Made in Russia

TIK-ZSK rocking machine emergency protection device

ТИК Research and production enterprise

Approval documents

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

Valid till 10/25/2027


ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СЕРТИФИКАТ
об утверждении типа средств измерений
№ 69044-17

Срок действия утверждения типа до 25 октября 2027 г.

НАИМЕНОВАНИЕ И ОБОЗНАЧЕНИЕ ТИПА СРЕДСТВ ИЗМЕРЕНИЙ
Вибропреобразователи DVA

ИЗГОТОВИТЕЛЬ
Общество с ограниченной ответственностью Научно-производственное предприятие "ТИК" (ТИК НПП ООО), г. Пермь

ПРАВООБЛАДАТЕЛЬ
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КОД ИДЕНТИФИКАЦИИ ПРОИЗВОДСТВА
ОС

ДОКУМЕНТ НА ПОВЕРКУ
РТ-МП-4515-441-2017

ИНТЕРВАЛ МЕЖДУ ПОВЕРКАМИ 2 года

Срок действия утвержденного типа средств измерений продлен приказом Федерального агентства по техническому регулированию и метрологии от 30 июня 2022 г. N 1582.

Заместитель Руководителя

Certificate of Conformity RU C-RU.АЖ58.В.03955/23 Series RU No. 0459029
for the DVA vibration transducers

Valid till 07/26/2028


ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

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ОРГАН ПО СЕРТИФИКАЦИИ

ЗАЯВИТЕЛЬ

ИЗГОТОВИТЕЛЬ

ПРОДУКЦИЯ

КОД ТН ВЭД ЕАЭС

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

СРОК ДЕЙСТВИЯ С

ВКЛЮЧИТЕЛЬНО

TIK-ZSK rocking machine emergency protection device

Purpose and contents

On the basic level the device consists of **DVA264.714.BCH1.D vibration sensor** and a **rocking machine protection module**, and is designed for automatic control of a “rocking machine” type rod downhole oil pump drive and its protection from destruction in case of an emergency situation.

Depending on the needs of the customer, the device can be completed for a fee:

- data collection module (OVEN MSD200) for archiving sensor parameters and further analysis in case of abnormal situations;
- additional RS-485 radio extender;
- multifunctional GSM router (iRZ RU21w) for data transmission over cellular networks;
- data collection/transmission module including a data collection module, RS-485 radio extender, GSM router *(used for a cluster of wells, TIK-ZSK-K version)*.

Principle of operation

The vibration sensor is installed on the traverse of the rocking machine, because the traverse is the most informative unit of the pumping unit. Most of the malfunctions of the elements of the rocking machine lead to distortions, vibrations, shocks and deflections, which are transmitted to the traverse. All these signs of malfunctions are recorded by the sensor.

Depending on the type and value of the parameter, it is possible not only to determine the dangerous state of the mechanism as a whole, but also to differentiate some defects and possible malfunction nodes.

The sensor simultaneously measures the following parameters related to the technical condition - instantaneous and averaged vibration parameters in different representations (vibration acceleration, vibration velocity, vibration displacement) on two coordinate axes, three angles of inclination relative to the planes X, Y, Z (in the sensor installation location):

- ”Vibration speed” parameter is used to determine the technical condition in accordance with GOST 10816, to identify the energy aimed at destroying the parts of the rocking machine;
- ”Vibration acceleration” parameter is used to determine the degree of damage, differentiate defects, determine the force of impacts during the operation of the rocking machine;
- ”Vibration displacement” parameter is used to assess the relative displacement, backlash and deformation of the elements of the rocking machine;
- ”Tilt Angle” parameter is used to protect the pumping unit from overturning, analyze wear, assess the reliability of attachment to the foundation, and emergency protection.

Measurement of these parameters provides a high degree of control over the technical condition of the pumping unit.

The controller built into the sensor processes and analyzes the information coming from the sensor, evaluates the levels of the measured parameters; controls the discrete output in accordance with the specified operating logic.

The sensor has a digital communication interface for transmitting information to the upper level, as well as for changing its settings (response delay time, setpoint level).

Protection module of the pumping unit is made in the form of a separate box, in which a *solid-state/power relay* (used to amplify vibration converter signal and provide drive shutdown in case of emergency), *RS-485 radio extender* (provides transmission of current values of vibration parameters and service information via digital wireless communication channel) and *24V power source* (supplies power to external vibration converter and all units of the pumping unit protection) are mounted.

DVA264.714.BCH1.D vibration sensor

Monitors the vibration level on the traverse and, if the settings are exceeded, sends a signal to turn off the pump, which allows you to save equipment from breakage of cables, rods and deformation of structures.
Can be installed on all types of RDPD, both domestic and foreign production.

Specifications

Metrological parameters

Measurement range of vibration acceleration, m/s² 1-100
Measurement range vibration velocity, mm/s 1-100
Measurement range of vibration displacement, μm 15-1000
Tilt measuring range of the Y-axis,° 0-90
Operating frequency range, Hz 2-1000
Absolute error in measuring the angle of the Y-axis,° 2
Transverse conversion coefficient ..... not more than ±5%
Relative amplitude characteristic ..... not more than ±5%

Performance

Operating temperature range, °C ..... -60...+125

Interface

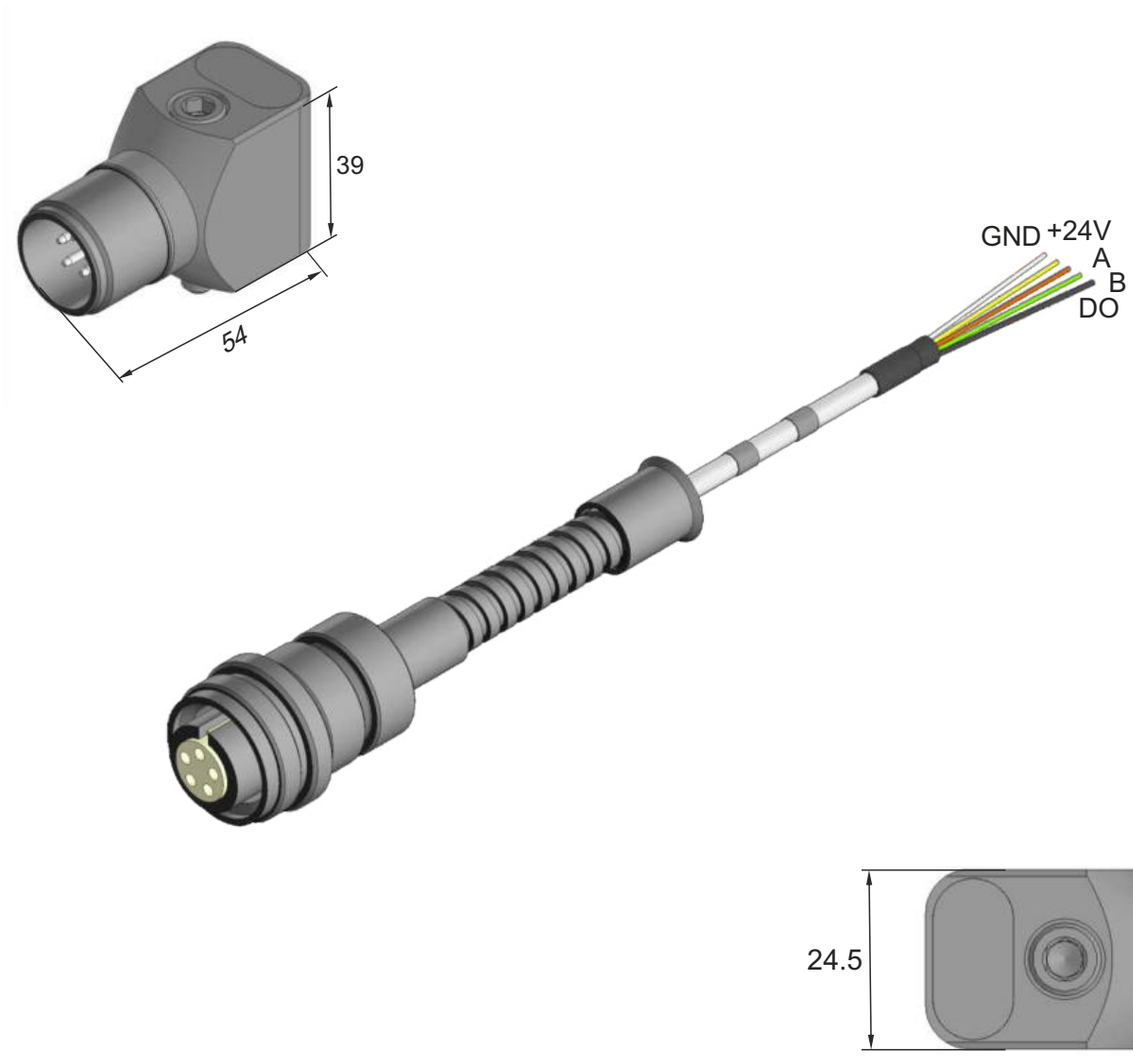
Output signal type ..... RS-485 digital; discrete output
Protocol ..... Modbus RTU
Data exchange rate ..... up to 1 Mbit/s
Supply voltage, V 10-24
Max. power consumption, W, not more than 1

Reliability and manufacturer's warranties

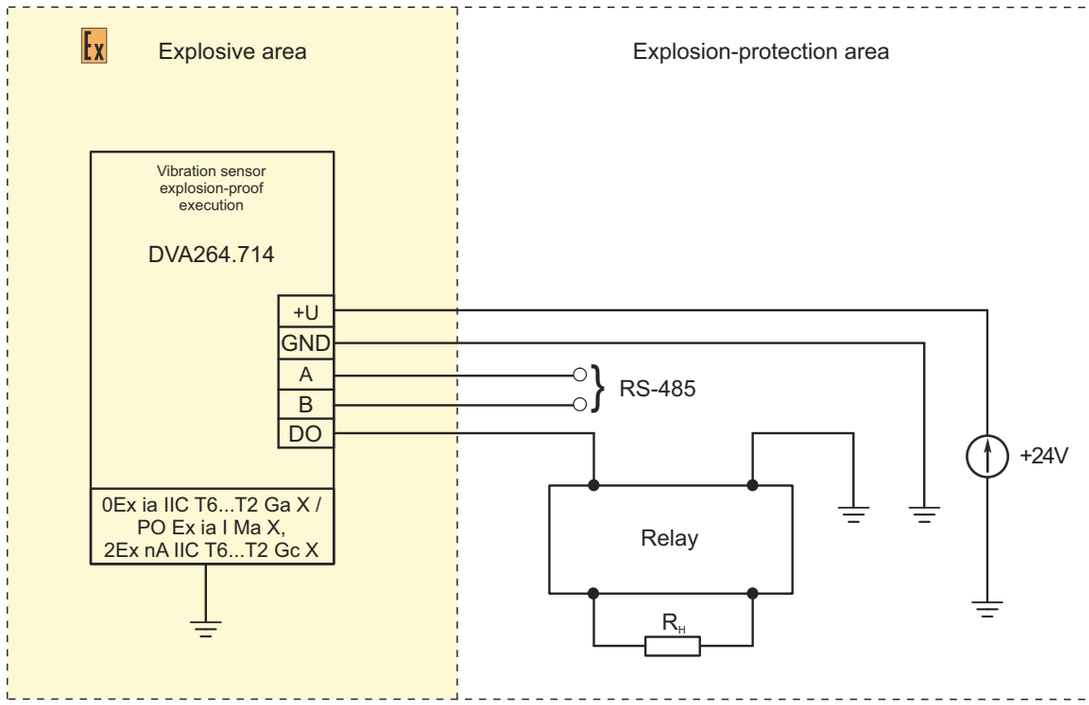
MTBF, hours, not less than 80 000
Calibration interval, years 2
Warranty period, months 18
Service life, years, not less than 10

Design options of the sensor

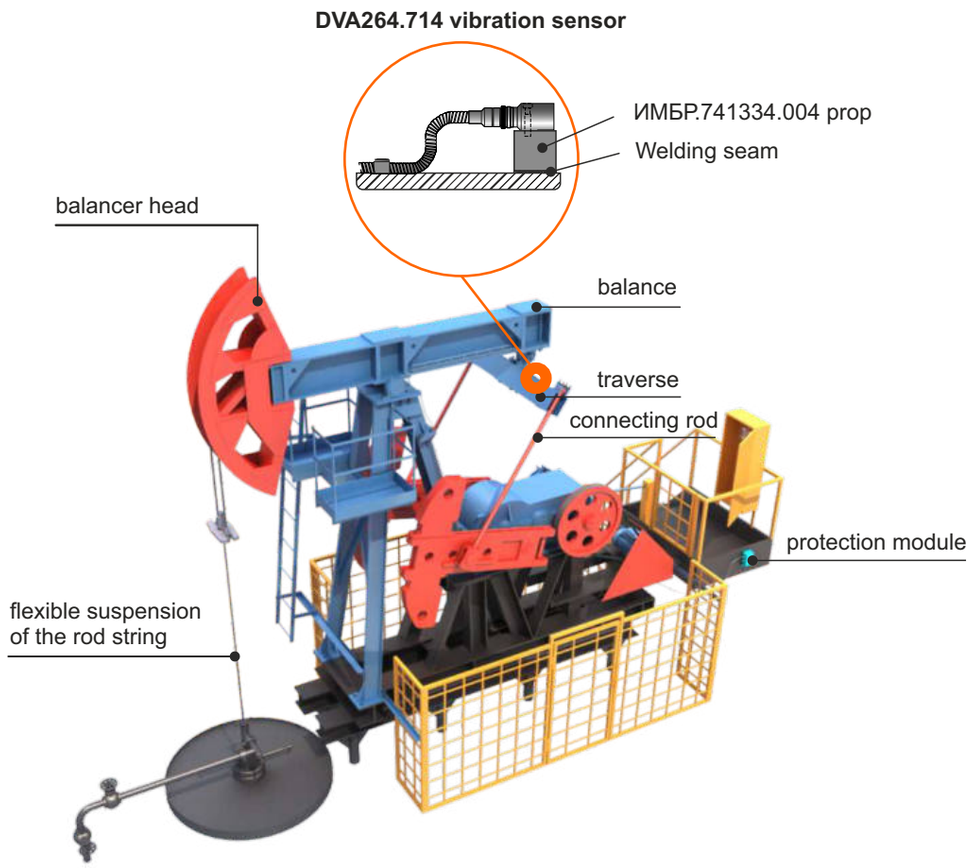
Type of shell	rectangular housing, electronics in the housing of the vibration sensor, 1 screw mounting
Connector type	ТИК-КХХ connector on the housing (analogue MIL-C-5015)
Mounting type	M6 screw 1 pc.
Overall dimensions	39x54x24.5 mm
Weight	250 g
Protection class	IP65/IP68
Explosion protection	0Ex ia IIC T6...T2 Ga X / PO Ex ia I Ma X 2Ex nA IIC T6...T2 Gc X



Connection scheme

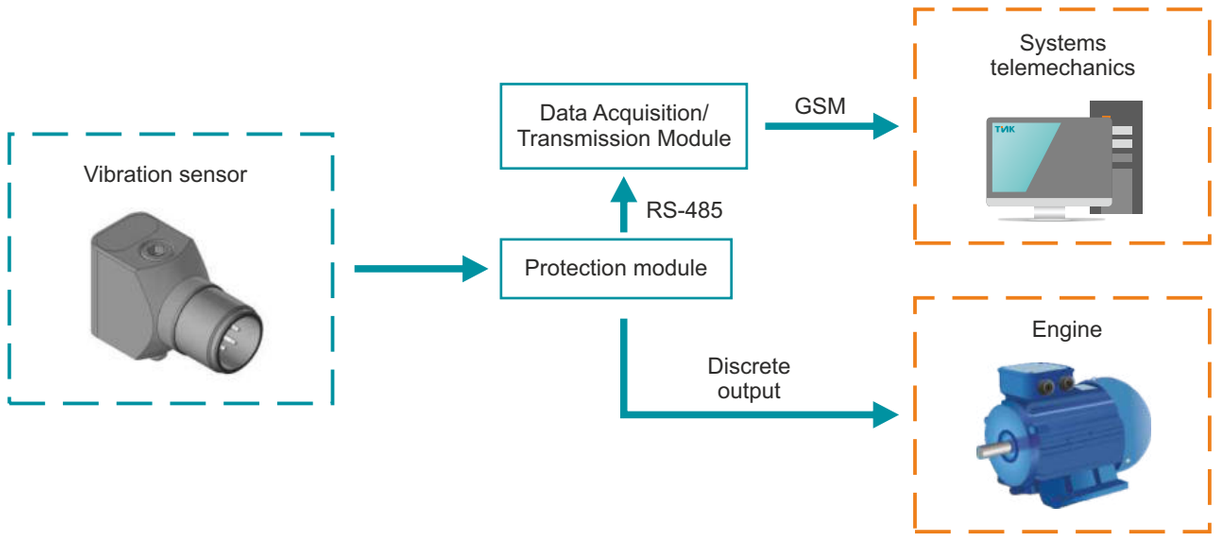


Installation diagram of the DVA sensor on the rocking machine



Structural scheme

When installing the **DVA264.714 vibration sensor** on the rocking machine, not only can the parameters be received via the RS-485 interface (Modbus RTU protocol) and organize EPS using discrete sensor output, but also transmit data to existing telemechanics systems via GSM-router.



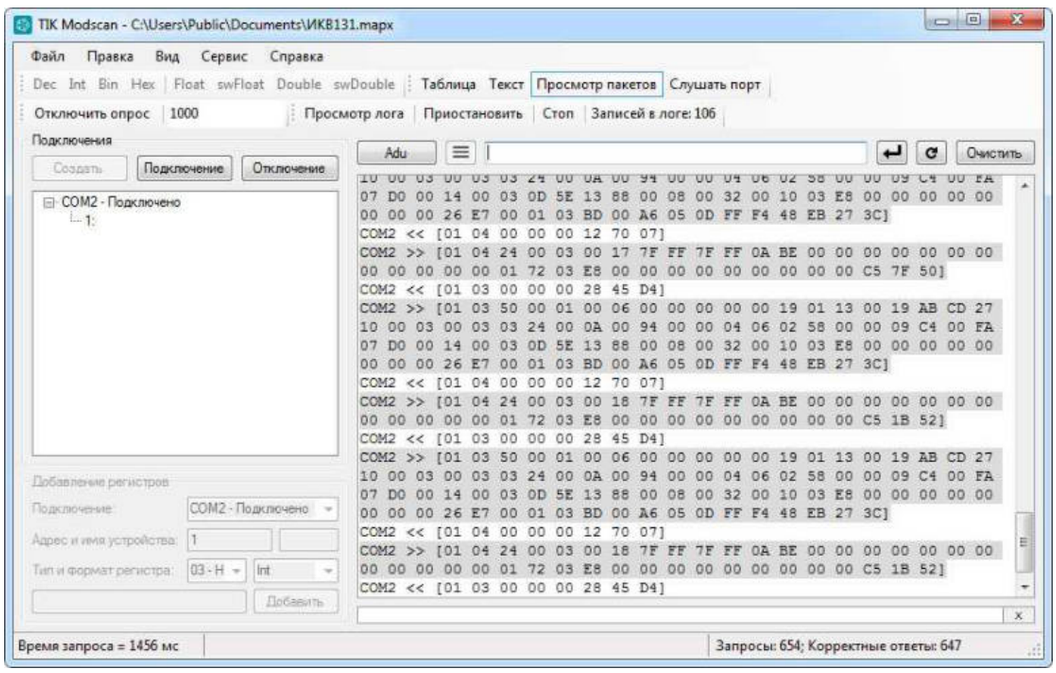
Software

The proprietary software package **"TIK Modscan"** is used to configure the sensor.

This software is intended for the development, configuration, maintenance and operation of equipment that supports the **Modbus** protocol.
The functional purpose of the program is to provide the user with the ability to connect to the equipment and work with it using the data transfer protocol Modbus (physical layer - RS-485 and Ethernet) through a convenient and intuitive graphical interface.

Main advantages of the program:

- polling any number of devices and any number of cells, regardless of their order, format and type;
- export and import map registers, including device;
- logging, and logs viewing in tabular and graphical forms.



TIK Research & Production Enterprise,
Limited Liability Company
14A, Marii Zagummennykh St., Perm, 614067, Russia
Tel.+7 (342) 214-75-75
E-mail: tik@perm.ru
Web-site: https://tik.perm.ru/en

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