

## Converters vibration acceleration and vibration velocity VPE/FS.

### 1 APPLICATION AREA

Converters VPE/FSA, (hereinafter VPE/FSA) are designed to convert the vibration acceleration and of vibration velocity units of machines and mechanisms in proportion to electric signals.

Complete with secondary devices PFE/FSA can be used as part of a of vibration control and of vibration diagnostics and state power, the power of the rotating parts of electrical equipment, oil pumping and gas compressor stations and other industrial facilities.

### 2 DESCRIPTION OF COMPONENTS PRODUCTS

VPE / FSA consists of VPE accelerometer connection cable and driver FSA.

Vibration transducer made of stainless steel. The sensor housing is secured. The design of the sensor - piezoelectric bimorph made by diffusion welding technology. At the top of the vibrator housing is installed the converter board. The cable is connected to the vibration transducer connector through 2RMG14.

Connecting dimensions of vibration transducers and VPE-079 VPE-080- four holes with a diameter of 5.5 mm to 25x25 square. Fixing of the vibrator in the two M5 bolts. Allowed attachment vibrator on the four bolts. The roughness of the surface to which the vibration transducers is set to be no worse than  $Ra = 3,2$ , flatness of 0.05 mm. Joining vibration transducers VPE-078 and VPE-089 to the pin or bolt M5 M6.

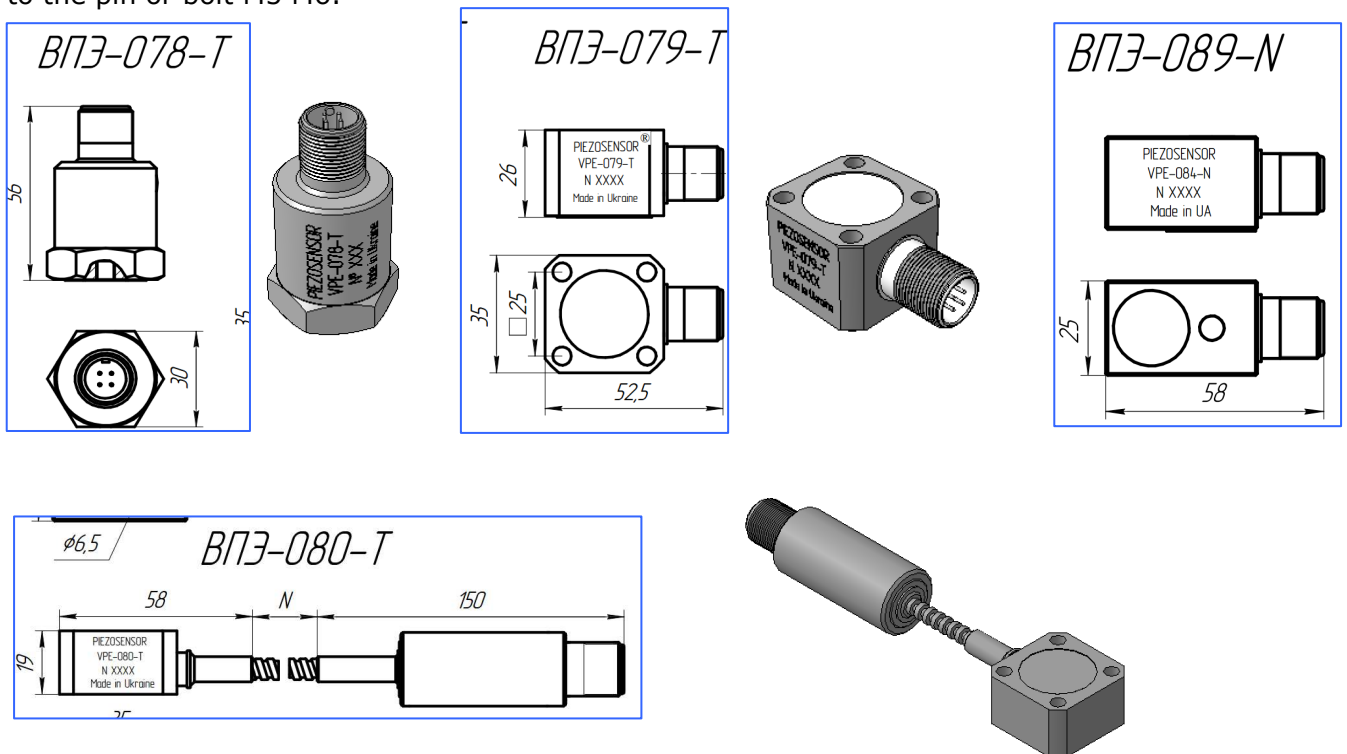


Figure 1 - Dimensions of vibration transducers VPE-087, VPE-079, VPE-089 and VPE-080.

The cable is used to transmit the signal from the accelerometer signal to the shaper.

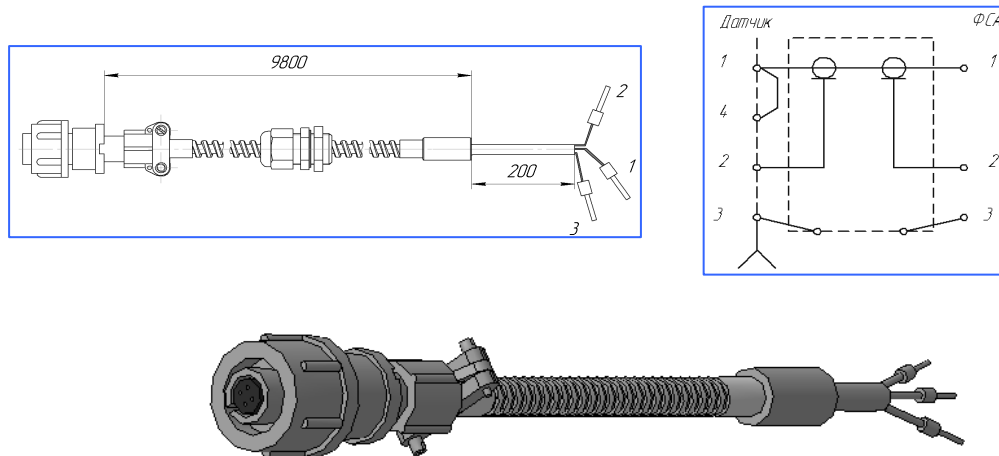


Figure 2 - Dimensions and scheme 079-088-125-10 cable.

The signal converter has a rectangular shape and is made of plastic, a light gray color. On the front panel of the signal generator FSA located: terminals for connecting the signal generator power supply, terminals for connecting VPE accelerometer terminals №1 and №2 outputs.

The dimensions and connections of the analog signal converter circuit FSA-088-T-16-NT.

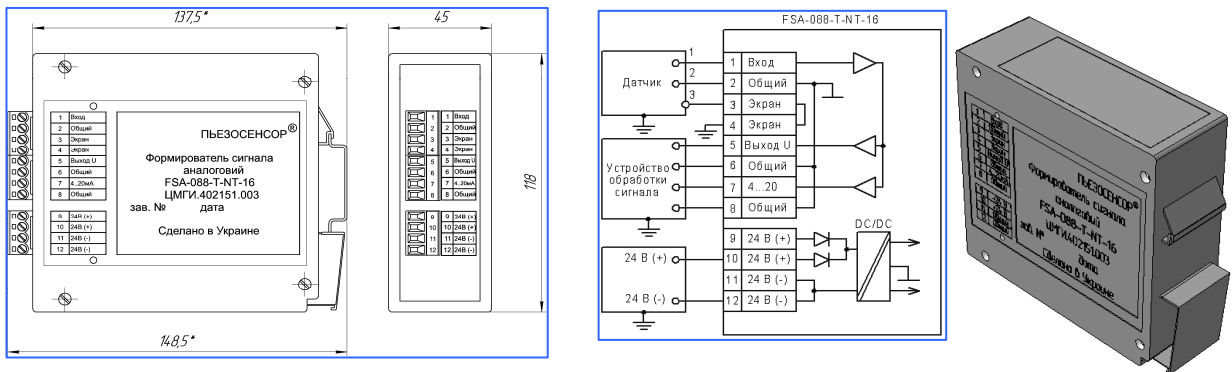


Рисунок 3 – Размеры и схема подключения формирователя.

### 3 DESIGN AND OPERATION

Vibration body parts aggregates converted VPE accelerometer into an electrical signal. According to the cable signal is transmitted further to the FSA converter. The converter converts the received signal for further processing and analysis. Components of the VPE / FSA are interchangeable without additional configuration.

The principle of operation is based on obtaining accelerometer electric signal from the piezoelectric sensor and its subsequent conversion to electrical signal converter specialized. When exposed to of vibration mechanical vibrations are transmitted to the test surface sensor. The piezo strain emerge, which are converted into an electrical signal proportional to the instantaneous value of the acceleration.

The principle of operation of the signal converter is based on the transformation of the electrical signal received from the accelerometer by filtering, amplification and integration into an AC voltage proportional to the instantaneous value of the velocity and direct current (4 to 20 mA) proportional to the RMS vibration velocity.

## 4 TECHNICAL SPECIFICATIONS

Table - Characteristics VPE-079-T / FSA-088-T-16-NT.

parameter name	Characteristics
1 Measurement range of vibration velocity in mm / s	0.5 to 16
2 Frequency range, Hz from 10 to 1000	from 10 to 1000
3 Ranges of change of the output signals: - AC voltage proportional to the instantaneous value (MV) of vibration velocity relative to the setting 1.5 V, mV - DC proportional to the RMS vibration velocity, mA	от 0 до 1000 от 4 до 20
4 The nominal transform coefficients: - for vibration velocity, mV / (mm / c), - for RMS vibration velocity, mA / (mm / s)	42,5 1,0
5 Deviation conversion factor of the nominal value - for vibration velocity,% - for RMS vibration velocity,%	$\pm 7$ $\pm 7$
6 Amplitude linearity at base frequency: - AC voltage proportional to the instantaneous value (MV) of vibration velocity relative to the setting 1.5V,% - DC proportional to the RMS vibration velocity,%	$\pm 5$ $\pm 5 \left[ 1 + 0,1 \left( \frac{X_{np}}{X} - 1 \right) \right]$
7 Limits of basic relative error of transformation base frequency at P = 0.95, not more than,%	$\pm 6$
8 Unevenness frequency response from 10 Hz to 1000 :,% - IV voltage proportional to of vibration velocity - DC proportional to the RMS vibration velocity	+10; -20
9 Unevenness frequency response up to 630 Hz ot 20 :,% - IV voltage proportional to of vibration velocity - DC proportional to the RMS vibration velocity	$\pm 10$
10 Mean time between failures (calculated): - accelerometer, however, h - формирателя не менее, ч	300000 200000
11 Average service life, years.	10

Note - HPR - upper value of the range of conversion; X - the current value of the output signal. Attenuation frequency response outside the working band in accordance with GOST ISO 2954-97.