



Association VAST - winner of the  
Main All-Russia public award  
"Russian National Olympus"  
as an "Outstanding Small or Medium  
Business Enterprise" for the 2003 year



Vibration Analyzer  
Data Collector

**DC-12M**



# DC-12M

Data collector and vibration analyzer  
Multipurpose instrument for condition monitoring,  
diagnostics, and balancing



## ACCELEROMETERS AND SENSORS

The DC-12M works with a variety of sensors such as accelerometers (charge, ICP, etc), clamp-on current, etc. Accelerometers have different designs and can be mounted permanently or temporarily on a magnet



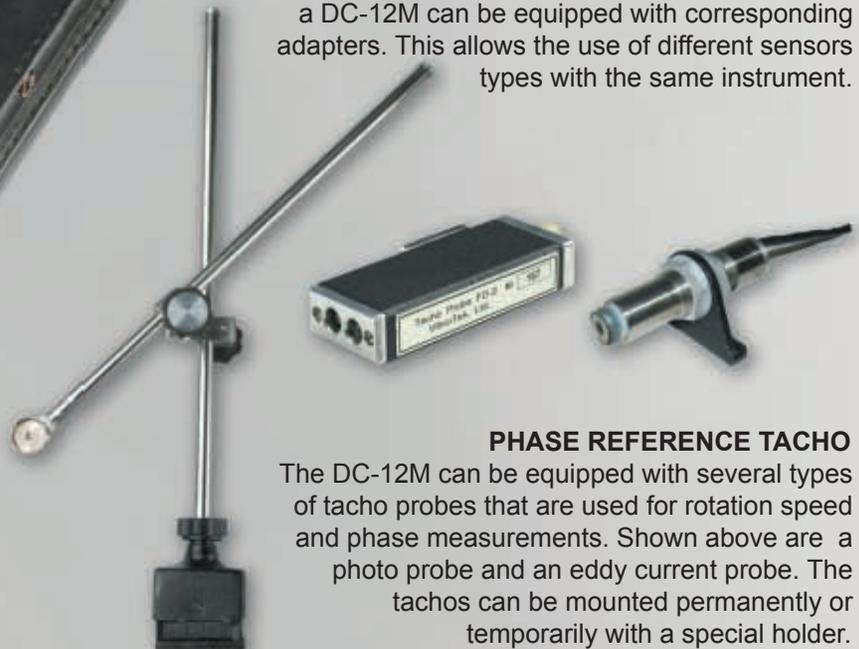
## SENSOR ADAPTERS

Depending on the sensor types used, a DC-12M can be equipped with corresponding adapters. This allows the use of different sensor types with the same instrument.



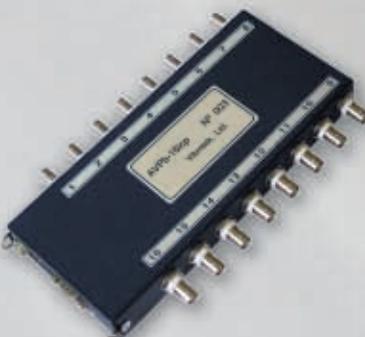
## HEADPHONES

The DC-12M has an audio output. Headphones can be used for audible monitoring of the signal from sensors. This is an oldest and simplest way to estimate machinery condition and search for the noise source.



## PHASE REFERENCE TACHO

The DC-12M can be equipped with several types of tacho probes that are used for rotation speed and phase measurements. Shown above are a photo probe and an eddy current probe. The tachos can be mounted permanently or temporarily with a special holder.



## MULTIPLEXERS

Two types of multiplexers can be used with the DC-12M. On the left is a 16 channel with internal battery that supplies constant power to all accelerometers, thus switching channels with no sensor switch-on or settling time delay. It can be used for 16 channel amplitude-phase-RPM measurements for run-up/coast-down measurements. On the right is a simple 8/16 channel multiplexer that powers accelerometers from a DC-12M. When equipped with multiplexers, the DC-12M can work as part of an on-line system for monitoring and test stand applications.



# DC-12M is designed to meet all the requirements for condition monitoring and balancing applications. It is expandable in functionality by firmware upgrades

DC-12M® is a fully digital spectrum analyzer and data collector. It is used for:

## Condition monitoring and diagnostics

- time wave form (oscilloscope mode)
- vibration levels in different frequency bands according to ISO standards, RMS, true peak, peak-peak
- autospectra
- envelope spectra selected by multiple band pass filters
- rotation speed
- amplitude and phase of rotation speed and its harmonics

## Rotor balancing

- 3-plane balancing
- 8 measurement points
- balancing using known influence coefficients without trial runs (trim balancing)
- utilities for trial weights estimation, summing, and splitting weights

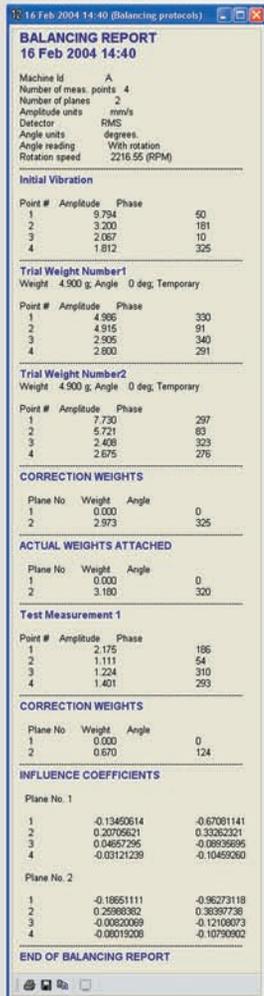
## Test diagnostics

- RPM/amplitude/phase characteristics during machine run-up/coast down (up to 16 channels simultaneously)
- modal analysis, logarithmic coefficient of damping for certain frequencies.



# Vibro12 is application software that is included in the DC-12M package. It supports all features of the DC-12M and provides database and analysis tools

# Vibro12

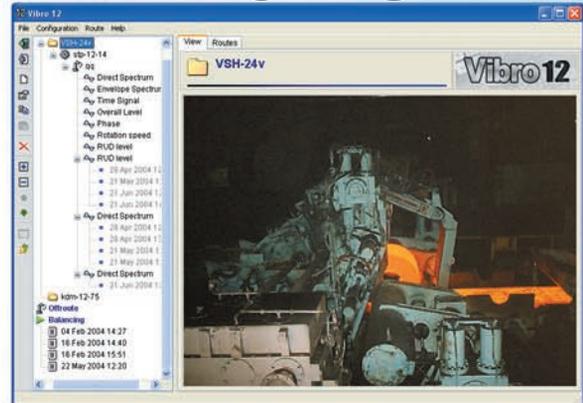
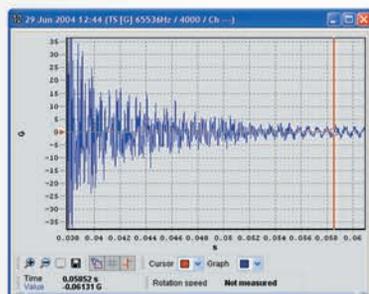


## USES

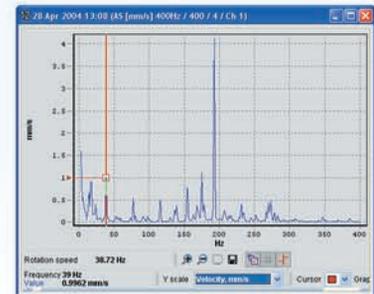
Vibro12 is designed for the DC-12M vibration analyzer database support with hierarchy tree, configuration of machines, measurement points, routes for measurements and provides standard means of data analysis. All data you collect with the DC-12M you can unload to Vibro12, including balancing protocols. It has a user friendly interface - for each machine point or route you can attach a picture or drawing to make it easier to distinguish your objects in field.

## DATA ANALYSIS

A complete balancing report, automatically generated in the DC-12M, and unloaded to the Vibro12 is presented on the left. You can see all the steps of balancing procedure. The influence coefficients can be used for future trim balancing.

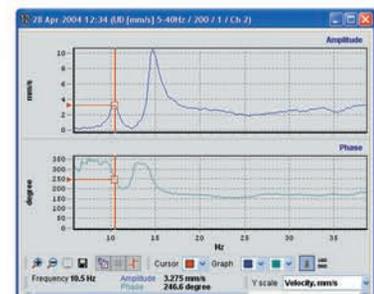


A typical autospectrum analysis window is presented on the right. You can choose any of the amplitude units for display. If the rotation speed was measured Vibro12 displays it with any measured data.



A shock response for the modal analysis is displayed on the left. From this time domain data, both Vibro12 and DC-12M calculate spectra and damping decrement.

On the right is an example of run-up amplitude and phase dependency on RPM.



## DC-12M specifications

### Input

Sensor types	ICP® accelerometer charge accelerometer current clamps phase reference tacho (TTL)
Frequency range	0.1 - 25600 Hz
Frequency response (+/-0.5dB)	0.5 - 25600 Hz
Linear input signal range	1 uV - 3 V
Gain	auto, 0-54 dB in 6 dB steps

### Vibration parameters

Measured magnitudes	displacement, velocity, acceleration, peak-factor
Detector	RMS, true peak, peak-peak
Frequency bands for vibration	
ISO standard:	2..1000, 10..1000, 10..2000 Hz
additional:	2..200, 3..300, 5..500, 10..5000, 5000..10000, 10000..25000 Hz
Vibration range	
acceleration	from 0.02 up to 1000 m/s <sup>2</sup>
velocity	from 0.01 up to 1000 mm/s
displacement	from 0.1 up to 10000 um

### FFT spectra

Frequency span	25, 50, 100, 200, 400, 800, 1600, 3200, 6400, 12800, 25600 Hz
Frequency resolution	400, 800, 1600 lines
Dynamic range	70 dB or better
Number of linear averages	1-256
Weighting function	Hanning
Scale type	Linear or Logarithmic
Envelope detector with passband filters	
1/3 octave:	800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6400, 8000, 10000, 12800, 16000, 20000 Hz
1/1 octave:	8000, 16000 Hz

### Amplitude and phase measurements for balancing

Rotation speed range	0.5-1700 Hz (30-102000 RPM)
RPM error	+/- 1%
Phase error	+/- 5 degrees
Amplitude error	+/- 1 dB
Automatic control	phase reference tacho signal parameters, reliability of measurements
Amplitude measurement units	G, m/s <sup>2</sup> , mm/s, um, in/s, mil (RMS, Peak, or Peak to Peak)

Internal power supply for  
phase reference tacho

5 V DC, 15 mA

### RPM-amplitude-frequency measurements for run-up/coast-down

Rotation speed range	0.5-1700 Hz (30-102000 RPM)
Frequency range	from 0.5 Hz up to 10xRPM
RPM resolution	up to 200 lines
Measurements are done on	1-10th harmonics of rotation speed

### General

Operation temperature	-20 / +50C (-5 / +120 F)
Weight	1.7 kg (in steel case)
Dimensions	50(W) x 225(L) x 45(H) mm
Operation time on batteries	10 hours or more
Battery full charge time	2 hours
Power management	Adjustable auto shut down Adjustable auto backlight switch off RS-232,
Interfaces	optional parallel interface for printer
Data storage capacity	400-800 lines spectra - 800 1600 lines spectra - 400

## DC-12M standard accessories

The following accessories are included in the DC-12M kit



DC-12M in the leather case, accelerometer with magnet, 1.5m cable and corresponding adapter, additional 5m cable, tacho probe with 1.5m cable, additional 5m cable, tacho holder mount with magnet, charger, communication cable.

The DC-12M kit is supplied in a nylon bag.

## DC-12M auxillary accessories



Different types of multiplexers and switchboxes for on-line, test stand, balancing, etc. applications.



Different types of sensors including current clamps, eddy current tachos, accelerometers, cables, adapters.



Headphones for audible monitoring of the signal from sensors.

## DC-12M firmware and software options

### Firmware options

VBal\_int balancing firmware. 1-3 balancing planes, 8 measurement points  
SHOCK modal analysis firmware

### Software options

VBal\_PRO balancing software. 16 balancing planes, 64 measurement points  
DREAM software for condition monitoring, automatic diagnostics, long term condition prediction



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