

# PRODUCTS CATALOG 2015

## EC Systems

[www.ec-systems.pl](http://www.ec-systems.pl)



# EC SYSTEMS

EC Systems is an expert in design and implementation of industrial systems for monitoring, diagnostics, testing and control. For over 15 years our solutions have been used all over the world, in all the key sectors of industry. We have completed a range of various projects, starting from solutions like battery management system for electric vehicles or electronic grenade fuse, through systems for windshield wipers engines end-of-line testing, condition monitoring of wind turbines and reciprocating compressors, systems for remote monitoring of railroad crossings, bus diagnostics, up to systems designed to manage entire power plants. Based on our internal resources we prepare the project plan, design electronics and mechanics, develop low level and high level software, and perform final assembly and commissioning. Our portfolio includes ready-made products and specialized services, including constant remote condition monitoring of machines. We are unique due to our independence, references and experience in implementing special purpose solutions.

In the range of ready-made, standard products our main focus is condition monitoring and diagnostic systems for rotating machinery, which are used in various applications, from wind turbines and printing machines, through exhaust gas ventilators in power plants and dewatering pumps in mines, up to natural gas reciprocating compressors and synthesis gas compressors in chemical factories.

**We offer:**

- Online condition monitoring systems for rotating machinery, together with installation and commissioning,
- Data acquisition and signal conditioning modules for specialized measurements and off-line analysis,
- Specialized services: machine technical condition assessment and constant remote condition monitoring,
- Vibration sensors renowned British manufacturer of MONITRAN,
- Swedish systems for laser shaft alignment and geometrical measurements from Easy-Laser® company.

## THEY'VE TRUSTED US



Over **15 years** on the market



**Specialized team of:**

- diagnostics engineers
- electronics designers
- software developers

Member of engineering holding of 500 people - **EC Grupa**



Close cooperation with **technical universities** from all over the world

**Hundreds of clients** in Poland and all over the world





# REMOTE DIAGNOSTICS SERVICE VIBcare 24/7

**VIB**care is a service delivered 24/7 by EC Systems engineers, supporting customer's maintenance team. Thanks to the use of the VIBstudio platform, VIBcare allows for remote, online analysis and assessment of machines' technical condition. Based on monitored parameters, VIBcare enables for an immediate notification of machines' users about occurrence of symptoms suggesting emerging threats for their operation, as well as possible

failures related to wear or damage of individual elements.

As a part of the package, client receives event related and periodical reports about each monitored machine, which describe its current condition. The reports contain relevant guidelines regarding further machine's operation and a list of elements, which should be under special supervision in the following period.



EC Systems Diagnostic Team



Immediate information about developing failure



Periodical reports for each monitored machine



Guidelines regarding further machine's operation



# PLATFORM FOR ONLINE CONDITION MONITORING VIBstudio

VIBstudio is an intelligent platform for online condition monitoring, failure protection and vibration-based diagnostics of machinery.



The platform allows to:

- reduce the number of failures and downtime by up to **70%**,
- decrease the maintenance costs by up to **20%**,
- increase lifetime of monitored machines by up to **30%**.

VIBstudio is comprised of VIBmonitor modules and VIBnavigator software. Wide range of configurations allows to adjust the system to the functional needs and financial capabilities of the customer. Moreover, the ease of future

expansion makes it possible to spread out the investment in time. This provides a unique business benefit allowing to start from an inexpensive base version of the system for monitoring of a single machine, and further gradual expansion into an advanced platform for remote diagnostics of the entire enterprise.

## VIBstudio KEY FEATURES:

- Affordable monitoring, safety and diagnostics
- Modular architecture and easy expansion
- Reduction of false alarms
- Automatic failure diagnostics
- Real-time processing
- Advanced diagnostic algorithms
- Access from any place in the world
- Access to historical data
- Compatibility with systems from other manufacturers



# CONDITION MONITORING SYSTEM VIBmonitor

**VIB** monitor is a modular, multichannel and autonomous system operating close to the monitored machine. The system monitors and protects operating machines through conditioning, high quality acquisition of signals and process parameters, all well as their continuous analysis. Due to True Data Validator™, the real-time data validation technology, as well as automated machine operational states detection and advanced diagnostic

analyses, the system effectively detects anomalies in an early development phase, and significantly reduces the number of false alarms.

Expansion of the system is possible through adding or exchanging hardware feature cards. The base version of the system is named VIBmonitor EL, and is comprised of: processing card, server card and measurement card.

VIBmonitor system specification is available on p. 16.

# VIBnavigator SOFTWARE

**VIB** navigator is the user interface of the VIBstudio platform based on I<sup>3</sup> Technology™. It is primarily used for event monitoring, data viewing, configuration and administration of the system. On one hand the interactive and easy to use browser ensures intuitive handling for the operator. On the other it offers to the maintenance and diagnostic teams a wide functionality for processing and analysis of signals. High degree of configurability and automation of operations make it very easy to verify the causes of an alarm.

VIBnavigator is available in two versions:

- **Standard Edition (SE)** – for small installations, allows to verify the causes of warnings and alarms,
- **Enterprise Edition (EE)** – diagnostic center, allows direct access to live and historical data from any number of machines.

Both versions offer the same set of diagnostic tools.

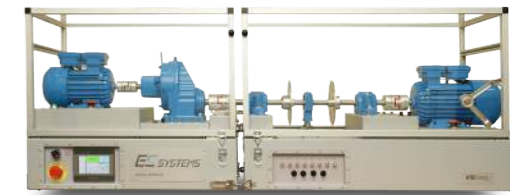


# RESEARCH-EDUCATIONAL TEST BENCH VIBstand2

**VIB** stand2 is a complete research-educational test bench for rotating machinery diagnostics. It consists of the mechanical part and the vibration based condition monitoring and diagnostics system. The mechanical part, placed on a stiff support, includes two three-phase asynchronous motors with frequency inverters (one of them acting as propulsion, the other one as load), a gearbox, a shaft supported on three rolling element bearings (one of which is mounted on an adjustable screw, and can be used to apply vertical force to the shaft, thus loading the bearings supporting it). The shaft has got a disc with holes designed for imbalance simulation. The diagnostic part is comprised of a full featured condition monitoring system VIBstudio, which consists of:

- **VIBmonitor,**
- **VIBnavigator.**

The system may include up to eight vibration input channels and two phase marker inputs. In the default configuration the test bench comes with four



piezoelectric accelerometers and one rotational speed sensor. The sensors can be mounted in one of the prepared holes or with a magnet, in order to measure vibrations in a selected plane in selected construction nodes. The VIBstand2 test bench allows full data acquisition and condition diagnostics with numerous charts (time view, frequency spectrum, frequency order spectrum, envelope analysis, trend diagram, XY plot, cascade plot, synoptic view, and alarm list). The signals can be also easily connected to third party acquisition hardware through prepared BNC outputs. VIBstand2 gives the opportunity to conduct academic research studies, and carry out a professional rotating machinery condition monitoring and diagnostics training.

## The set includes:

### MECHANICAL PART

- steel frame
- 2 three-phase asynchronous motors
- one stage parallel gearbox (i=2.91)
- 2 frequency inverters
- 3 couplings
- 3 bearings with casings (1 mounted on adjustable screw)
- RCD breaker
- safety switch
- steel shaft
- disc with threaded holes
- set of threaded weights for imbalance simulation
- housing made of organic glass

### SYSTEM PART

- 4 vibration sensors with connectors and cabling
- 1 rotational speed sensor
- VIBmonitor signal conditioning and data acquisition modules
- VIBstudio license (educational version)

# SIGNAL CONDITIONING

## VI Bamp

We offer a wide range of signal conditioning systems. Small, portable, single channel devices on one hand, and big, rack mountable, multichannel systems on the other. Our systems are a perfect solution for

industrial, as well as for scientific installations. The systems can be also used in automation due to implemented communication interface.

## // PA 1000 // SIGNAL CONDITIONER

Single channel conditioner



→ **PA 1000** is a single channel, portable conditioner for ICP® signal with built-in battery pack. The conditioner is equipped with 2.4mA/24V power supply for IEPE (ICP®), and with a special input circuit for gaining optimal transitional performance. There are three LED indicators on the control panel, showing as follows: measurement path shorting and opening, power On/Off, battery low status. The PA 1000 has a durable aluminum housing. The low noise, wide dynamic range and excellent accuracy make this model an excellent choice for demanding measurement applications.

### PARAMETERS

Number of channels (in/out)	→ 1/1
Input type	→ ICP® 2.4 mA/24V
Signaling	→ Open/Short, Battery low, on/off
Input impedance	→ 100 kΩ
Output impedance	→ 100 Ω
Gain	→ x1 (0dB)
Gain error	→ < 0,1 %
Gain drift	→ < 10 ppm/°C
SNR	→ > 90 dB (10 Hz - 20 kHz)
Frequency response	→ 0.2 Hz do 100 kHz
Distortions	→ < 0,05%
Output voltage range	→ 20 Vpp
Offset error	→ < 10mV
Battery	→ 4xAAA
Power supply	→ 9 VDC
Dimensions	→ 60 x 100 x 30 mm
Operational temperature	→ 0°C ...+ 60°C

## // PA 3000 // SIGNAL CONDITIONER

Triple channel conditioner



→ **PA 3000** is a triple channel, portable conditioner for ICP® signal with built-in battery pack. Each channel has an independent control of gain level and frequency response. Settings can be adjusted by buttons on the front panel. The module has built in sensor circuit diagnostics and detects short and open circuits in the measurement chain.

### PARAMETERS

Number of channels (in/out)	→ 3/3
Input type	→ ICP® 2.4 mA/24V
Signaling	→ On/Off, Charging , Open/Short, Overload, Gain, LP & HP Filters
Input impedance	→ 100 kΩ
Output impedance	→ 100 Ω
Gain	→ x1 (0dB)
x10 (20dB)	→ < 0.1 %
x100 (40dB)	→ < 10 ppm/°C
SNR	→ > 90 dB (10 Hz - 22 kHz)
Gain error	→ < 0.5 %
Gain drift	→ < 50 ppm/°C
Frequency response	→ 0.5 Hz to 100 kHz (optionally 0.5 Hz to 300 kHz)
Distortions	→ < 0.1 %
Output voltage range	→ 20 Vpp
Offset error	→ < 10mV at the output (DC –short)
Battery	→ NiMH with built-in charger
Power supply	→ DC, 12V/400mA
Operational temperature	→ 0°C ...+ 50°C

## // PA 16000D // SIGNAL CONDITIONER

8 or 16 channel conditioner



→ **PA 16000D module:** excellent solution for both educational and laboratory purposes. Ruggedized housing, keyboard and big legible display enable for a quick and easy configuration of the system. There is available version with 8 or 16 channels. Inputs can be prepared as screw terminal (industrial version) or BNC (laboratory version). The signal conditioner is adapted to external control via RS232 interface.

### PARAMETERS

Number of channels (in/out)	→ 16/16 or 8/8
Input type	→ IEPE 4,7 mA/24V
Signaling	→ Filter on/off, Open/short, Overload
Input impedance	→ 100 kΩ
Output impedance	→ 120 Ω
Gain	→ x1, x10, x100 (0dB, 20dB, 40dB)
SNR	→ > 90 dB (10 Hz - 22 kHz)
Distortions	→ < 0,1%
Gain error	→ < 0,5 %
Gain drift	→ < 50 ppm/°C
Output voltage range	→ 20 Vpp
Offset error	→ < 10 mV
High pass filter	→ 10 Hz or custom
Low pass filter	→ 1 KHz or custom
Power supply	→ 12V / 400 mA DC
Dimensions	→ 160 x 150 x 90 mm
Operational temperature	→ 0°C ...+ 50°C



# DATA ACQUISITION

## VIBdaq

We offer a full range of high quality data acquisition systems, starting from small, single or double channel systems, up to big multichannel systems. The smaller systems can identify themselves to the operating system as soundcards, for

the bigger systems we deliver MatLab and DasyLab application drivers. The modules are dedicated for machine off-line analysis based on collected time signals.



### // VIBdaq 2.0 // DATA ACQUISITION MODULE

*Dual channel system acquisition module*



→ **VIBdaq 2.0** is a double channel data acquisition module for signal processing in IEPE standard. Device's inputs can be also configured as AC or DC inputs. The selected input type is indicated by an appropriate diode on the panel, and can be switched using proper buttons. The device is fully powered from USB port. The small size and weight make the device very convenient to use.

#### PARAMETERS

Number of input channels	→ 2
Input channels connectors	→ BNC
Input signal type	→ DC, AC, ICP®
ICP®	→ 24 VDC, 2,4 mA
Input voltage range	→ ±10 V
Input impedance	→ AC: 220 kΩ → DC: 220 kΩ → ICP®: 110kΩ
THD	→ typically: -88 dB → max: -70dB → (F =48 kHz, input signal: 1 kHz sinusoid)
SNR	→ 92 dB
Crosstalk	→ 1 kHz sinusoid: < -120 dB → 10 kHz sinusoid: < - 90 dB → 20 kHz sinusoid: < - 86 dB
A/C converter	→ multi bit Delta - Sigma → 16 bit (optionally 24 bit)
Sampling frequency	→ 44,1 kHz, 48 kHz (16 bit, 24 bit) → 96 kHz (only for 16 bit)
Communication interface	→ USB

### // VIBdaq 2.1 // DATA ACQUISITION MODULE

*Dual channel system acquisition module*



→ **VIBdaq 2.1** is a double channel data acquisition module for signal processing in IEPE standard. Device's inputs can be also configured as AC or DC inputs. The selected input type is indicated by an appropriate diode on the panel, and can be switched using proper buttons. The device is fully powered from USB port. The small size and weight make the device very convenient to use.

The module has configurable gain (1,10,100) for each channel that is indicated on the panel by diodes, and is easily adjustable using buttons on the panel. The device has also signal overload indicator for both channels.

#### PARAMETERS

Number of input channels	→ 2
Input channels connectors	→ BNC
Input signal type	→ DC, AC, ICP®
ICP®	→ 24 VDC, 2,4 mA
Input voltage range	→ ±10 V
Gain	→ x1, x10, x100
Input impedance	→ AC: 220 kΩ, DC: 220 kΩ, ICP®: 110kΩ
THD	→ typically: -88 dB → maks.: -70dB → (F =48 kHz, Input signal: 1 kHz sinusoid)
SNR	→ 92 dB
Crosstalk	→ 1 kHz sinusoid: < -120 dB → 10 kHz sinusoid: < - 90 dB → 20 kHz sinusoid : < - 86 dB
A/C converter	→ multi bit Delta - Sigma → 16 bit (optionally 24 bit)
Sampling frequency	→ 44.1 kHz, 48 kHz (16 bit, 24 bit) → 96 kHz (only for 16 bit)
Anti-aliasing filter	→ digital decimation
Communication interface	→ USB



# DATA ACQUISITION

## // VIBdaq 4.1 // DATA ACQUISITION MODULE

4- or 8-channel data acquisition module



→ **VIBdaq 4.1** is a 4- or 8-channel (optionally) data acquisition system for signal processing in IEPE standard. The device features a USB interface, which, besides the data transfer, is used for powering up the module and connected vibration sensors. All channels of the device can work independently, which means, that the gain level can be individually adjusted. VIBDAQ 4.1 allows for measurement chain diagnostics, and can be fully controlled from a PC computer using dedicated software package.

### PARAMETERS

Number of input channels	→ 4 or 8 (optionally)
Input type	→ IEPE/ICP® (24 VDC, 2.4 mA)
Input impedance	→ 100 kΩ, AC-coupled
Gain/input voltage range	→ x1/ ± 10 V → x2/ ± 15 V → x5/ ± 2 V → x10/ ± 1 V
Gain drift	→ < 50 ppm/°C → 12 dB/oct.
Power	→ 5V DC from USB → max 400 mA
Communication interface	→ USB 1.1; USB 2.0
Max. sampling frequency	→ 100 kS/s 12 dB/oct.
Resolution	→ 16 bit
Signal-to-Noise	→ -80 dB (from 0 to 25 kHz)
Operational temperature	→ 0°C to +60°C
Dimensions	→ 196 x 110 x 45 mm

## // VIBdaq 16.1 // DATA ACQUISITION MODULE

16-channel data acquisition module



→ **VIBdaq 16.1** is a 16-channel data acquisition system for signal processing in IEPE standard. The data transfer to a PC computer, as well as the system management is carried out through a USB interface.

### PARAMETERS

Number of input channels	→ 16
Input type	→ IEPE 2,4 mA 24V
Input impedance	→ 100 kΩ, AC-coupled
Resolution	→ 16 bit
Crosstalk	→ 0-25 kHz sinusoid : < - 80 dB
Gain error	→ < 0.5%
Input voltage range max relative error (% score + % range)	→ range ± 10 V 6mV → range ± 5 V 3mV → range ± 2 V 1,5 mV → range ± 1 V 1 mV
Power	→ 5 V DC from PC computer USB → 12 V DC from external source
Communication interface	→ USB 1.1; USB 2.0
Software	→ drivers for DasyLab & LabVIEW
Operational temperature	→ 0°C to +70°C
Storage temperature	→ -10°C to +70°C
Dimensions	→ 200 x 260 x 110 mm

# MACHINERY CONDITION MONITORING

EC Systems has a great experience in the field of vibration-based condition monitoring and diagnostic systems for rotating machinery. Our systems allow to continuously monitor the most critical machines, and to keep them in desired technical condition. They also give possibility to perform an emergency shutdown in case of a threat of a serious failure. Using advanced vibration diagnostics methods allow to early detect symptoms of failures like: imbalance, misalignment, loose foundation or gears and bearings damage. This gives time to plan the maintenance and thus to minimize the machine downtime.

Our offer includes a range of solutions, all of which have various levels of complexity, what makes it possible to present each client a customized proposal fulfilling exactly the client's expectations on one hand, and taking into account the specifics of the industrial facility. We offer both stationary and portable systems, working online, as well as offline, the systems performing advanced analysis, and the ones presenting only the basic, the most necessary information.

## // VT 1000 // MACHINERY CONDITION MONITORING MODULE

Universal module for online condition monitoring and diagnostic of constant and variable speed rotating machinery



→ **VIBtransmitter VT1000** module is a single channel device for online condition monitoring and diagnostic of constant and variable speed rotating machinery. A built-in line indicator (22 points) with marked typical warning and alarm thresholds makes it easy to determine machine's state. The 4..20mA current output for signal estimate (RMS, PEAK) makes it possible to directly connect the VT1000 into the monitored machine control system.

### PARAMETERS

Sensor type	→ ICP® 100mV/g
Measured values	→ velocity or acceleration
Calculated estimates	→ RMS or 0-PEAK
Power supply	→ 24 VDC
Power consumption	→ < 4 W
Low pass filter	→ 1 or 10 kHz, 24 dB/oct
High pass filter	→ 3 lub 10 Hz, 12 dB/oct
Isolation	→ 1.5 kV
Current output	→ 4..20mA
Voltage output	→ AC, 10Vpp max

# MACHINERY CONDITION MONITORING

## // VT1002D // MACHINERY CONDITION MONITORING MODULE

Vibration monitoring systems with 2 relay outputs



→ **VIBtransmitter VT1002D** is an upgraded version of the VT1000 module with 2 relay outputs, which can work independently performing the warning and alarm functions. The device has a built-in display showing current measured vibration signal value. The configuration is made with 3 buttons and DIP switches. The 4..20mA current output for signal estimate (RMS, PEAK) makes it possible to directly connect the VT1002D into the monitored machine control system.

### PARAMETERS

Sensor type	→ ICP® 100mV/g
Measured values	→ velocity or acceleration
Calculated estimates	→ RMS or 0-PEAK
Power supply	→ 24 VDC
Power consumption	→ < 4 W
Low pass filter	→ 1 or 10 kHz, 24 dB/oct
High pass filter	→ 3 lub 10 Hz, 12 dB/oct
Insulation	→ 1.0 kV
Current output	→ 4...20mA
Voltage output	→ AC, 10Vpp max

## // VIBtransmitter VT1002DK // RECIPROCATING COMPRESSORS MONITORING MODULE

→ **VIBtransmitter VT1002DK** is equipped with specially designed analog circuit, which takes into account large pulses associated with the work of the compressor.

### PARAMETERS

Sensor type	→ ICP® 100mV/g
Measured values	→ velocity or acceleration
Calculated estimates	→ RMS or 0-PEAK
Power supply	→ 24 VDC
Power consumption	→ < 4 W
Insulation	→ 1.0 kV
Current output	→ 4...20mA
Voltage output	→ AC, 10Vpp max
Warning relay	→ 100mA/24V
Alarm relay	→ 100mA/24V

## // VIBtransmitter VT1002DS // RECIPROCATING COMPRESSORS MONITORING MODULE

→ **VIBtransmitter VT1002DS** measures the vibration in intervals, which are fractions of the full work cycle of the compressor. This allows to distinguish the vibration coming from piston strokes, valves operation and other phenomena associated with the operation of a reciprocating compressor.

### PARAMETERS

Sensor type	→ ICP® 100mV/g
Measured values	→ acceleration
Calculated estimates	→ RMS or 0-PEAK
Minimal rotational speed	→ 1 RPS
Maximal rotational speed	→ 20 RPS
Angular resolution of intervals	→ 15 degrees
Number of phase markers per revolution	→ 1
Minimal time of phase marker active state	→ 5ms
Sampling frequency	→ 20kHz
Power supply	→ 24 VDC
Power consumption	→ < 4 W
Insulation	→ 1.0 kV
Current output	→ 4...20mA
Voltage output	→ AC, 10Vpp max
Warning relay	→ 100mA/24V
Alarm relay	→ 100mA/24V

## // VIBtransmitter VT1002DP // RECIPROCATING COMPRESSORS MONITORING MODULE

→ **VIBtransmitter VT1002DP** is a module dedicated to work with the proximity vibration sensors (eddy current). Additionally, the module has a feature to calculate average value of an estimate, synchronized with the phase maker.

### PARAMETERS

Sensor type	→ proximity
Circuit A input range	→ ± 2V
Circuit V input range	→ 0-20 V
Calculated estimates	→ RMS or 0-PEAK or PEAK-PEAK
Power supply	→ 24 VDC
Power consumption	→ < 4 W
Low pass filter	→ 300 Hz or 10 kHz, 24 dB/oct
High pass filter	→ 3 lub 10 Hz, 12 dB/oct
Insulation	→ 1.0 kV
Current output	→ 4...20mA
Voltage output	→ AC, 10Vpp max

# MODULES FOR RECIPROCATING COMPRESSORS MONITORING

The VT1002DK, VT1002DS and VT1002DP modules are specially modified versions of the VT1002D module, which are designed for condition monitoring of reciprocating compressors. Their design takes into account the specific nature of work

of this type of equipment, and allows for better monitoring, then with the standard modules. Additionally, the parameters of the modules can be individually adjusted for a specific model of a compressor.



# CONDITION MONITORING SYSTEM VIBmonitor

**VIB** monitor is a modular, multichannel and autonomous system operating close to the monitored machine. The system monitors and protects operating machines through conditioning, high quality acquisition of signals and process parameters, all well as their continuous analysis. Due to True Data Validator™, the real-time data validation technology, as well as automated machine operational states

detection and advanced diagnostic analyses, the system effectively detects anomalies in an early development phase, and significantly reduces the number of false alarms.

Expansion of the system is possible through adding or exchanging hardware feature cards. The base version of the system is named VIBmonitor EL, and is comprised of: processing card, server card and measurement card.



## VIBmonitor > CONDITION MONITORING SYSTEM

### PARAMETERS

<b>Inputs</b>	4 measurement inputs (expandable up to 20):
	<ul style="list-style-type: none"> <li>→ Input type: IEPE (ICP)</li> <li>→ Resolution: 24bit</li> <li>→ Synchronized sampling: 25/50/100kHz</li> <li>→ Spectrum resolution: down to 0,002Hz</li> <li>→ Parallel processing</li> <li>→ 1 phase marker</li> </ul>
<b>Outputs</b>	Modbus TCP (expandable by OPC, 4-20mA, relays)
<b>Estimates available for each channel</b>	Wideband:
	<ul style="list-style-type: none"> <li>→ RMS</li> <li>→ VRMS</li> <li>→ PP</li> <li>→ Crest</li> <li>→ Kurtosis</li> </ul>
	Narrowband (up to 20 per channel)
<b>Casing</b>	IP code: IP65 Prepared for optional LCD panel
<b>Power supply and environmental conditions</b>	Power supply: 24V DC 25W Operational temperature: from -40°C to +85°C Vibration resistance: group 1B Optional ATEX compliance



# REMOTE CONDITION MONITORING

## VIBmeter > PORTABLE VIBRATION ANALYZER



→ **The VIBmeter** is a compact, rechargeable, portable device designed to conform to ISO10816-3 and operate with a constant current accelerometer providing an accurate vibration measurement.

Features comprise of the ability to store up to 100 time-stamped readings, including; RMS, peak, peak-peak, crest factor and bearing conditions all on an easy to read vibrant colour LCD display.

### PARAMETERS

<b>Acceleration</b>	→ 20 g
<b>Velocity</b>	→ 200 mm/s
<b>Displacement</b>	→ 2000 µm
<b>Modes</b>	→ RMS
	→ Peak
	→ Peak-peak
	→ Crest factor
	→ Bearing acceleration
	→ Bearing velocity
<b>Low pass filters</b>	→ 1 kHz, 5 kHz, 10 kHz
<b>Band-pass filter</b>	→ 1-10kHz
<b>Operating temperature</b>	→ 0 to +45°C
<b>Battery life</b>	→ >20 hours
<b>Accessories</b>	→ Probe
	→ Magnet
	→ 4" ¼"-28UNF Spike
	→ Coiled sensor cable
	→ USB A to mini USB B cable
	→ Worldwide adaptor with 4 adaptors
	→ Carry case
	→ Handbook

## VIBinspector > MACHINERY CONDITION MONITORING SYSTEM

Portable vibration analyzer



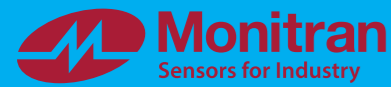
→ **VIBinspector** is a single channel device recording vibration time signals together with machine's rotational speed registered on the second channel. Thanks to advanced vibration diagnostics methods the system detects in advance slowly developing machine failures like: bearings or gears damage, imbalance, misalignment and weak foundation. Early warning against failures makes it possible to replace the faulty elements before they cause further, greater damage to the machine. Another important usage of VIBinspector is machine balancing feature.

### PARAMETERS

<b>Sensitivity (± 10%)</b>	→ 100mV/g
<b>Measuring range</b>	→ ± 50 g
<b>Frequency range (± 3db)</b>	→ 0,5 - 10 000Hz
<b>Nonlinearity</b>	→ ± 1 %
<b>Sampling frequency</b>	→ 24 kHz
<b>Touch screen</b>	→ 7" 1024x600, resistive
<b>Operation on batteries</b>	→ up to 8 h
<b>Amplification</b>	→ x1, x10, x100
<b>Technical data</b>	→ Processor Intel Atom Z530, 2GB RAM, SSD 64GB, Windows 7, LAN 1Gb, WiFi, 1 USB, Audio In/Out



# VIBRATION SENSORS



EC Systems is a sole distributor of Monitran's sensors in Poland, the Czech Republic, Romania, Hungary and Slovakia.

Monitran's products include general and special purpose accelerometers, velocity sensors, eddy current probes and LVDTs. They are used in a diverse range of applications including industrial processing, power stations, water treatment, wind turbines, mining and the oil and gas industry.

Monitran has two categories of general purpose accelerometer:

- AC output units suitable for vibration analysis with hand-held and online vibration analysers; and
- DC output units suitable for machine protection, ideal for direct input to PLC, DCS and other industrial controllers.

For more specialised applications Monitran has sensors providing dual outputs such as acceleration with temperature and velocity with acceleration. It also has special purpose sensors for high temperature applications, AC velocity, modal analysis and tri-axial measurements.



**MTN/2200-2P/4P/C**

*General purpose top-entry constant current accelerometer with isolated AC output.*

- Environment: ⚠Industrial
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 140°C
- Output: AC 100mV/g
- Entry Type: Top Entry



**MTN/2200I-2P/4P/C  
MTN/M2200IC\***

*ATEX and IECEx Group I & II certified. General purpose top-entry constant current accelerometer with isolated AC output.*

- Environment: ⚠Industrial, ⚠Hazardous, \*Mining
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 140°C
- Output: AC 100mV/g
- Entry Type: Top Entry



**MTN/2200W**

*Submersible, general purpose, top-entry constant current accelerometer with isolated AC output.*

- Environment: 💧Submersible
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 90°C
- Output: AC 100mV/g
- Entry Type: Top Entry



**MTN/2200IW**

*ATEX and IECEx Group II certified. Submersible, general purpose, top-entry constant current accelerometer with isolated AC output.*

- Environment: 💧Submersible, ⚠Hazardous
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 90°C
- Output: AC 100mV/g
- Entry Type: Top Entry



**MTN/2200S-2P/4P/C**

*General purpose, side-entry constant current accelerometer with isolated AC output.*

- Environment: ⚠Industrial
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 140°C
- Output: AC 100mV/g
- Entry Type: Side Entry



**MTN/2200IS-2P/4P/C  
MTN/M2200ISC\***

*ATEX and IECEx Group I & II certified. General purpose side-entry constant current accelerometer with isolated AC output.*

- Environment: ⚠Industrial, ⚠Hazardous, \*Mining
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 140°C
- Output: AC 100mV/g
- Entry Type: Side Entry



**MTN/2200SW**

*Submersible, general purpose, side-entry constant current accelerometer with isolated AC output.*

- Environment: 💧Submersible
- Frequency Range: 0.8Hz – 12kHz
- Temperature Range: -55 to 90°C
- Output: AC 100mV/g
- Entry Type: Side Entry



**MTN/2285-2P/4P/C**

*General purpose, top-entry velocity transducer with DC output.*

- Environment: ⚠Industrial
- Frequency Range: 2Hz – 1kHz
- Temperature Range: -25 to 90°C
- Output: DC 4-20mA
- Entry Type: Top Entry





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