# VIBRORACK1000

**8-Channel Simultaneous Vibration Analyzer**

## Applications

Nowadays, the majority of medium to large sized rotating machinery used in industry are protected against excessive vibrations via protection monitoring systems. Unfortunately, expensive condition monitoring systems have limited their use in industry, hitherto creating an obstacle for moving from preventive maintenance strategy to predictive maintenance strategy.

ABPVibro Company has been always trying to present high quality engineering products in vibration measurement and analysis while keeping the price low. To cope up with the problem of machines with installed protection systems, the company has developed and manufactured a vibration measurement system called VIBRORACK1000.

VIBRORACK1000 is a multi-purpose vibration analyzer which has been developed to be used in different conditions from harsh environmental situations to laboratory modal testing applications. Based on the software and hardware options the customer chooses, it may be used as:

1- Laboratory Vibration Analyzer:

For this application, a pack of useful modal analysis, acoustics and vibration analysis software modules are installed to be used for the determination of mode shapes and natural frequencies of the structure under test (SDOF & MDOF FRF), ODS (Operating Deflection Shape) analysis, sound quality (loudness & harshness) analysis, OMA (Operational Modal Analysis).

2- Condition monitoring system installed parallel to other 3rd party vibration protection systems:

In this application, VIBRORACK1000 is connected to the buffered output signals of vibration protection systems like Vibrometer® VM-600, Bently-Nevada® 3500, Schenck VibroControl® 4000 etc. and use transducers connected to the aforementioned protection systems as inputs to VIBRORACK1000 and perform all the required on-line vibration analysis like waterfall, FFT spectrum, time signal, historic trend and so on to improve the system from protection monitoring to on-line condition monitoring.

3- Protection & Condition monitoring system:

In this application, vibration transducers are installed on different points of the machine and connected to VIBRORACK1000 through cabling and junction boxes. All the required processes for an on-line condition monitoring system is done and data is monitored to the user via a control PC.

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## Description

VIBRORACK1000 acquires vibration data or process parameter values from the transducers and records data on a remote condition monitoring system server or database for storage, trending, early fault detection and alarming. The hardware may be installed in a robust enclosure close to the machines as a field monitor even in ATEX Zone II areas, or it can import vibration signals from buffered outputs of an existing protection system located in an instrument cabinet. Data is transmitted via LAN connection at user-defined intervals.

## Specification

**Input Type:** a wide range of sensors can be used directly or indirectly via corresponding transmitters as input channels:

- ICP® / charge mode accelerometer
- Displacement Sensors
- Velocity Sensors
- KeyPhasor®/ Tachometer
- Other voltage/current driven sensors

**Signal Conditioner:** Amplifier/integrator to obtain velocity or displacement response by integration

**Frequency Response:** 0.1 Hz to 10 kHz (Optional)

### Environmental

**Operational Temperature:** 0°C to +65°C (+32°F to +149°F)
**Storage Temperature:** -40°C to +85°C (-40°F to +185°F)
**Humidity:** 0% to 95% non-condensing

### System Compatibility

**Monitoring Software:** Vibro-CMS Software, MDS Software (Machinery Diagnosis Software)
**Modal Analysis Software:** VibroModal , ICATS, ARTEMIS
**Acoustic Analysis:** Pulse Sound Quality Software
**Compatible with 3rd party protection monitoring systems like:**

- Bently Nevada (7200 model)
- Bently Nevada (3500 model)
- Bently Nevada (3300 model)
- Cemb
- Vibrometer (VM600)
- Schenck (Vibro Control 4000)
- etc

**Input Power:** 220VAC

❖ **In parallel mode, KeyPhasor® sensors may all be connected to VIBRORACK1000, but in direct mode, only one of 8 channels may be assigned to KeyPhasor® probe**.

**Anti-Alias:** Root raised cosine linear phase 10th order lowpass filter

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## Physical

| | |
|---|---|
| **Housing:** | Aluminum Alloy |
| **Weight:** | 2Kg |
| **Dimension:** | 48*9*27 cm |
| **Input Channels:** | 8 channels |
| **Input Connector:** | Screw Terminal |
| **Mounting:** | 19" Rackmount |
| **Resolution:** | 12bit |

## Electromagnetic Compatibility:

EMC and Safety Certificate

**EMC (IEC61000-6-2,IEC61000-6-4)**

- Radiated Emissions
- Burst Test
- Surge Test
- Electrostatic Discharge Immunity Test
- Power Frequency Magnetic Field Immunity Test
- Voltage Dips and Short Interruption Immunity Test
- Conducted EMI Measurements

**Safety (IEC61010)**

- Protection against Shock
- Protection against Hazards
- Resistance to Mechanical load
- Temperature limits and fire protection
- Protection against Hot Temperature
- Protection against Humidity and liquids
- Lock Test

## Waveform Sampling

| | |
|---|---|
| **Coupling**: | DC/AC/Current |
| **Input Range**: | ±2.5 V with up to ±25 Vpk-pk |
| **Sampling Method:** | Synchronous sampling (simultaneous) |
| **Sampling Rate*:** | From 1 KHz to 10 KHz per channel (Anti-alias filtered) |
| **Number of Samples*:** | From 1000 to 100000 per channel |

**Over Voltage:** 30 V Pk-Pk

## Data Transfer from VibroRack1000*

**Supported Protocol:** TCP/IP protocol encapsulating

## Data Transfer from Server

**Communication Standard:** RS-485 or RS-232 with ModBus protocol

**Supported Data**: 1X, 2X, DC Gap, all vibration overall data and RPM values for all 1Keyphasor inputs

**Current Output:** 4-20mA $0.37\frac{mA}{mm/s}$

**Buffered Output**: for connection to portable data collectors

**Adjustable Full Scale Range:** Single Turn Potentiometer (0-100% Full Scale Range)

**Accuracy:** Input: 0~2.5 v , Accuracy (%FSR) ±1LSB: 0.05

**Dynamic Range:** 0,6,14,20 dB

**(*) These items are most significant features of VIBRORACK1000 device.**

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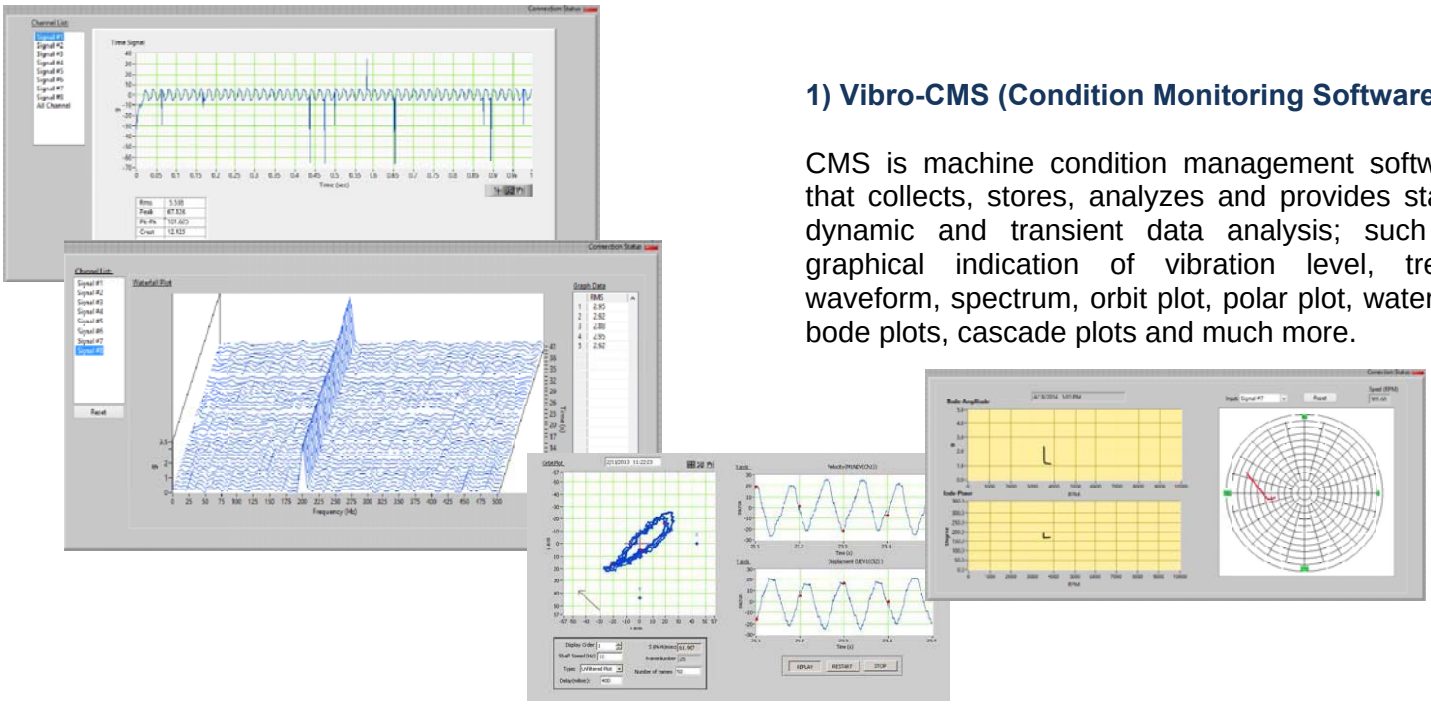
# Software

A variety of software modules are developed and may be optionally installed on VibroRack-1000based on the customer needs. A brief description of the software modules available for VIBRORACK1000 is defined as the following:

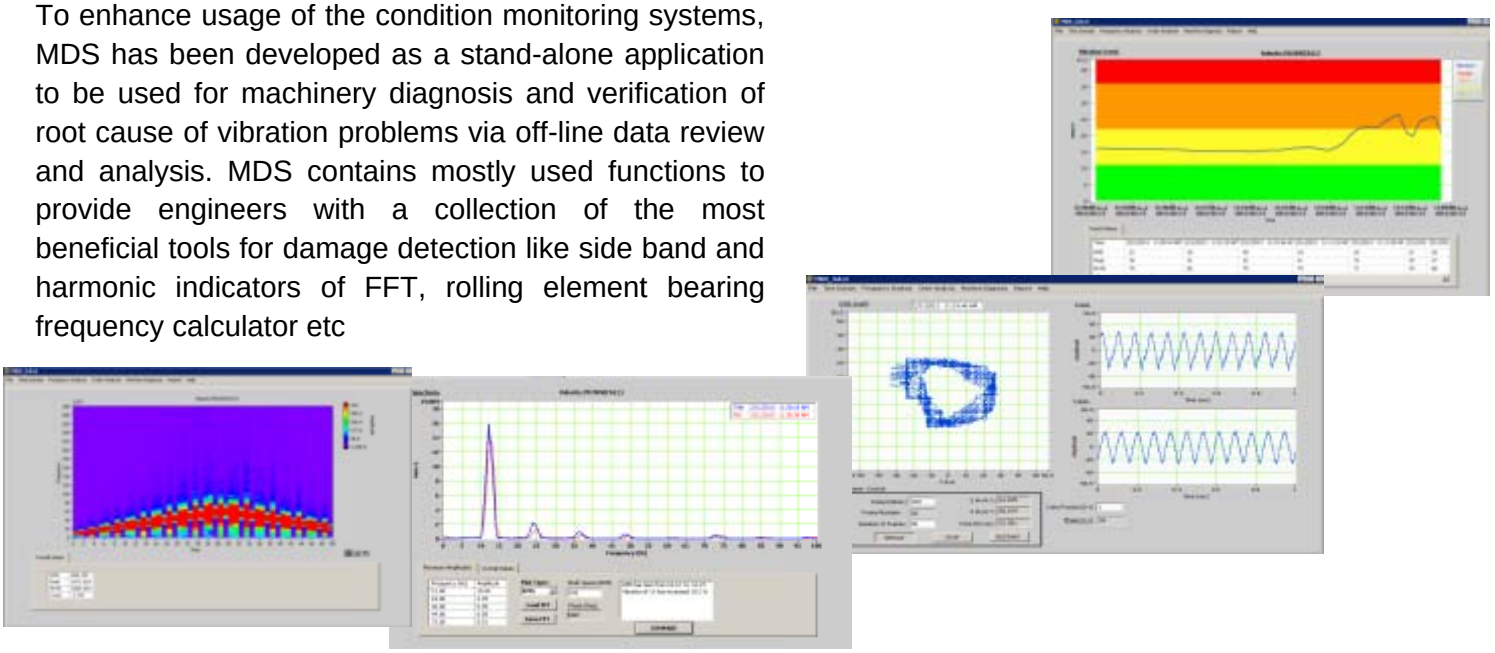


## 1) Vibro-CMS (Condition Monitoring Software)

CMS is machine condition management software that collects, stores, analyzes and provides static, dynamic and transient data analysis; such as graphical indication of vibration level, trend, waveform, spectrum, orbit plot, polar plot, waterfall, bode plots, cascade plots and much more.

## 2) Vibro-RMDS (Rotary Machine Diagnostics Software)

To enhance usage of the condition monitoring systems, MDS has been developed as a stand-alone application to be used for machinery diagnosis and verification of root cause of vibration problems via off-line data review and analysis. MDS contains mostly used functions to provide engineers with a collection of the most beneficial tools for damage detection like side band and harmonic indicators of FFT, rolling element bearing frequency calculator etc



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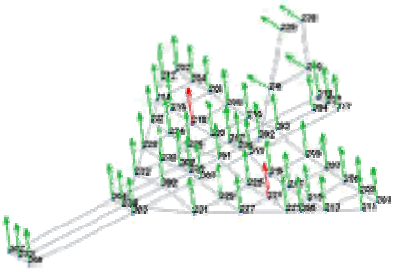
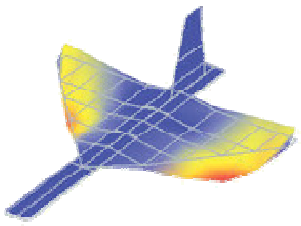
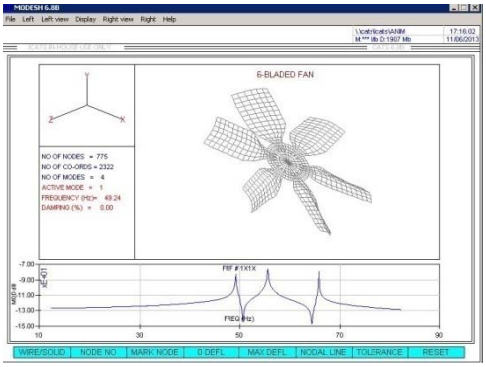
## 3) Vibro-Modal

VibroModal is software developed for the measurement of frequency response function during an impact test. It calculates H1, H2 or H3 FRF with Force/exponential, Hanning, Hamming or other user defined window function. Moreover, it calculates and displays coherence, FFT, time waveform for every input. FRF measurement files are saved in formats compatible with ICATS modal analysis software and ARTEMIS operational modal analysis software.

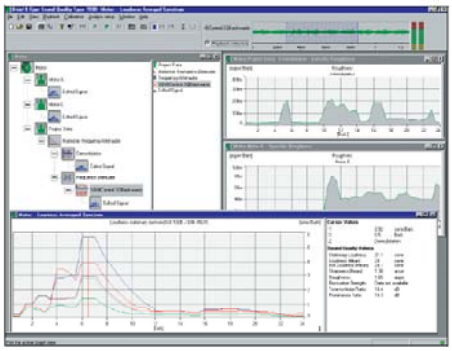


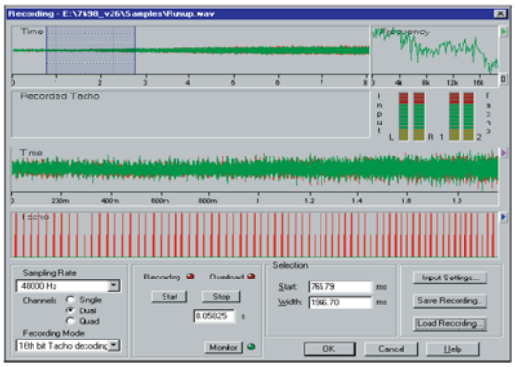





## 4) Acoustic Analysis

Acoustic analysis software consists from two wizards recorder and analyzer, Sound recorder records sound from microphones connected to VibroRack-1000 in .wav files. Acoustic analysis is done in Pulse sound quality software capable of performing sound harshness, loudness, roughness analysis. Octave band analysis, demodulation and sound level measurement is also included in the software.



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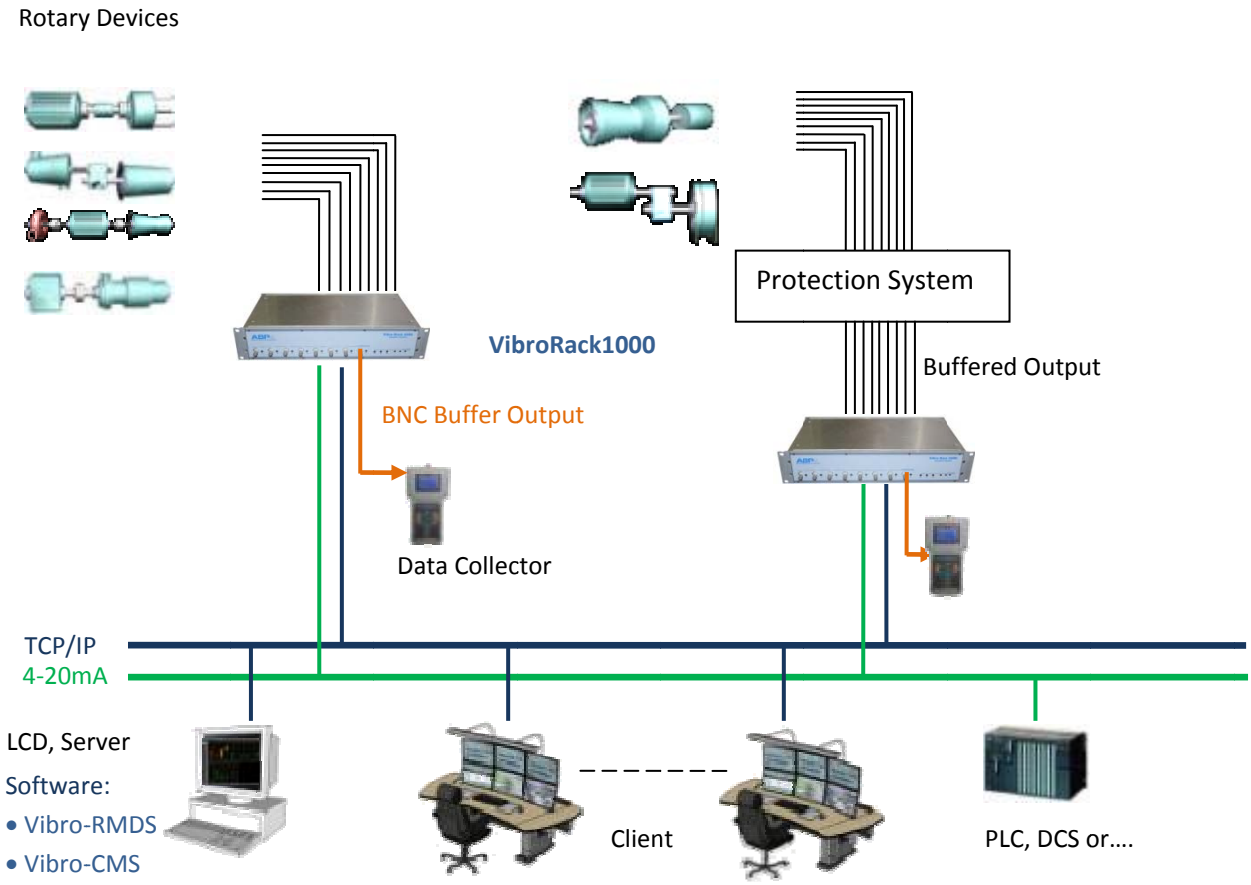
# VIBRORACK1000 System Configuration

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