

Equipment condition monitoring system



The system provides



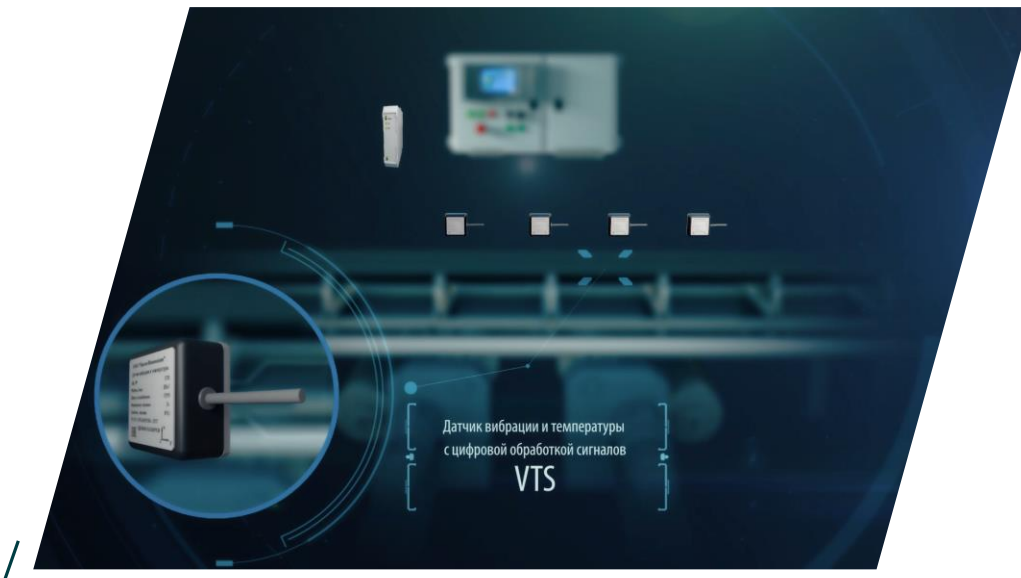
Continuous monitoring of equipment operating parameters



Logging "extreme events"



Prevention of critical and irreversible damage to equipment



The system is designed for ...



Chief Mechanic Department

For planning maintenance and repair, receiving reports on the condition of equipment and the results of the work of employees



Vibration diagnostics specialist

For identification of abnormal operation of equipment, prediction of emergency situations.



What can the system detect?

- Development of stages of bearing defects
- Determine imbalance and misalignment
- Define resonance
- Determine the mechanical wear of couplings, bearings, support structures









Vibration State Assessment Criteria

1. Absolute vibration values

Qualitative assessment of the vibration condition of machines :

-  Zone A new machines, just put into service
-  Zone B machines suitable for unlimited use
-  Zone C machines unsuitable for long-term continuous operation
-  Zone D vibration levels are severe enough to cause damage to the machine

2. Dynamic changes in vibration parameters

3. Total score for 1 and 2 criteria of equipment condition

Well within the boundaries between zones A and B

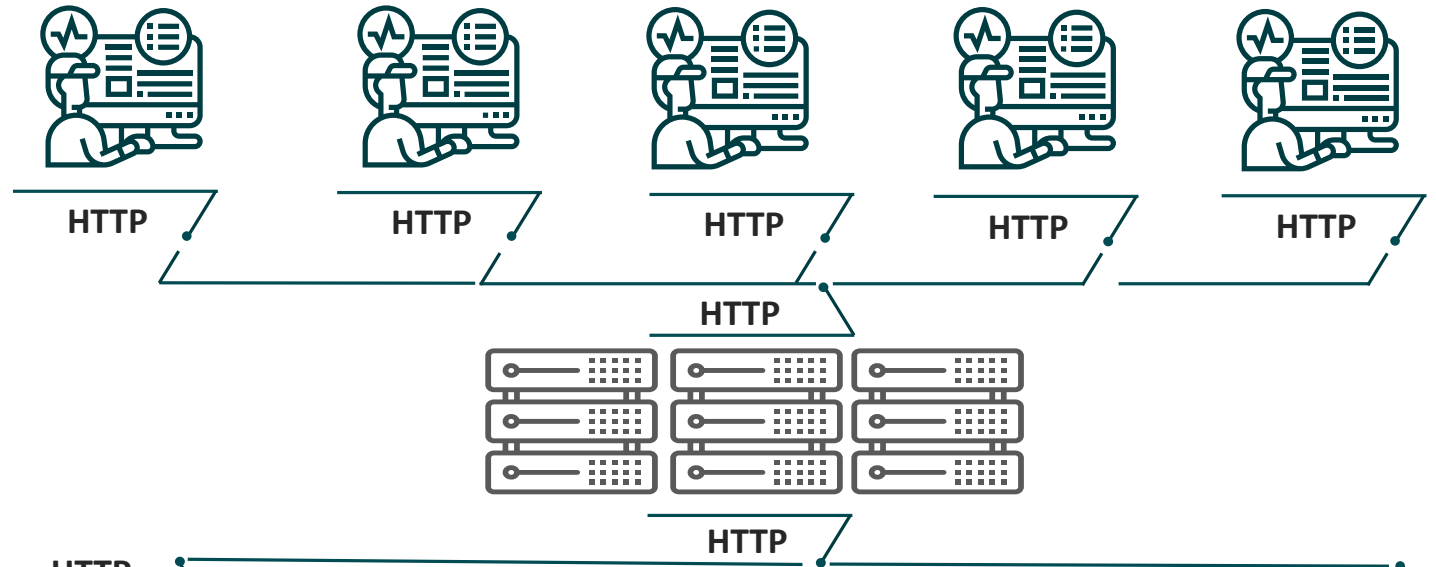
Acceptable work in zone B until level is reached WARNING

Requires action work in zone C until the level of EMERGENCY is reached

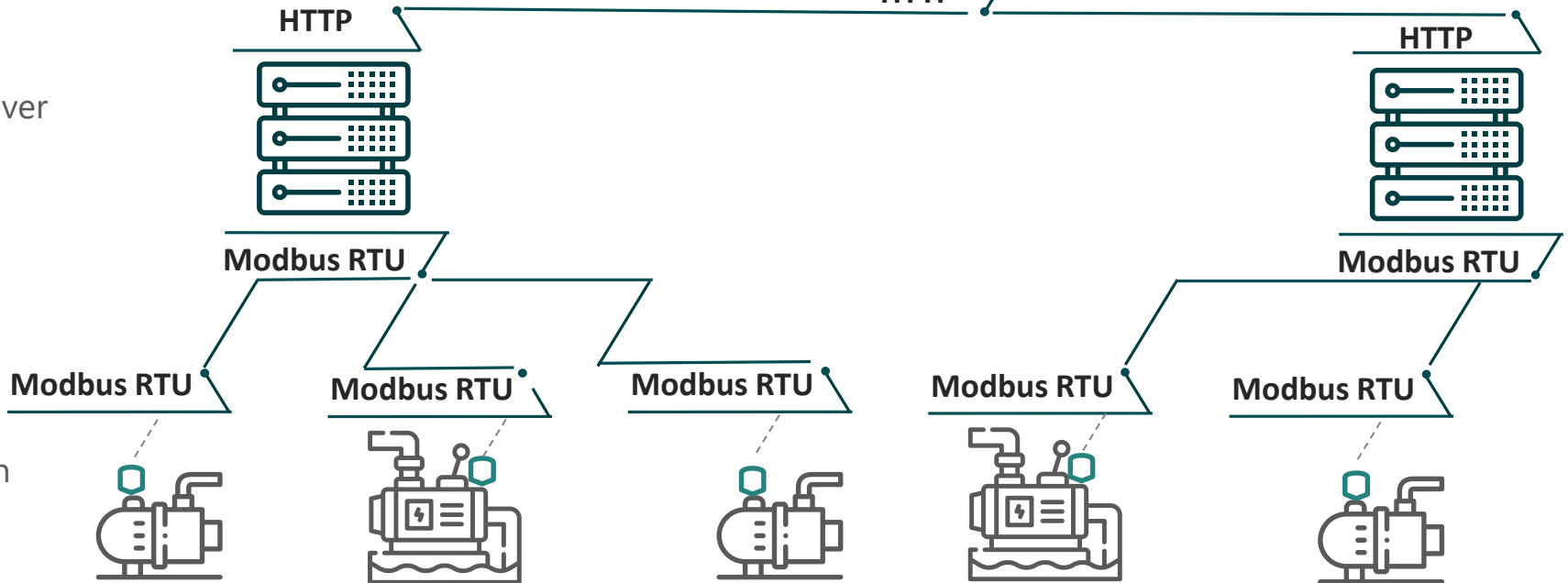
Unacceptable transition from zone C to zone D or when the level EMERGENCY is exceeded

Scheme for building a 3-level system

1 main server



2 local server



3 vibration sensor

Vibration and temperature sensor VTS-3D



No	Parameters and characteristics	Value
1	Type of supply voltage	direct current
2	Supply voltage, V	9 – 36 V
3	Power consumption, no more, W	0.25
4	Sensing element type	MEMS
5	Number of axes	3
6	Frequency band for measuring vibration acceleration, not worse, Hz	5000
7	Measurement of integral characteristics of vibration in frequency bands, Hz:	
	RMS vibration acceleration	10 – 3000
	RMS vibration velocity	10 – 1000
	RMS vibration displacement	10 - 200
8	Relative errors in measuring the integral characteristics of vibration (normalized to the actual value), not worse,%	
	RMS vibration acceleration	±6.0
	RMS vibration velocity	±10.0
	RMS vibration displacement	±15.0
9	Number of temperature sensors	2 (top, bottom)
10	Temperature measuring range, °C	-40 - +85
11	Communication interfaces:	
	- type of	RS485
	- maximum transmission rate, bit/s	115200
	- galvanic isolation	no
	- protection against impulse noise	yes
	- built-in terminal resistor	No
12	Overall dimensions, no more, WxHxD mm	30x22x30
13	Mounting	stud, magnet
14	The degree of protection against dust and moisture, not worse	IP67
15	Ambient temperature, °C	-40 - +85

Enterprise level



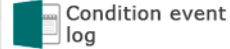
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Condition event log



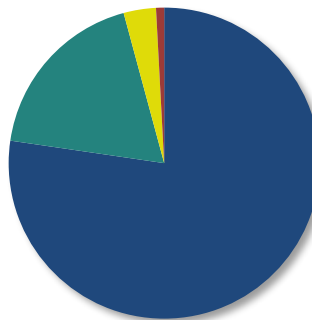
Received Samples Schedule



System network configurator

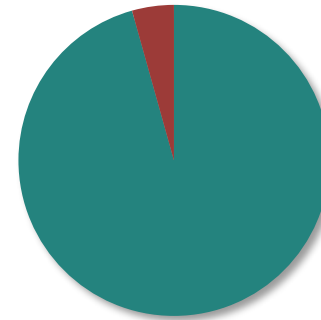
Equipment condition

Condition according to criterion 1



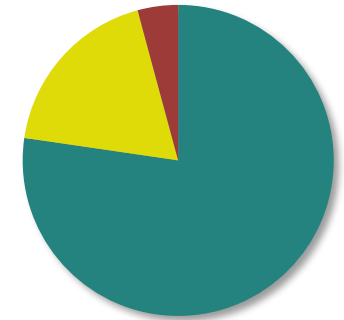
■ 74 pcs. ■ 22 pcs. ■ 7 pcs. ■ 1 ед.

Condition according to criterion 2



■ 102 pcs. ■ 2 ед.

Status by temperature zones



■ 98 pcs. ■ 5 pcs. ■ 1 pc.



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Vacuum crystallization department



pump



node



Level Technological object



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Condition event
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Received Samples
Schedule



System network
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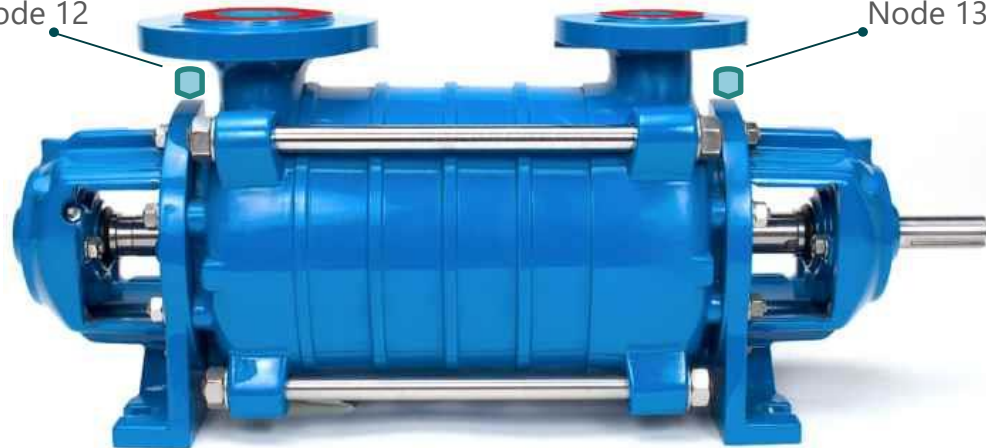


pump



node

Node 12



Node 13

Type

Number of days
without repair

Date of the next
maintenance

Motor resource

Centrifugal
sectional pump

72

13.03.2021

20 000 hours

Level Node



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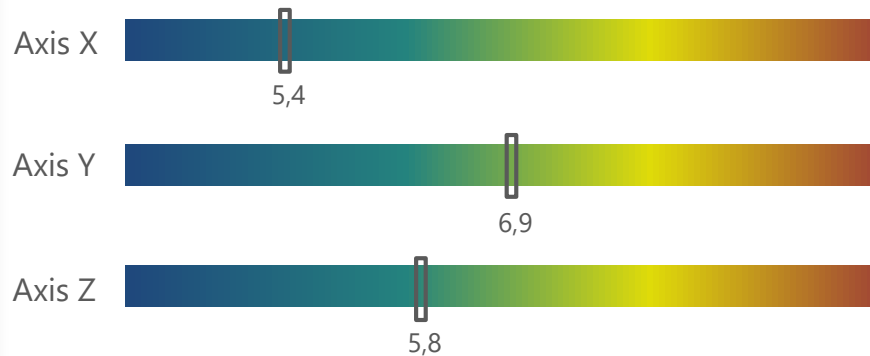
pump



node

Node 12

Current RMS Vibration Acceleration Data



Raw data plots

Spectral
representation

RMS charts

Equipment
condition report

Node card

Level Node



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Condition event log

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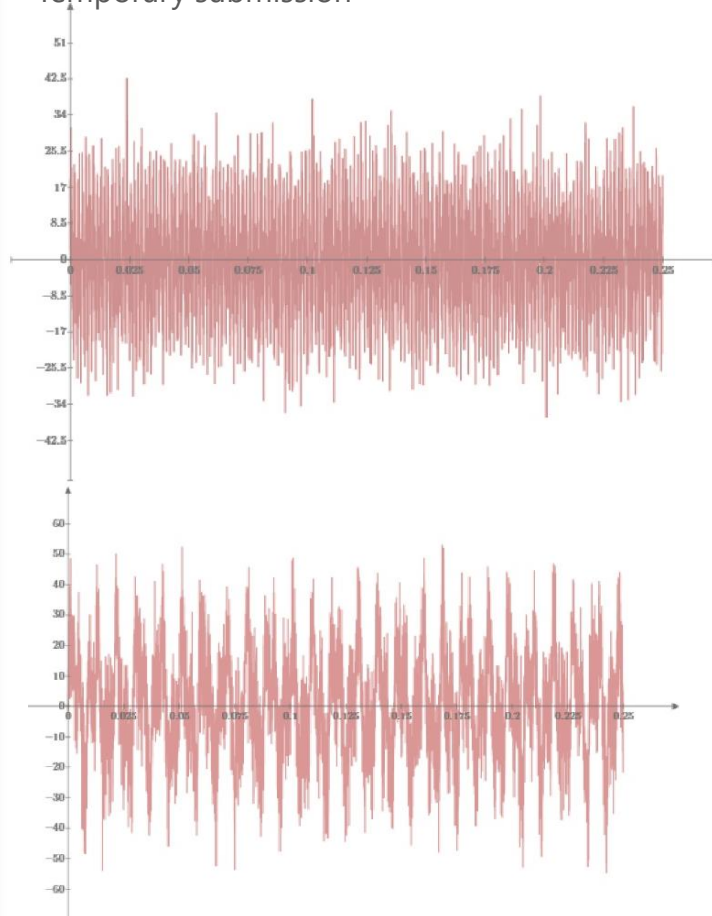


node

Node 12

Raw data plots

Temporary submission



Raw data plots

Spectral representation

RMS charts

Equipment condition report

Node card

Уровень Узел



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Condition event
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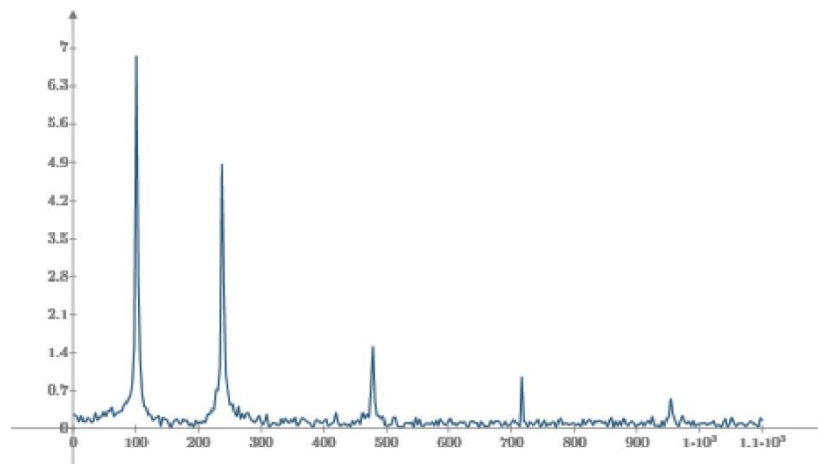
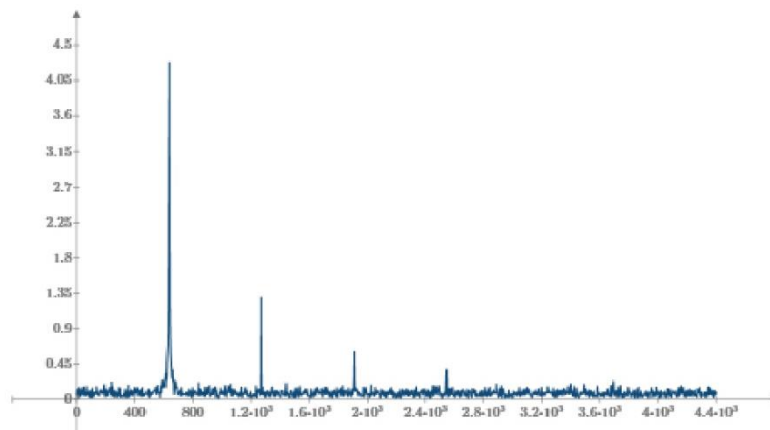


pump



node

Node 12 Spectral representation of data



Raw data plots

Spectral
representation

RMS charts

Equipment condition
report

Node card

Уровень Узел



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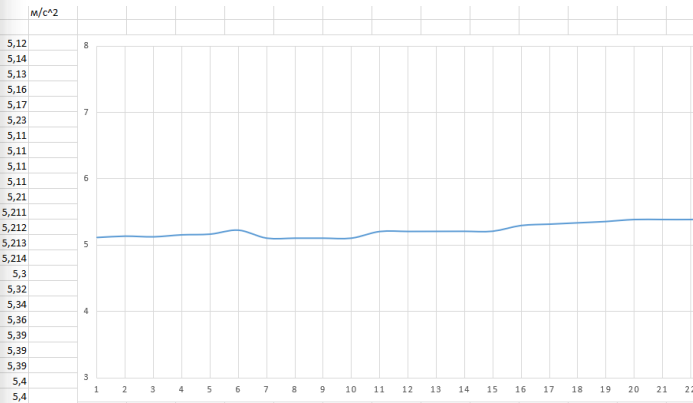
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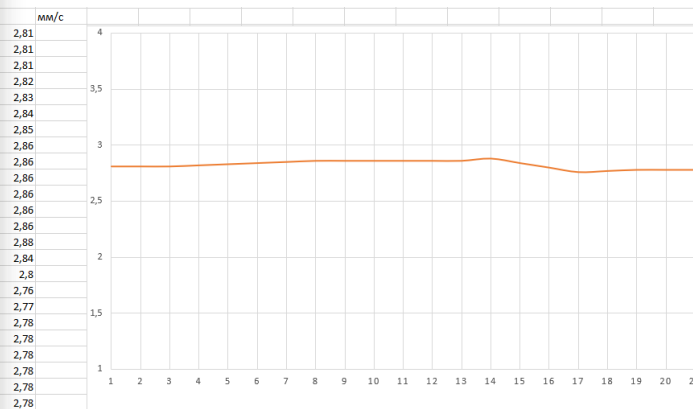
node

Node 12 RMS charts

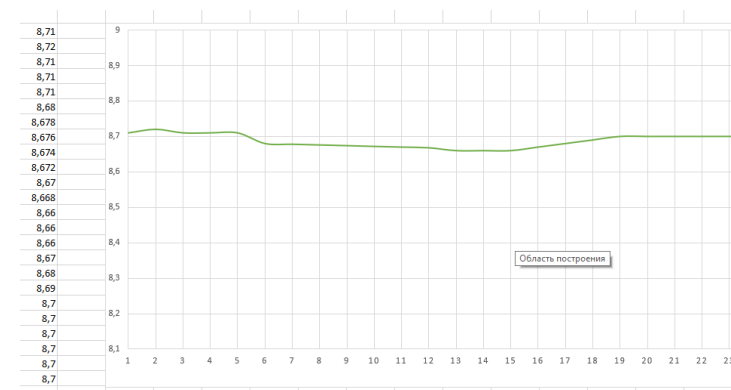
Vibration acceleration



Vibration velocity



Vibration displacement



Raw data plots

Spectral representation

RMS charts

Equipment condition report

Node card

Level Node



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log



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System network
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Node 12 Equipment condition report

Frequency, Hz	Wear	Defects	Risk level
24,61	Normal	Balance defect	0,32

Raw data plots

Spectral
representation

RMS charts

Equipment condition
report

Node card



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