия, Пермский край, город Пермь, улица Марии Загуменных, дом 14, А.

ПРОДУКЦИЯ Преобразователи TIK-DSA, изготовленные в соответствии с техническими условиями ТУ 26.51.66-051-12036948-2021 «Преобразователи TIK-DSA». Маркировка взрывозащиты и иные сведения о продукции, обеспечивающие ее идентификацию, приведены на листах 1,2,3 Приложений (бланки №№ 0894941, 0894942, 0894943). Серийный выпуск.

КОД ТН ВЭД ЕАЭС 9031 80 380 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах» (ТР ТС 012/2011)

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ Протокола испытаний № 1740-НИ-01 от 18.05.2022 Испытательной лаборатории взрывозащищенного оборудования Общества с ограниченной ответственностью "ТЕХБЕЗОПАСНОСТЬ", аттестат аккредитации RA.RU.21HB54 от 26.03.2018. Акта анализа состояния производства № 1740-АСП от 09.02.2022. Технической документации изготовителя (перечень приведен на листе 3 Приложения (бланк № 0894943). Схема сертификации 1с.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Стандарты и иные нормативные документы, применяемые при подтверждении соответствия, приведены на листе 4 Приложения (бланк № 0894944). Условия хранения, срок хранения и срок службы (годности) приведены на листе 1 Приложения (бланк № 0894941)

СРОК ДЕЙСТВИЯ С 20.05.2022 **ПО** 19.05.2027 **ВКЛЮЧИТЕЛЬНО**

Руководитель (уполномоченное лицо) органа по сертификации (подпись) Шмелев Антон Андреевич (Ф.И.О.)

М.П.

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) (подпись) Пономарев Михаил Валерьевич (Ф.И.О.)