PASSAT
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Geotra

About company

PassatInnovations LLC is a product IT-company from Belarus (Soligorsk).

The main activity is the development of information and analytical products that allow the efficient operation of production assets of industrial enterprises.

We are part of the PASSAT holding.
Holding PASSAT is operating in the mining and chemical industry for 30 years, collaborating with enterprises in Belarus, Russia, Kazakhstan and Uzbekistan.

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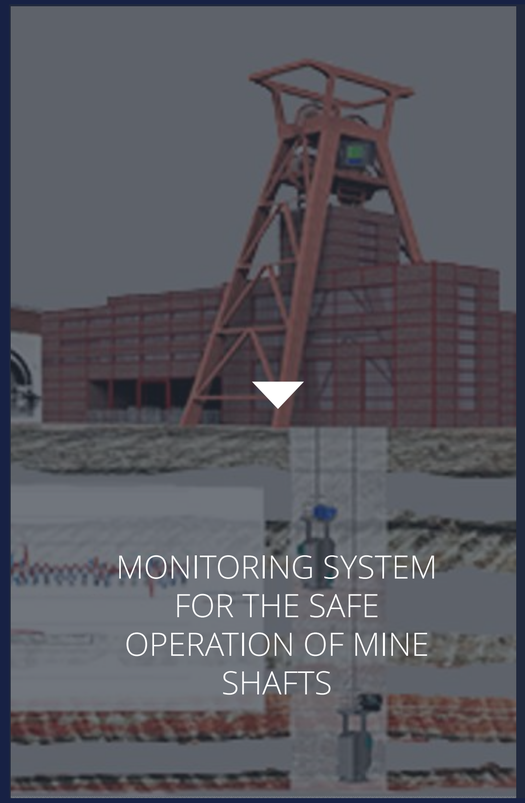
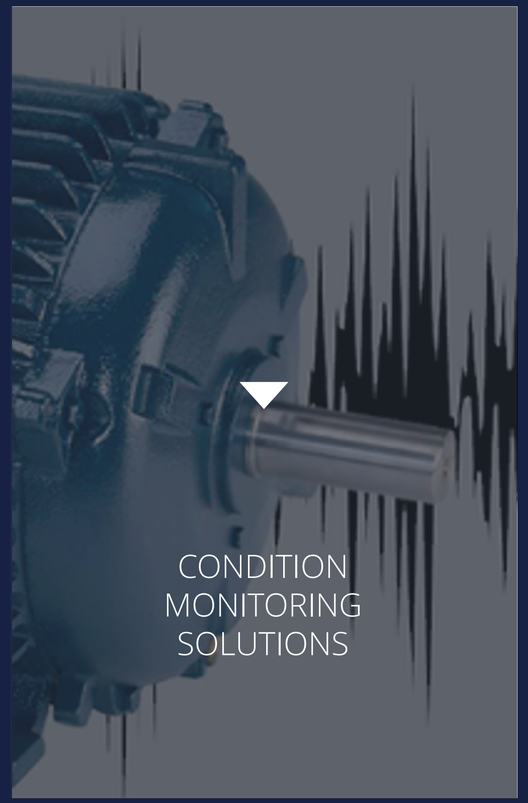
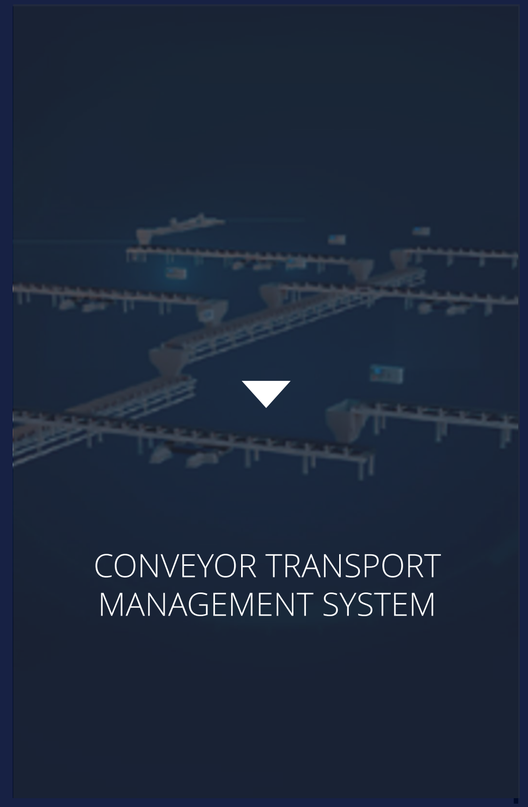
Our developments are the basis of smart enterprises

Our company works closely with specialists from mining and chemical enterprises, which allows us to take into account all the wishes and recommendations of operating personnel.

Our activity





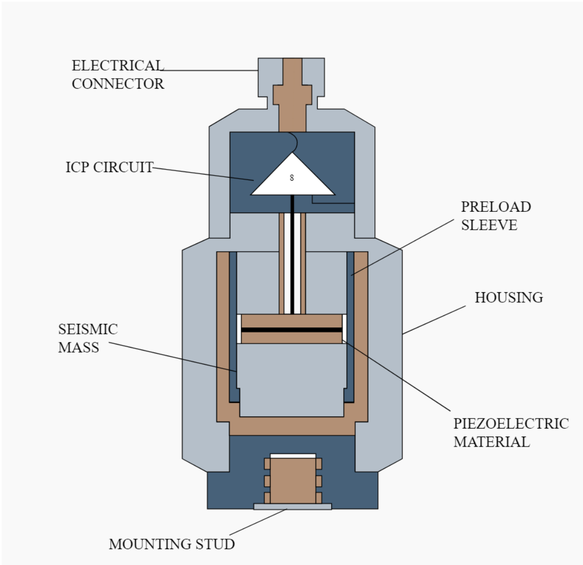


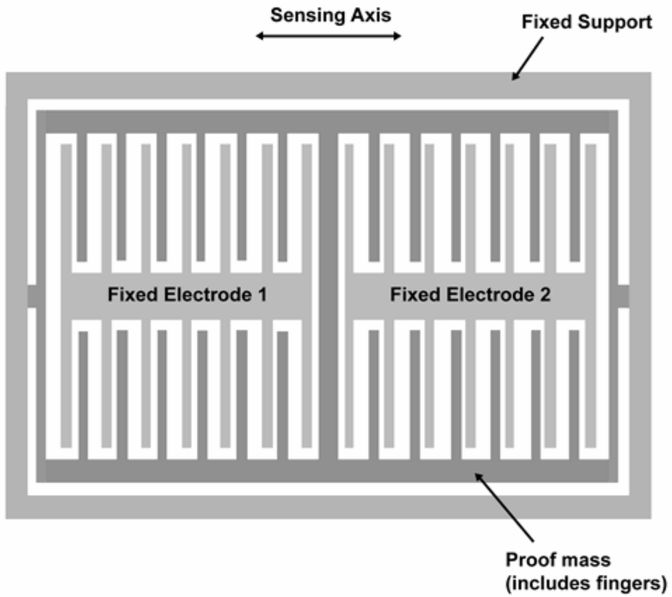
Types of vibration sensors

- By type of element sensitivity
  - 01 capacitive
  - 02 induction
  - 03 piezoelectric
- By the presence of built-in microcircuits
- By type of output electrical signals
- By equipment mounting methods

The main thing in a vibration sensor is the sensitive element.

Each type of measuring transducer has its own advantages and disadvantages.





Vibration and temperature sensor VTS-3D

Advantages of VTS-3D over analog sensors

Plug and play connectivity

Software Update, new opportunities

Transmission line length

Self-diagnosis capability

Noise immunity

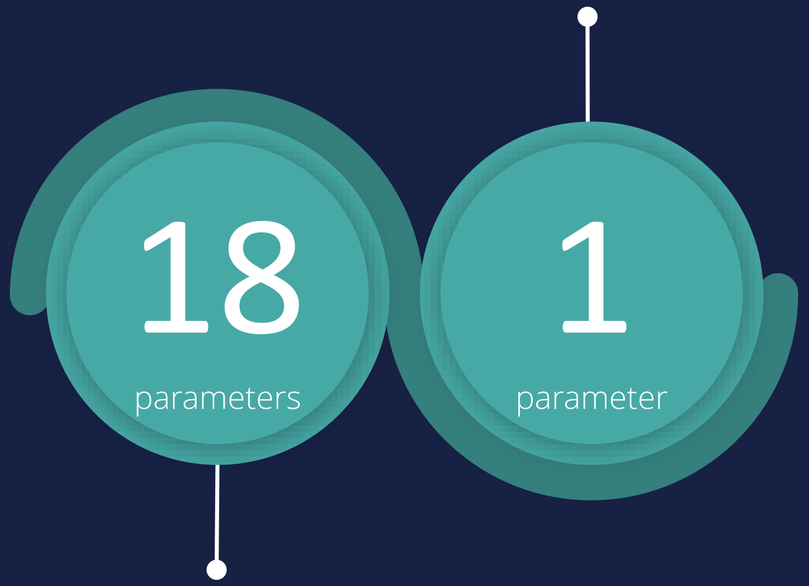
Multipoint interface

Support for industrial communication protocols

Vibration and temperature sensor VTS-3D

provides

indication of the temperature of the surface on which the sensor is installed



designed for monitoring vibration and temperature characteristics of industrial equipment.

The sensor can be used:

- as part of distributed systems for monitoring the condition of machines and mechanisms,
- as an autonomous means of emergency protection.

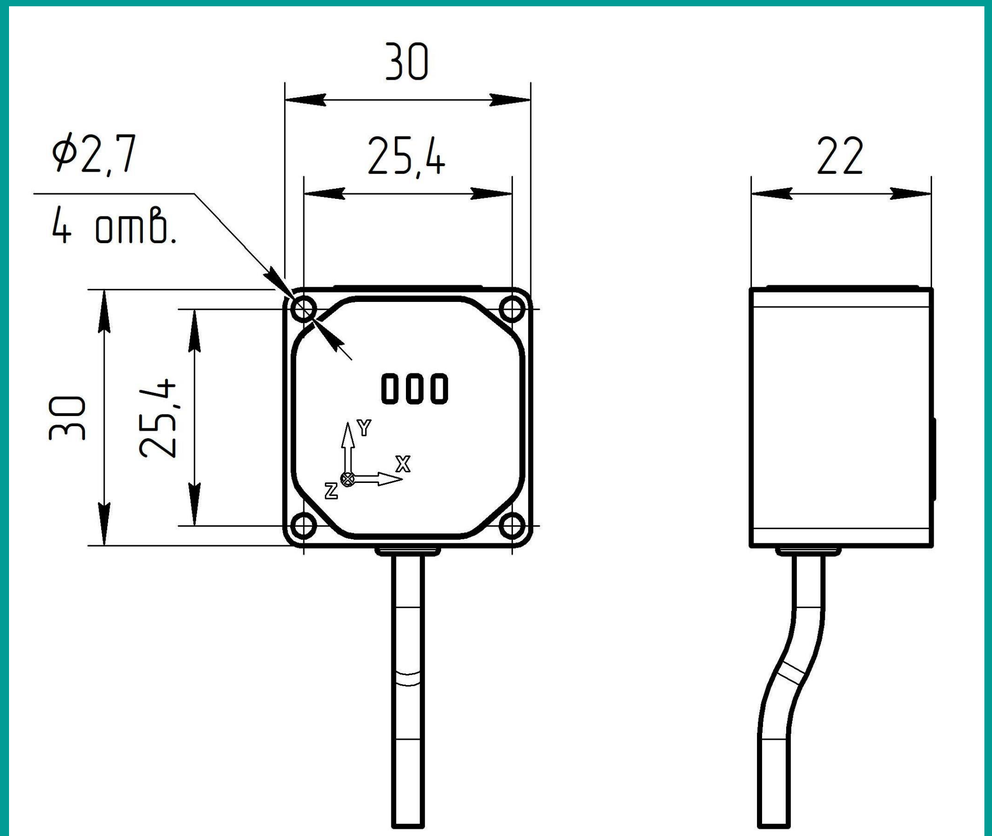
On three axes:
- RMS vibration acceleration,
- RMS vibration velocity,
- RMS vibration displacement,
- signal range,
- crest factor,
- frequency with maximum amplitude

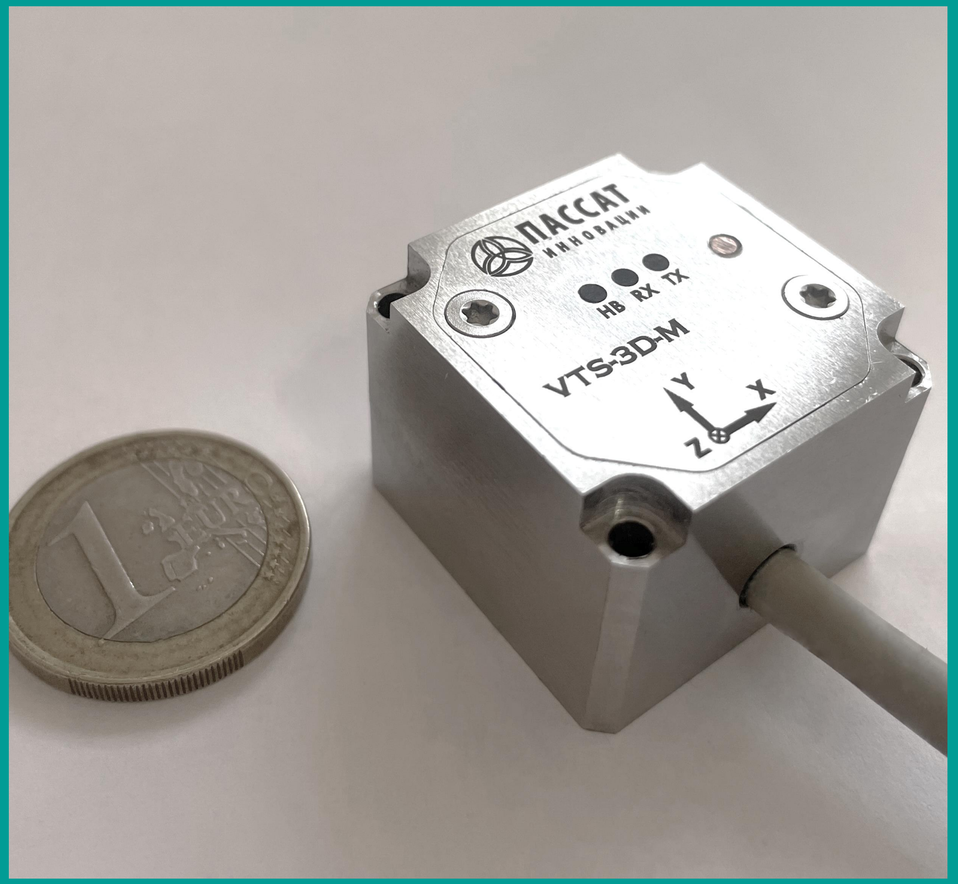
Main characteristics of the sensor VTS-3D

Parameters and characteristics	**Value**
Type of supply voltage	DC
Supply voltage, V	9 – 36
Power consumption, no more, W	0.25
Sensor type	MEMS
Number of axes	3
Frequency band for measuring vibration accelerations, no worse, Hz	**5000**
Measurement of integral vibration characteristics in frequency bands, Hz:	
RMS vibration acceleration	**10 – 3000**
RMS vibration velocity	**10 – 1000**
RMS vibration displacement	**10 - 200**
Number of temperature sensors	1
Temperature measurement range, ^{o}C	-40 - +80
Communication Interfaces:	
- type	RS485
- maximum transmission speed, bit/s	115200
- galvanic isolation	No
- impulse noise protection	Yes
- built-in terminal resistor	No
Overall dimensions, no more, WxHxD mm	30x22x30
Fastening	pin, magnet
Degree of protection against dust and moisture, no worse	**IP68**
Ambient temperature, ^{o}C	-40 - +80
Design	general industrial

8

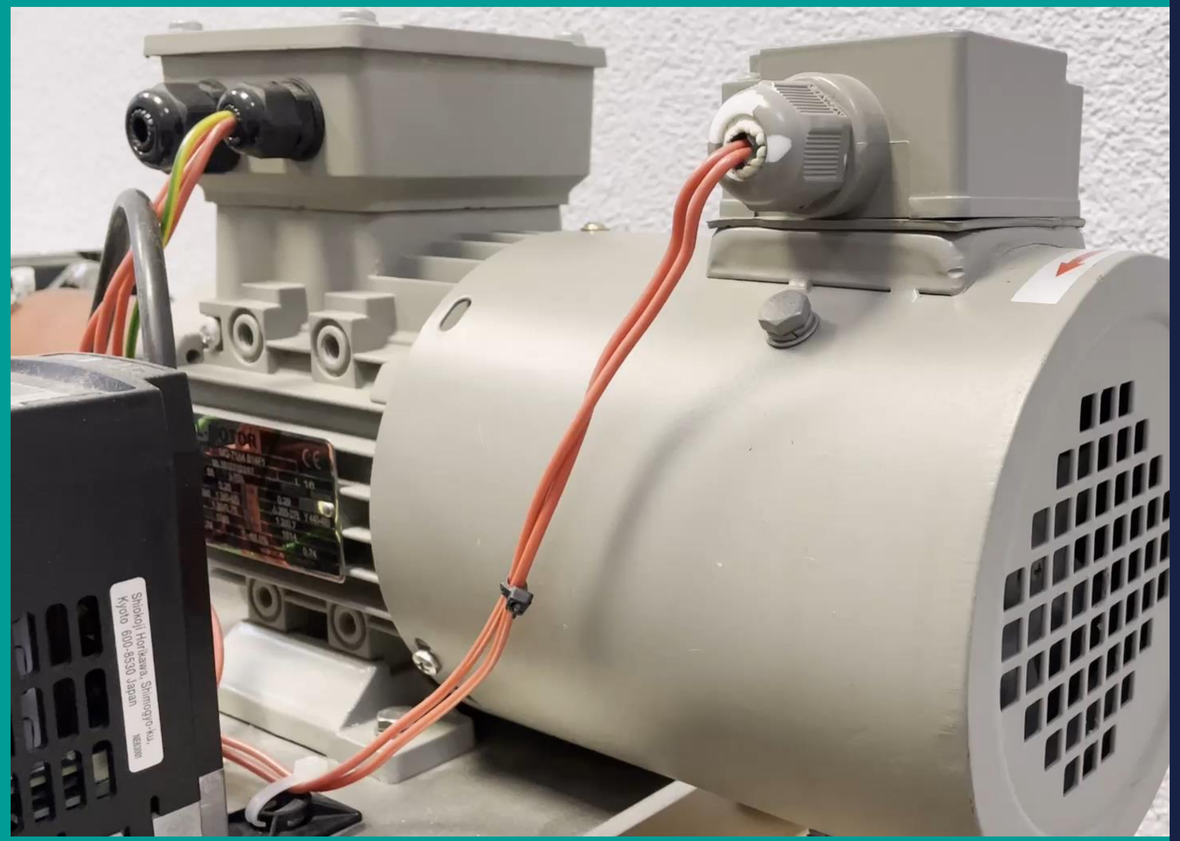
VTS-3D dimensions



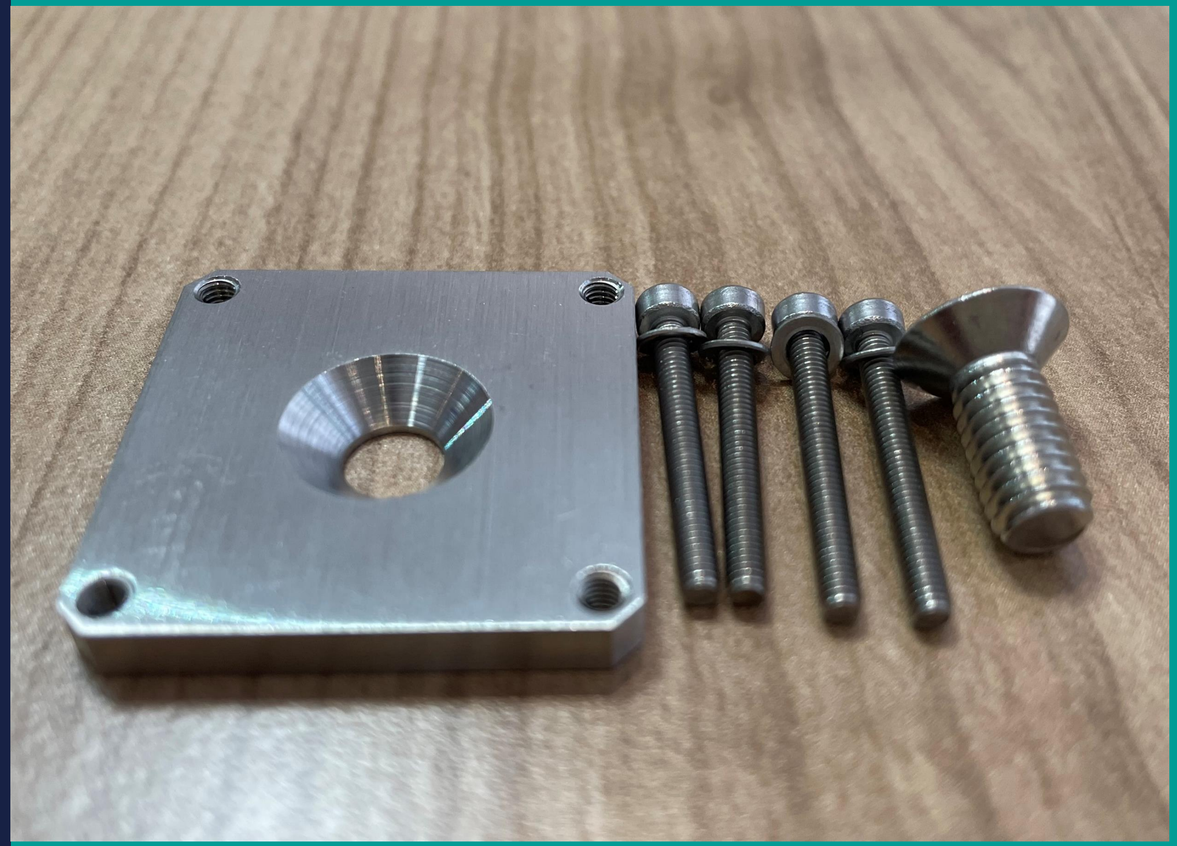


Types of fastening

Magnetic mount



Stud mount



Connection options of VTS-3D

PLC

RS 485

Modbus RTU

APCS

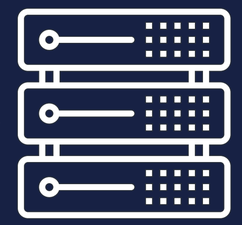
GW Modbus TCP/RTU

RS 485

Modbus RTU

Modbus TCP

Local network

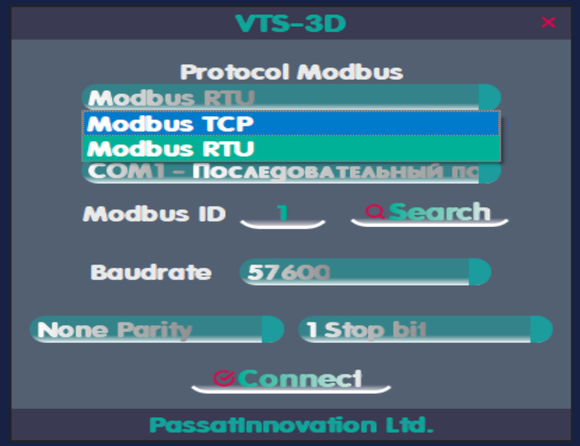


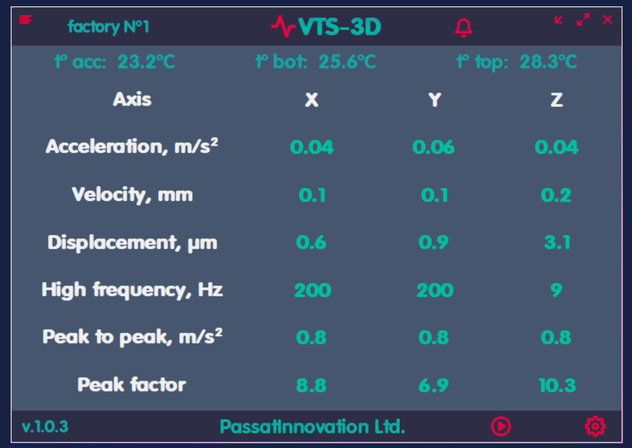
APCS

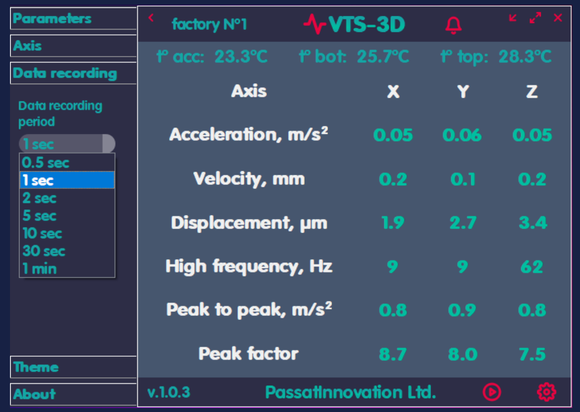
Free service software

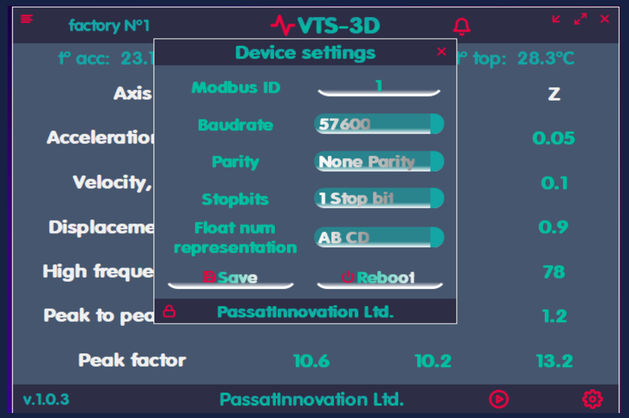
Supported protocols:

- Modbus RTU
- Modbus TCP



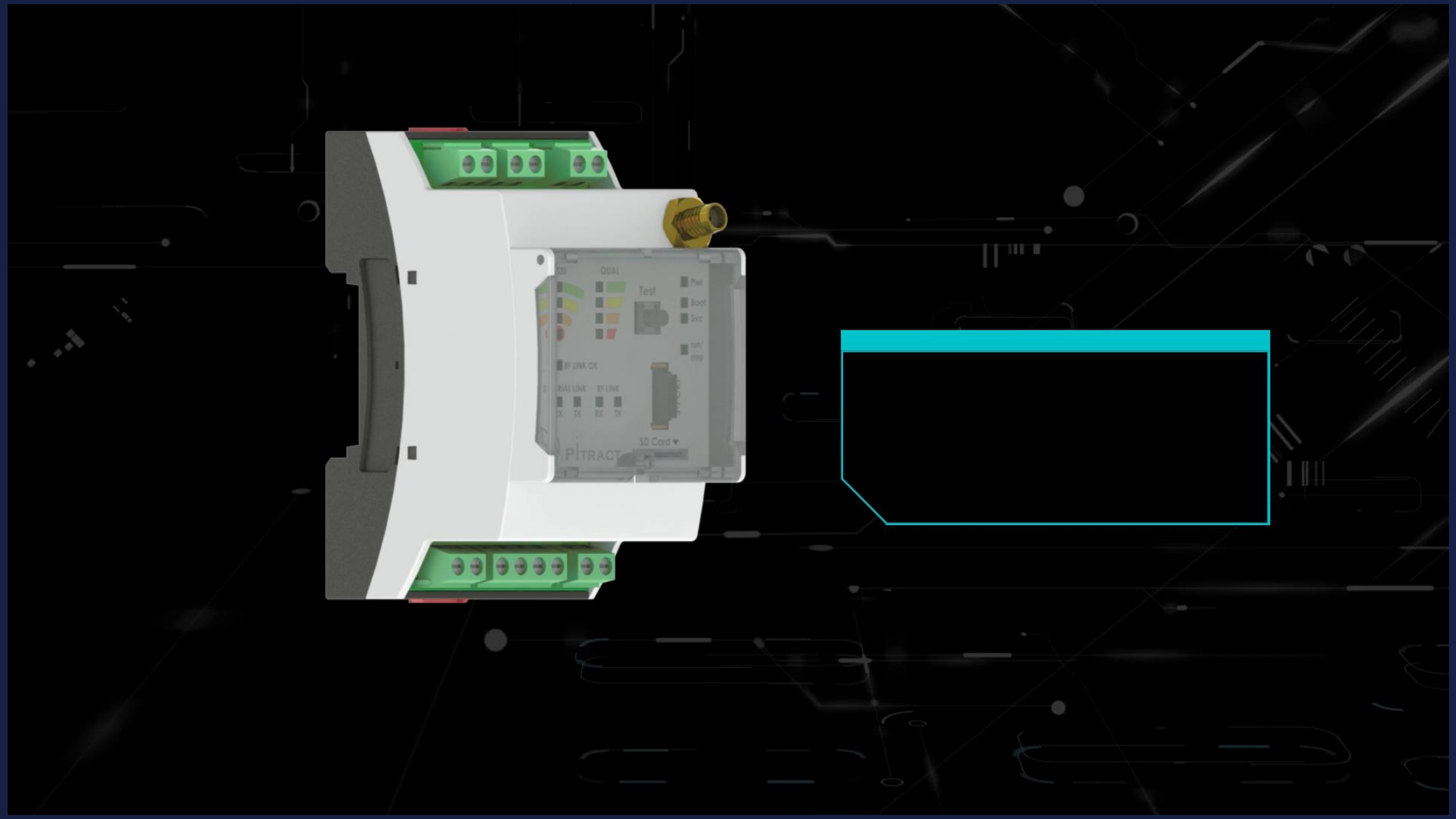






Case Study: conveyor METSO

Case Study: conveyor METSO (Pitract)



Vibration monitoring solutions

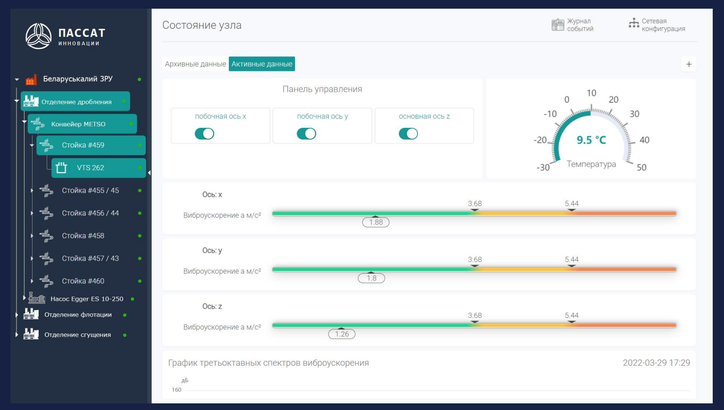
Portable solution

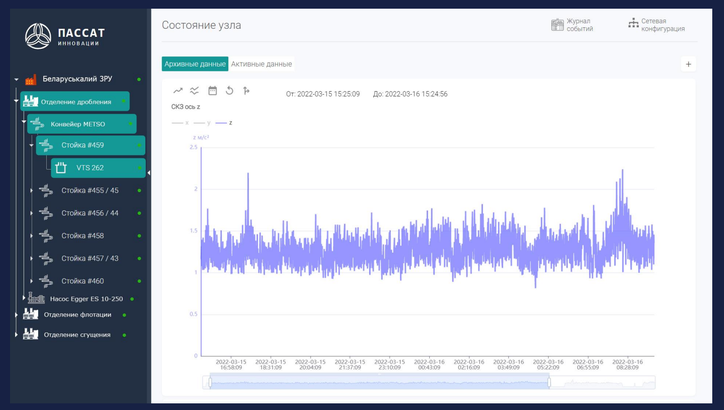
Local solution

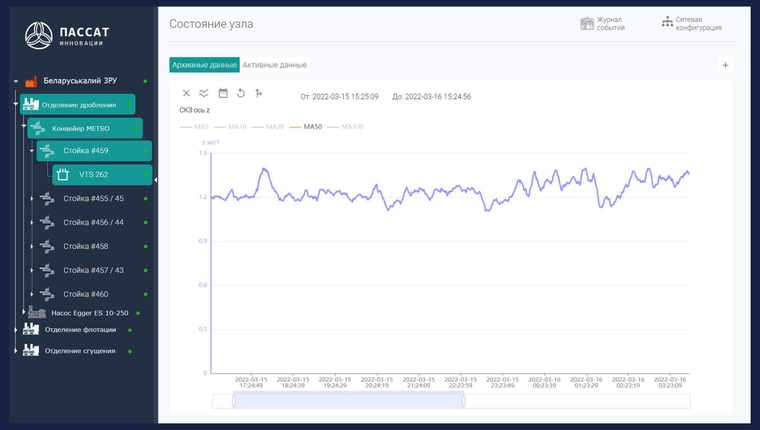
APCS integration

Equipment health monitoring system EMMADIS

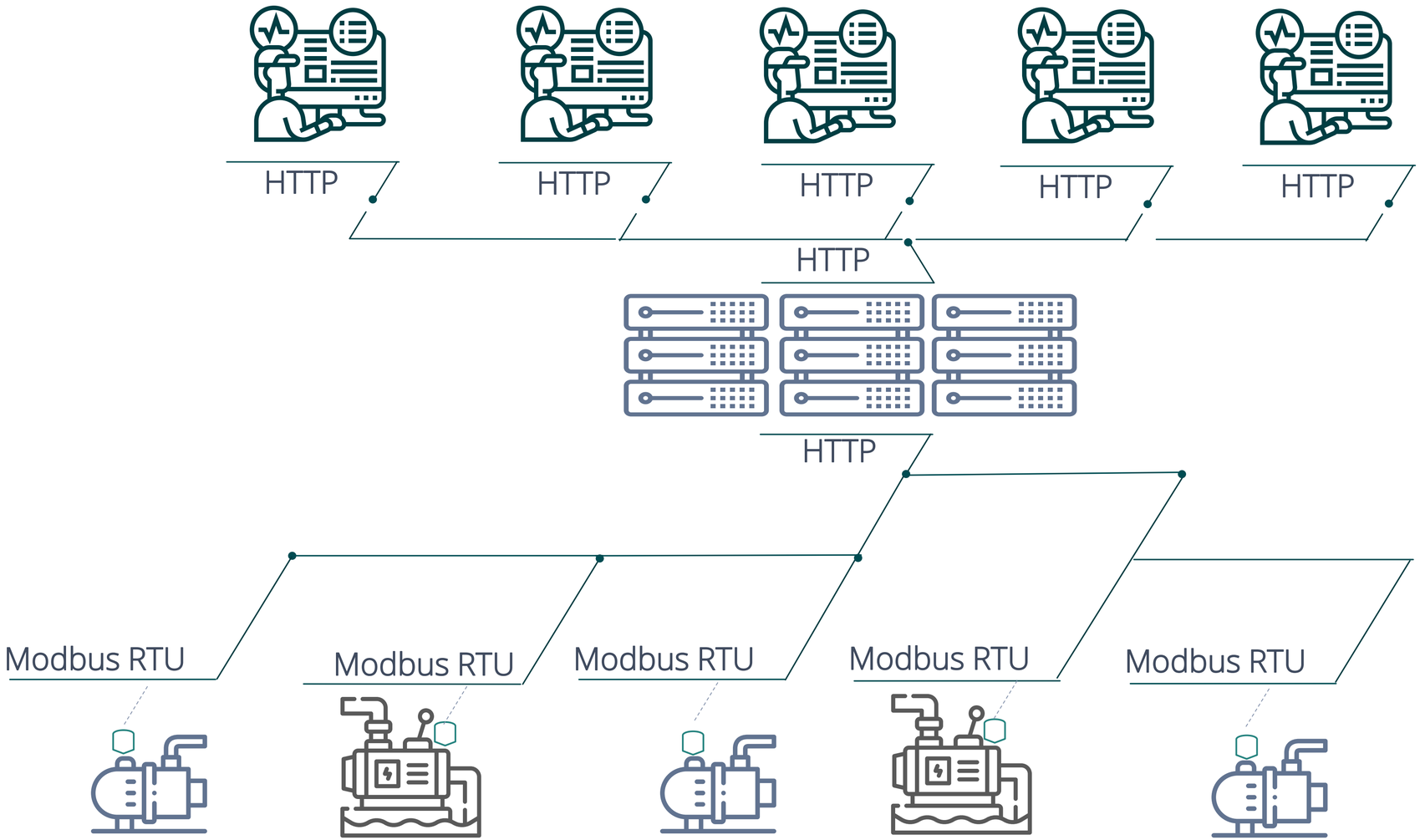
Система EMMADIS







Scheme of building a monitoring system



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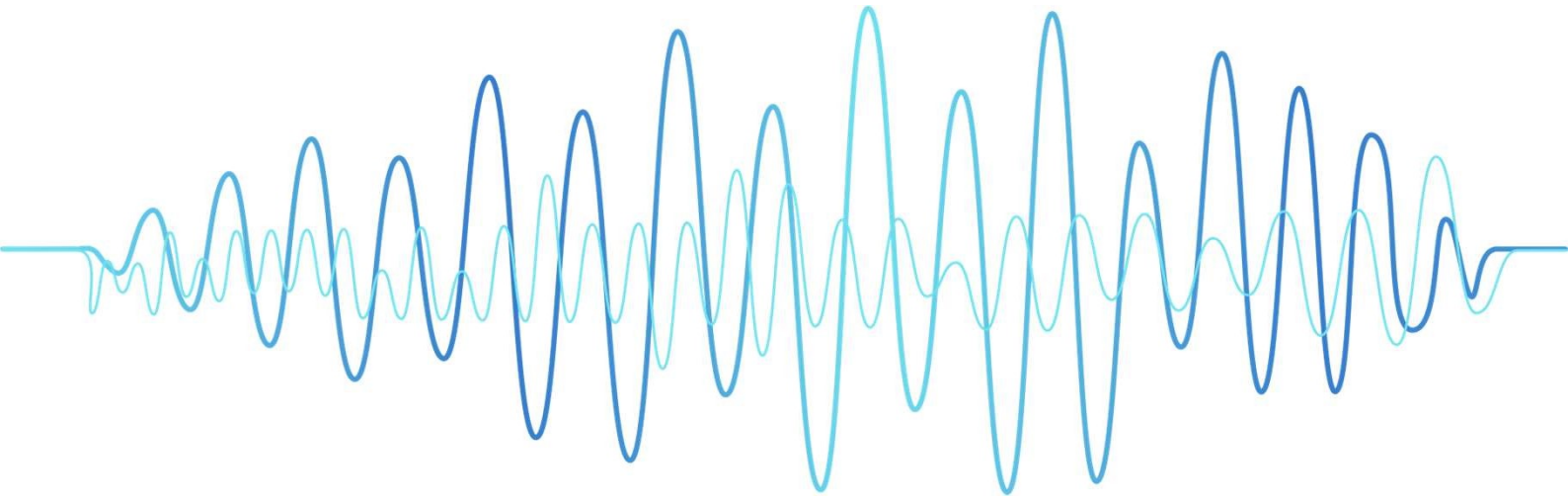
Equipment health monitoring System EMMADIS

White Paper



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PassatInnovations LLC
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Introduction

Vibration monitoring is an effective way to detect the pre-emergency condition of the operating equipment.

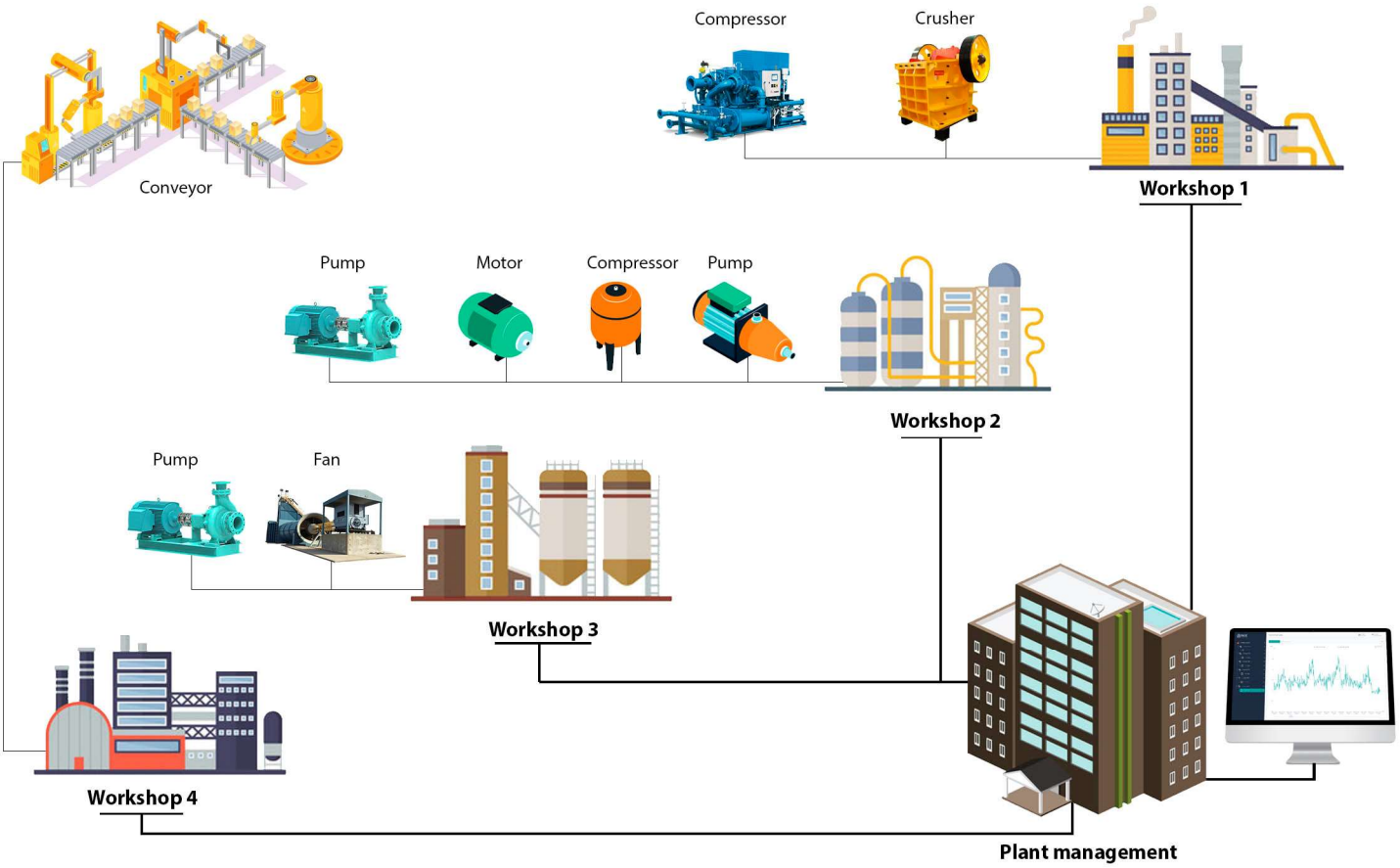
The efficiency and competitiveness of enterprises operating a significant number of machines and equipment is highly dependent on the capabilities and condition of those machines and equipment that are involved in the main technological processes.

Vibromonitoring solves the problem of continuous or periodic monitoring and detection of sustainable changes in controlled vibration parameters.

Vibration monitoring is focused on a long-term forecast of the health of operated machines and equipment.

EMMADIS system structure

The monitoring system is a multi-user local system installed on the enterprise server, which receives and processes information in real time from all VTS-3D vibration and temperature sensors installed on the enterprise equipment.



The equipment condition monitoring system provides continuous monitoring of the vibration levels of this equipment.

Thanks to this, maintenance personnel can quickly respond to changes in indicators and minimize the risks of failure or destruction of parts and assemblies of the controlled object.

Advantages of using VTS-3D vibration and temperature sensors in the system over analog sensors:

- high noise immunity
- extended functionality
- no need to use secondary converters
- operation in the frequency range up to 5 kHz
- the ability to connect up to 32 sensors in one line
- self-diagnosis

Presence of a status indicator :
- normal operation
- no response from sensor
- warning
- emergency state

Criteria for assessing the vibration state of equipment

Criterion 1: Absolute vibration value

This criterion for assessing the state is associated with the determination of th absolute values of the vibration parameters corresponding to the permissible dynamic loads

Criterion 2: Dynamic changes in vibration parameters

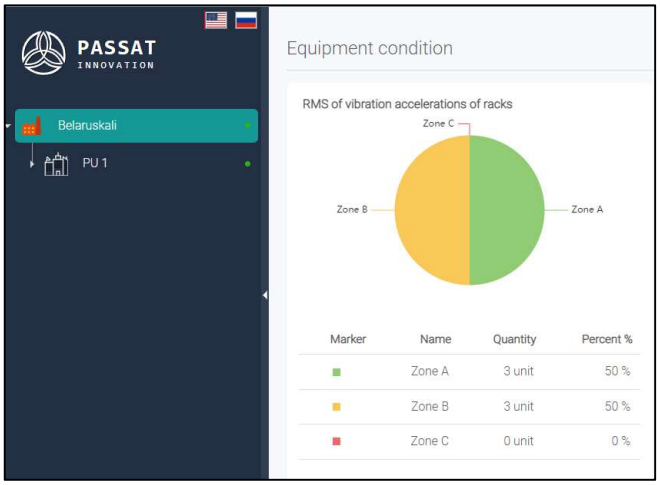
This criterion is based on an assessment of the change in vibration parameter values over time

Technical capabilities of the monitoring system

Controlled characteristics:

- RMS vibration acceleration
- RMS vibration velocity
- RMS vibration displacement
- peak-factor
- peak-to-peak
- frequency with the high amplitude
- temperature of the equipment casing

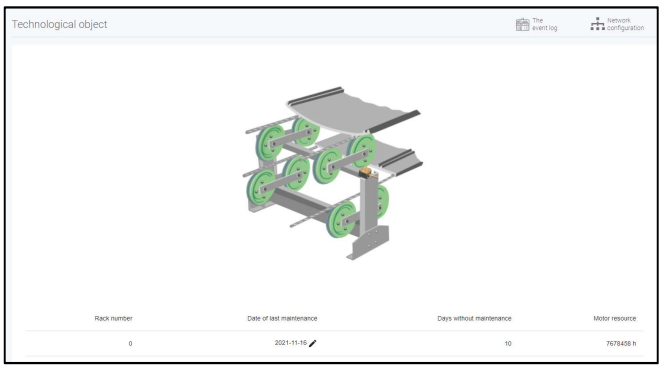
Data update rate for all channels once every 10 seconds



Assessment of the vibration state of equipment in general

The maximum absolute value of the vibration parameter obtained as a result of the measurement is compared with the allowable value of the dynamic load corresponding to the boundaries of zones A - D:

- zone A – «Good»
- zone B – «Acceptable»
- zone C – «Emergency»
- zone D – «Unacceptable»

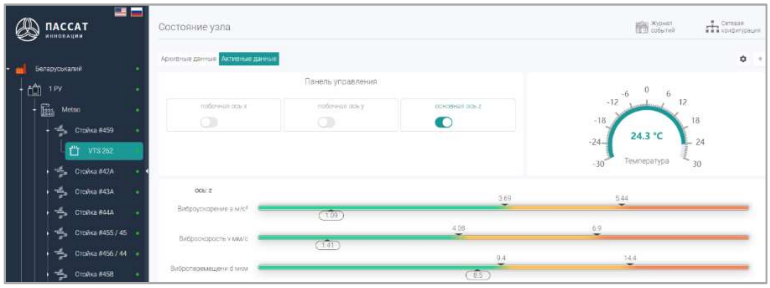


Assessment of the vibration state of a technological object

Providing information about:

- installation location of vibration and temperature sensor VTS-3D
- object maintenance
- motor resource of the object

Assessing the vibration state of the assembly

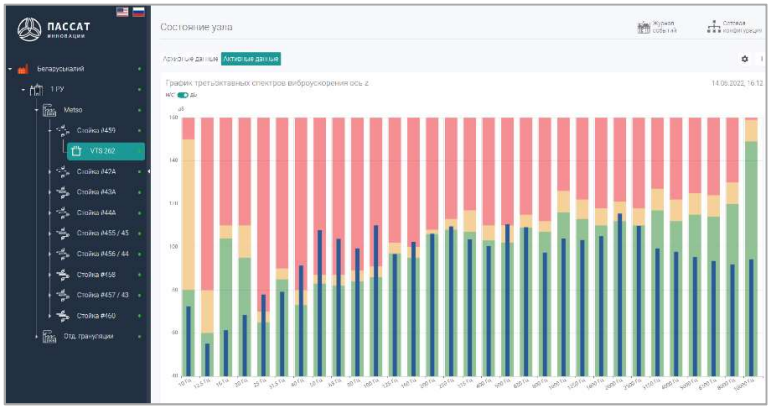


Visualization of current values along the axes X, Y, Z:

- RMS vibration acceleration
- RMS vibration velocity
- RMS vibration displacement
- peak-factor
- peak-to-peak
- frequency with the high amplitude
- temperature of the equipment casing

Thresholds are provided: "Warning" and "Danger".
The following tools have been implemented:

- measuring axis selection
- settings for displaying threshold values of vibration characteristics



Visualization of one-third-octave spectra (TOS) of vibration acceleration along one of the axes in the frequency range from 10 Hz to 10 kHz.

The use of one-third octave bands expands the possibilities of monitoring, for example, it allows detecting defects at early stages due to a significant increase in a separate band(s) against the background of a slight increase in the RMS of broadband vibration, and also expands the possibilities for determining the type of defect.

The following tools have been implemented:

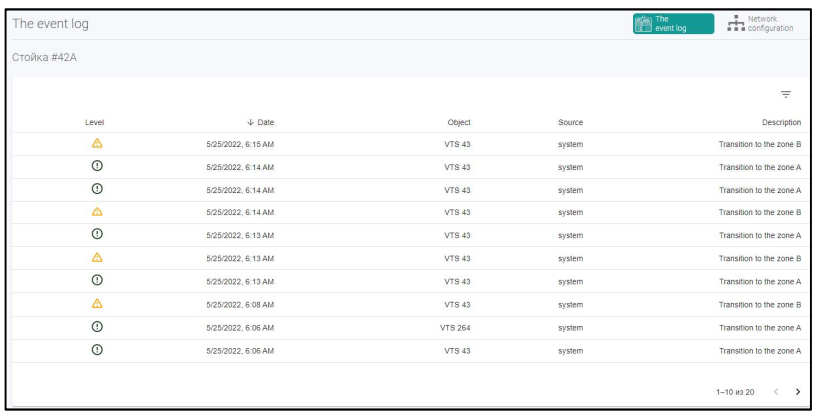
- selection of display units (dB, m/s^2) of vibration acceleration values on the diagram
- setting the display of threshold values in frequency bands
- compliance of color marking of frequency bands with danger levels, which improves the perception of information staff

Providing detailed information about the events that have occurred

Provision in the "Event Log" of detailed information about the level of danger at the measurement point with reference to time, transitions to zones A - D.

Ability to filter events:

- by date
- by danger level



Visualization of RMS archive data

The user is given the opportunity to do the following:

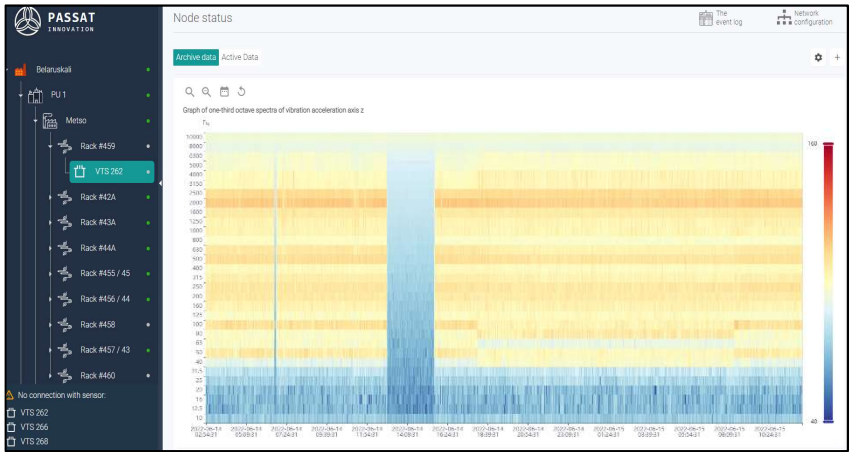
- averaging the received data over 5, 10, 20, 50, 100 values
- adding warning and danger levels to the chart (for easy monitoring)
- query data selection for the period of interest
- updating data manually
- measuring axis selection
- viewing data along the X, Y, Z axes at the same time
- display of the lack of communication with the sensor
- graph scaling

The amount of stored data depends on the technical capabilities of the Customer

Visualization of archived TOC data

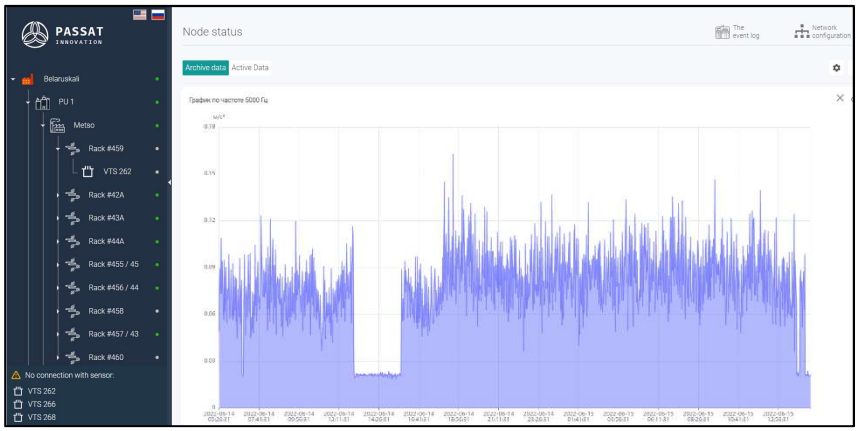
The following tools are realized:

- chart scaling
- request for data sampling for the period of interest
- updating data manually
- selection of the range of displayed values
- display of the lack of communication with the sensor

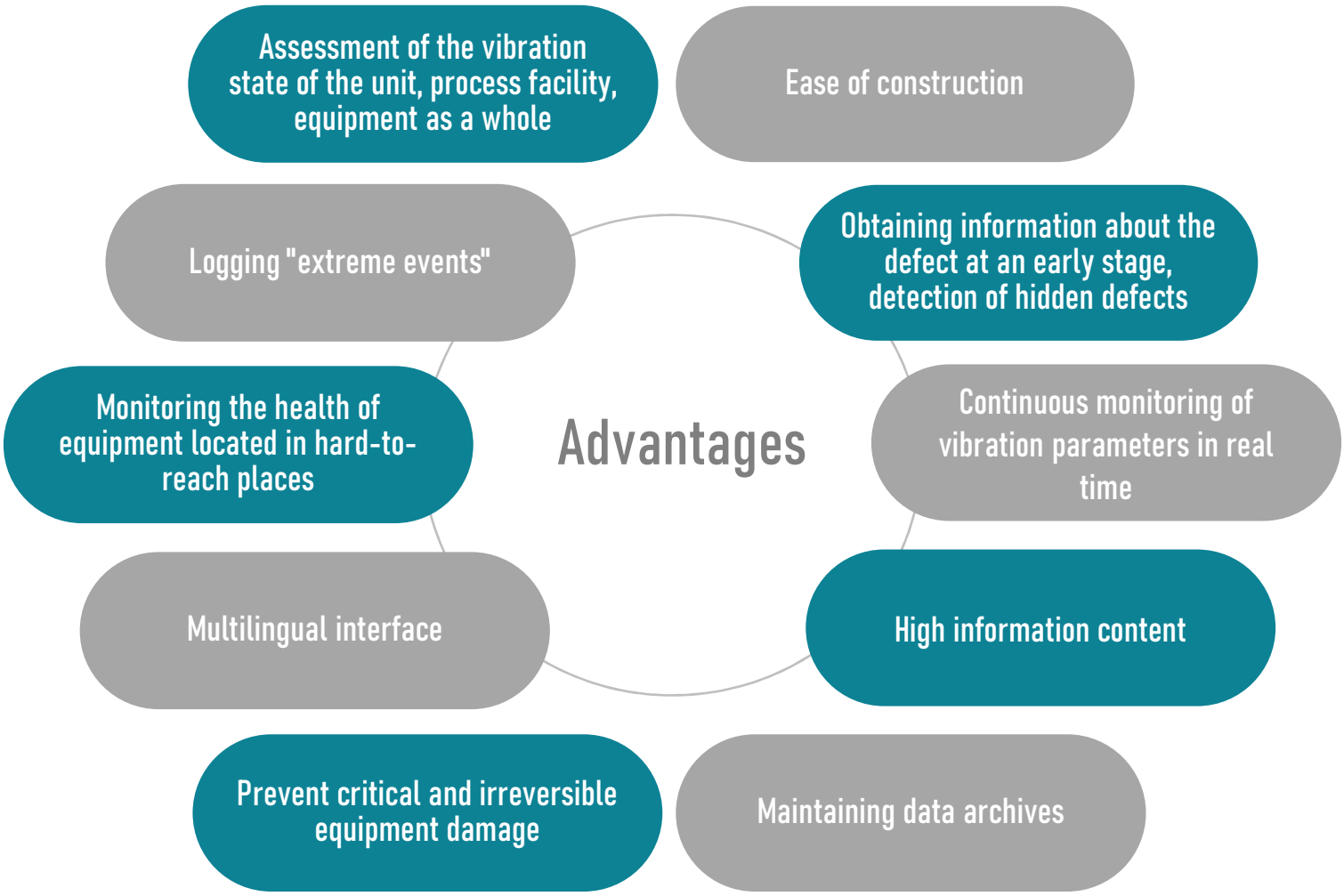


Time Base Displays at Selected Frequency

Detailed analysis of the RMS level of vibration acceleration in a specific frequency band.



Benefits of EMMADIS system



The feasibility of introducing a monitoring system

Reduced equipment repair costs	+		
Reducing the cost of repairs due to the timely detection of defects in parts and assemblies	+		
Exclusion of costs for eliminating the consequences of accidents	+		
Reducing financial losses from production downtime	+		
Reduced operating costs by eliminating maintenance work	+		
Increasing the actual overhaul period due to the exclusion of unreasonable scheduled repairs			+
Reduction of standby equipment in individual technological processes		+	
Reducing the amount of repairs		+	

About company

PassatInnovations LLC is a product IT company, a resident of the Hi-Tech Park.

The main area of activity is the development of information and analytical products that allow efficient operation of the production assets of mining and processing enterprises.

PassatInnovations LLC closely cooperates with specialists from mining and chemical enterprises, which allows us to take into account all the wishes and recommendations of the operating personnel.

We provide 24/7 technical support for our products and services.

We are always ready to share our experience and knowledge.

We will be glad to cooperate with you!

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