

# VibroDAQ2 Advanced 16 bit System for Balancing and Vibration Analysis

## MAIN FEATURES

- dynamic one and two-plane balancing of rigid rotors in-place and on balancing stand
- machine technical evaluation based on vibration measurements
- innovative digital measurements method with 16 bit resolution
- two independent measurement channels
- laser speed sensor
- operation with full range of vibration sensors: accelerometric, velocity and displacement
- grinding wheel balancing directly on the grinder
- measured rotational speed range 0,1Hz - 10kHz
- sampling rate range: 10Hz – 200kHz
- buffer length: 16k or 32 x 16 bits per channel
- synchronous and asynchronous spectrum analysis
- correction mass division
- multi-language user interface
- Possibility of work with all types vibration sensors
- strong and esthetic metal case

VibroDAQ2 is fully digital instrument adjust to work and powerd with PC computer via USB interface. The tool allows for one-plane and two-plane balancing as well as analysis of vibrations. It offers in-place balancing without disassembling of the rotor what reduce costs and time of operation.

Construction of VibroDAQ2 system is based on DSP technology and 16-bit A/D converters and allows for very high precision measurements. Technical state of the machine may be determined using FFT spectral analysis. Graphically presented results and easy to use software makes balancing process simple and quick. As far as the balancing procedure is concerned, user has to make two (one-plane balancing) or three (two-plane balancing) very simple measurement steps to get proper result and get precise location and size of correction mass. Whole measurement process is very simplified, so the user is informed what he has to do online on the computer screen. Graphical chart of the vibrations and spectrum analysis view is also available. The software provides many additional features: balance tuning - eliminates errors in placement of correction mass, correction mass division for balancing of propeller fans, balancing of grinding wheels directly on the grinding machine.



## IN-PLACE AND STAND BALANCING

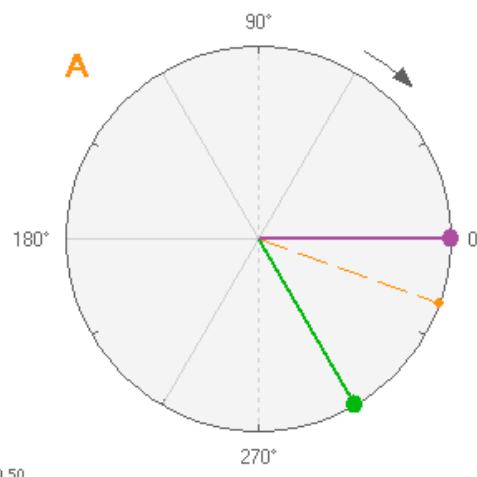
VibroDAQ2 is universal systems which allows for balancing in-place and stand balancing as well. The stand balancing is made on special kind of mechanical stands, especially done for balancing purposes. Balance stands are used in production cycle of different detail like engines, automobile wheels, abrasive wheels, fans and many other parts of different devices. In-place balancing is made in place of rotor placement during his normal working process. This very accurate way of balancing since it compensates unprecise rotor mounting possibility. So, it eliminates so called technological unbalance, which can be appeared during mounting the rotor in the bearing system. In the case of in-place balancing of abrasive wheels, special kind of balancing head can be used. VibroDAQ2 includes special kind mathematical procedures to speed up the process. In-place balancing saves also time and money needed for disassembling rotor and putting him on balancing stand.

## EXTERNAL CONTROL JUNCTION

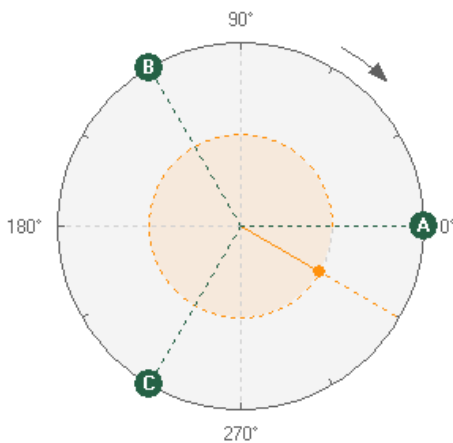
External control junction placed on the back side of device can used in automated balancing process to controlling external units, like drill machine and others. This can programmed individually on customer request.

## CORRECTION MASS VECTOR DIVIDING

Correction mass vector dividing is mathematical procedure which divides the correction mass calculated by VibroDAQ2 on given number of parts. This is very useful, during balancing rotors like fans etc., where the placement of correction mass are limited only for blades of the rotor. The number of rotor blades can be defined in the software, so the user has many possibilities of making comfortable mass placement for him. VibroDAQ2 can calculate mass placement around heavy point and it can calculate the correction drilling also around light point of rotor.



Measurement result			
Operation	Mass [g]	Angle [deg]	Unbalance [%]
Measurement	+0,35	340°	100%
Division	+0,14	300°	
Division	+0,26	360°	



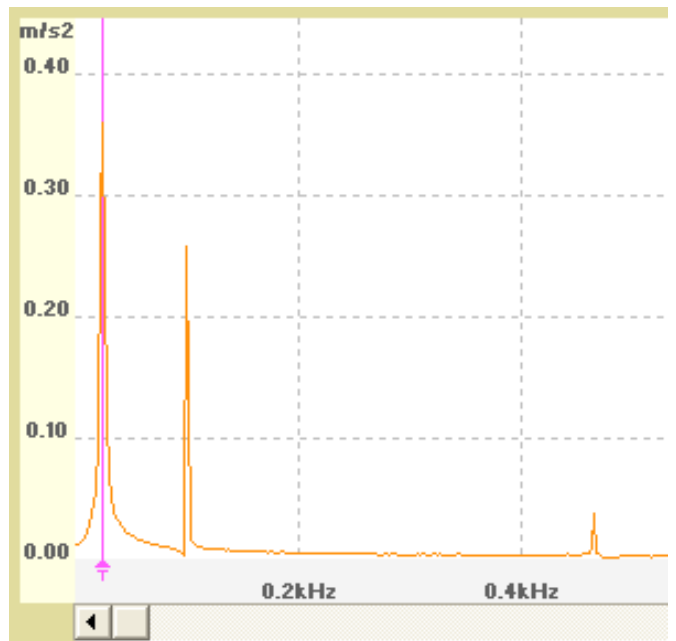
- uniform arrangement of balance weights						
Amplitude [m/s <sup>2</sup> ]	Phase [deg]	Unbalance [%]	Correction mass location			
			A	B	C	
0,500	330°	100%	0°	120°	240°	
			45°	120°	240°	

## SYNCHRONOUS AND ASYNCHRONOUS SPECTRUM ANALYSIS

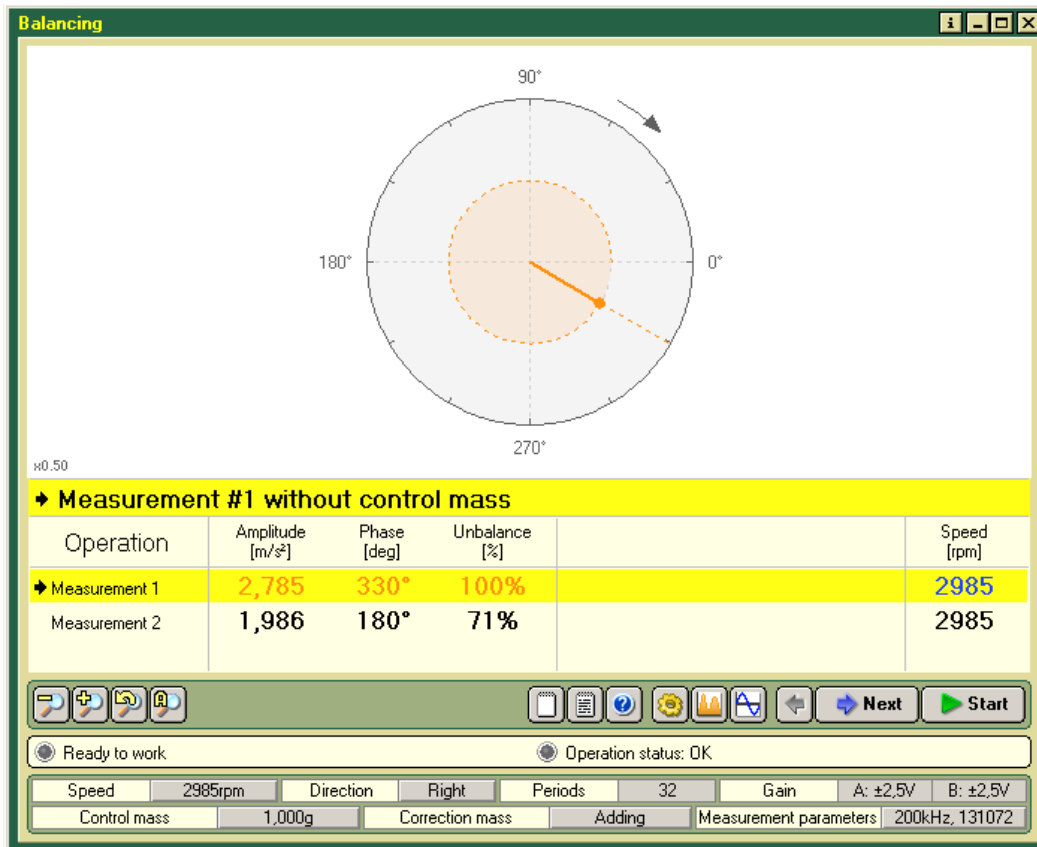
VibroDAQ2 allows synchronous and asynchronous FFT vibration spectrum graph displaying. The difference between synchronous and asynchronous spectrum graph is that the first one is made synchronously to the rotor speed (required laser sensor usage) and second one does not need to have laser sensor, only one vibration sensor has to be used. Synchronous measurement allows to observe vibration harmonics in relation to rotor turns. In the case measured angle values are correct.

## GRINDING WHEEL BALANCING

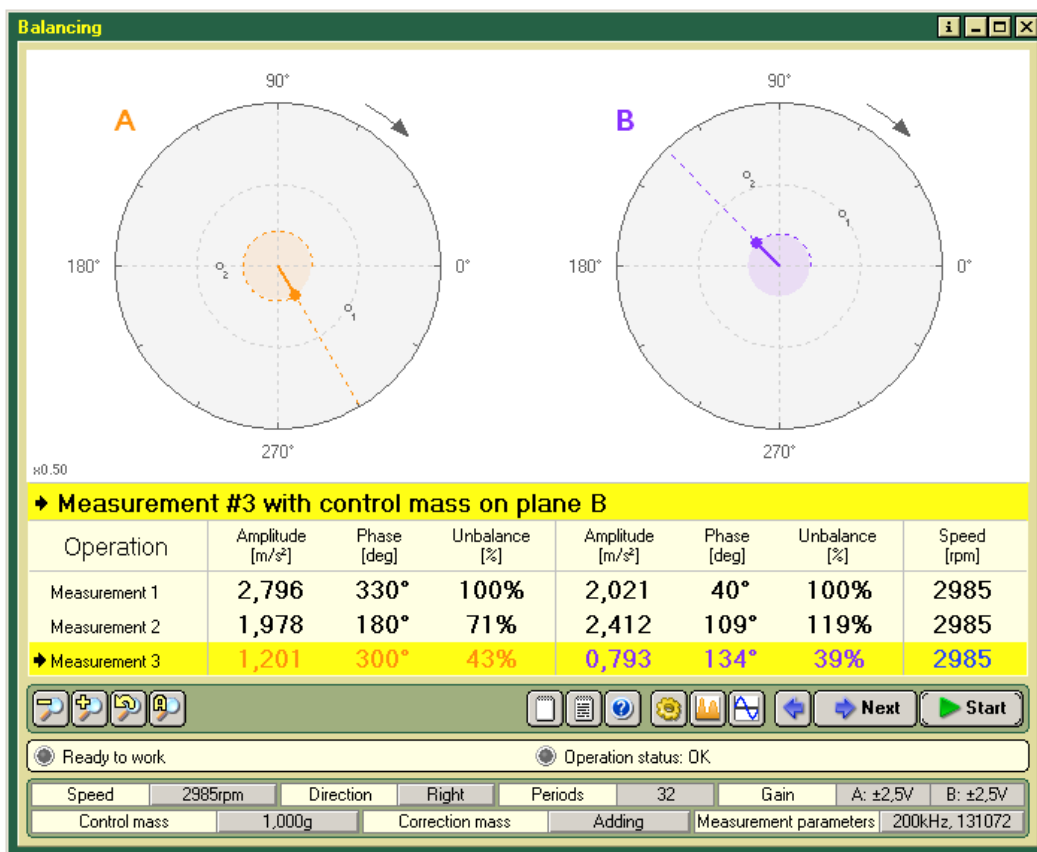
VibroDAQ2 is equipped in mathematical procedure allowing cooperation with so called balancing head. Almost every grinding machine is equipped with balancing head, which allows the user easy in-place or stand balancing procedure making. In case of grinding machine in-place balancing process should be applied, so as to be able proper accuracy to be achieved. Normally, the grinding wheels should be balanced by wheel manufacturer, but during grinding process the wheel should be balanced by user as well, as often as required to archive proper surface smoothness of material.



# VibroDAQ2 - Example Screen Shots

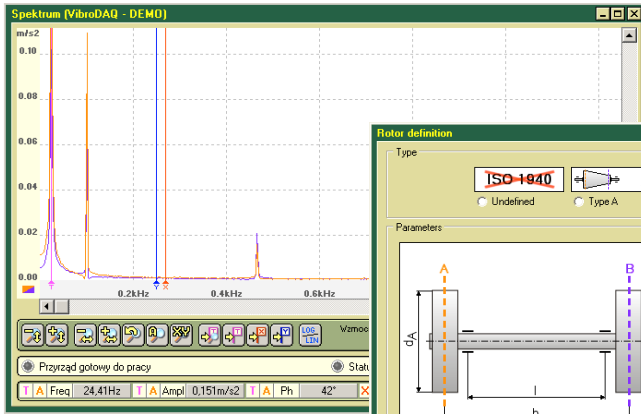


Picture1. One plane balancing.

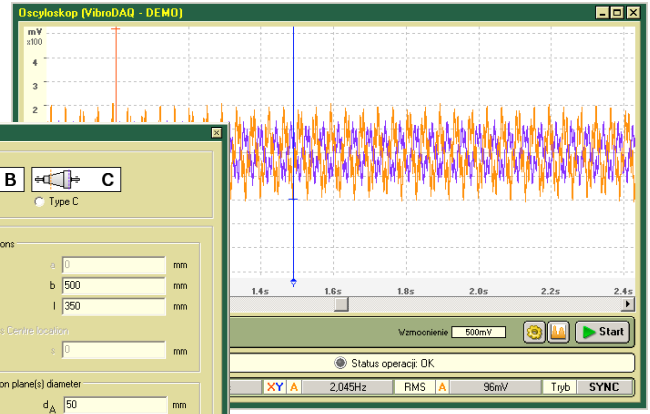


Picture2. Two planes balancing.

Picture3. FFT vibration spectrum.



Picture4. Vibrations in time domain.



Picture5. Rotor balancing according to ISO standards.

Cement factory, 2008-01-28

### Balancing report

Machine type	Engine 2KW
Component name	Fan
Weight	1,500kg
Quality grade	G16
Work speed	2500rpm
Type	Two planes

**Process flow**

Measurement #1 without control mass

Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Speed [rpm]
0,501	330°	100%	0,358	40°	100%	1400

Measurement #2 with control mass on plane A

Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Speed [rpm]
0,357	110°	71%	0,429	270°	120%	1400

Measurement #3 with control mass on plane B

Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Amplitude [m/s²]	Phase [deg]	Unbalance [%]	Speed [rpm]
0,215	300°	43%	0,143	135°	40%	1400

**Measurement result**

Mass [g]	Angle [deg]	Unbalance [g mm]	Mass [g]	Angle [deg]	Unbalance [g mm]
+0,35	340°	17,41	17,41	23°	76,26

**Tuning 1**

Mass [g]	Angle [deg]	Unbalance [g mm]	Mass [g]	Angle [deg]	Unbalance [g mm]	Speed [rpm]
+0,07	325°	3,534	+0,32	267°	37,25	1400

**Tuning 2**

Mass [g]	Angle [deg]	Unbalance [g mm]	Mass [g]	Angle [deg]	Unbalance [g mm]	Speed [rpm]
+0,04	281°	2,008	+0,22	259°	25,42	1400

**Tuning 3**

Mass [g]	Angle [deg]	Unbalance [g mm]	Mass [g]	Angle [deg]	Unbalance [g mm]	Speed [rpm]
+0,06	334°	2,757	+0,21	272°	24,63	1400

**Balancing result**

<b>Final unbalance</b>	<b>2,757 [g mm]</b>	<b>24,63 [g mm]</b>
<b>Permissible residual unbalance</b>	<b>32,09 [g mm]</b>	<b>32,09 [g mm]</b>
<b>ISO1940 legal</b>	<b>Yes</b>	<b>Yes</b>

**Parameters**

Sampling rate	10kHz
Buffer size	5000
Control mass	1,000g
Vibration sensor	Sensor I Acceleration 560,0 [mV/(m/s²)] 0,1Hz - 2,5kHz

Date: 2008-01-28  
 Processing unit: RK-SYSTEM  
 ul. Chelmonskiego 30  
 05-825 Grodzisk Mazowiecki  
 POLAND  
 tel. +48 22 724 30 39, +48 22 755 89 83  
 Operator: John Doe  
 Operator's signature: .....

RK-SYSTEM, VibroDAQ - Universal vibro-balancing system

Picture6. Balancing report view.

## MORE INFO

### MANUFACTURER:

#### RK-SYSTEM

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 05-825 Grodzisk Mazowiecki  
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 email: rk-system@rk-system.com.pl  
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## STANDARD SET

- VibroDAQ 2 instrument
- Laser rotation detector
- Holder for laser detector
- Two vibration sensors with magnetic stands
- CD with software
- USB cable
- Carry case for instrument and accessories