



Vibration Analyzer

VibroBalancer
VB95

CATALOG / 2017



Vibration severity assessment against ISO standard levels, condition monitoring and diagnosis in the field.



Fast and easy Measurement, Diagnosis and Balancing.

VB95 is a two channel portable vibration analyzer developed by Tavator Sepahan Co (TSC) for condition monitoring, fault diagnosis and field balancing of rotating machine on plants. VB95 is suitable device for oil, petrochemical, power plant, steel, cement ... industrial plants. By collecting modern mechanical technologies in vibration analysis, electronics in measurement, processing and display, as well as computers in analytical algorithms, we tried to get the honor of producing the first Iranian portable vibration analyzer. This device can be used for vibration measurement, troubleshooting and balancing of all rotating equipment, including electric motors, generator, turbines, pumps, fans, compressors, etc.

In addition to using common measurement and displays, the VB95 also uses special innovative machine animation technique. In this method, low frequency faults are easily diagnosed in the site. The ability to call standard warning and danger vibration limits makes it very easy for the user to assess machine vibration. Amplitude and phase measurement by averaging methods, in addition to increasing the accuracy and speed of balancing jobs in the site, have also made phase analysis simple and accurate. The robust aluminum box, full color screen and polycarbonate keyboard and the use of quality connectors make this device suitable for industrial environments.

VB95 features:

- Modular design, you can add modules whenever you want.
- Frequency range: 0.5 Hz ~ 20 KHz
- Dynamic range: 0.05 ~ 200 mm/s rms
- Storage memory: 2GB
- ISO 2372 vibration severity standard
- Filter with and without tacho
- Total vibration amplitude
- Displacement, velocity and acceleration
- BCU bearing condition
- Time waveform
- Frequency spectrum
- Shaft orbit shape
- Bearing orbit shape
- Single plane balance
- Two-plane balance
- Vector display
- Machine animation
- Run up and cast down analysis

For beginners and professionals

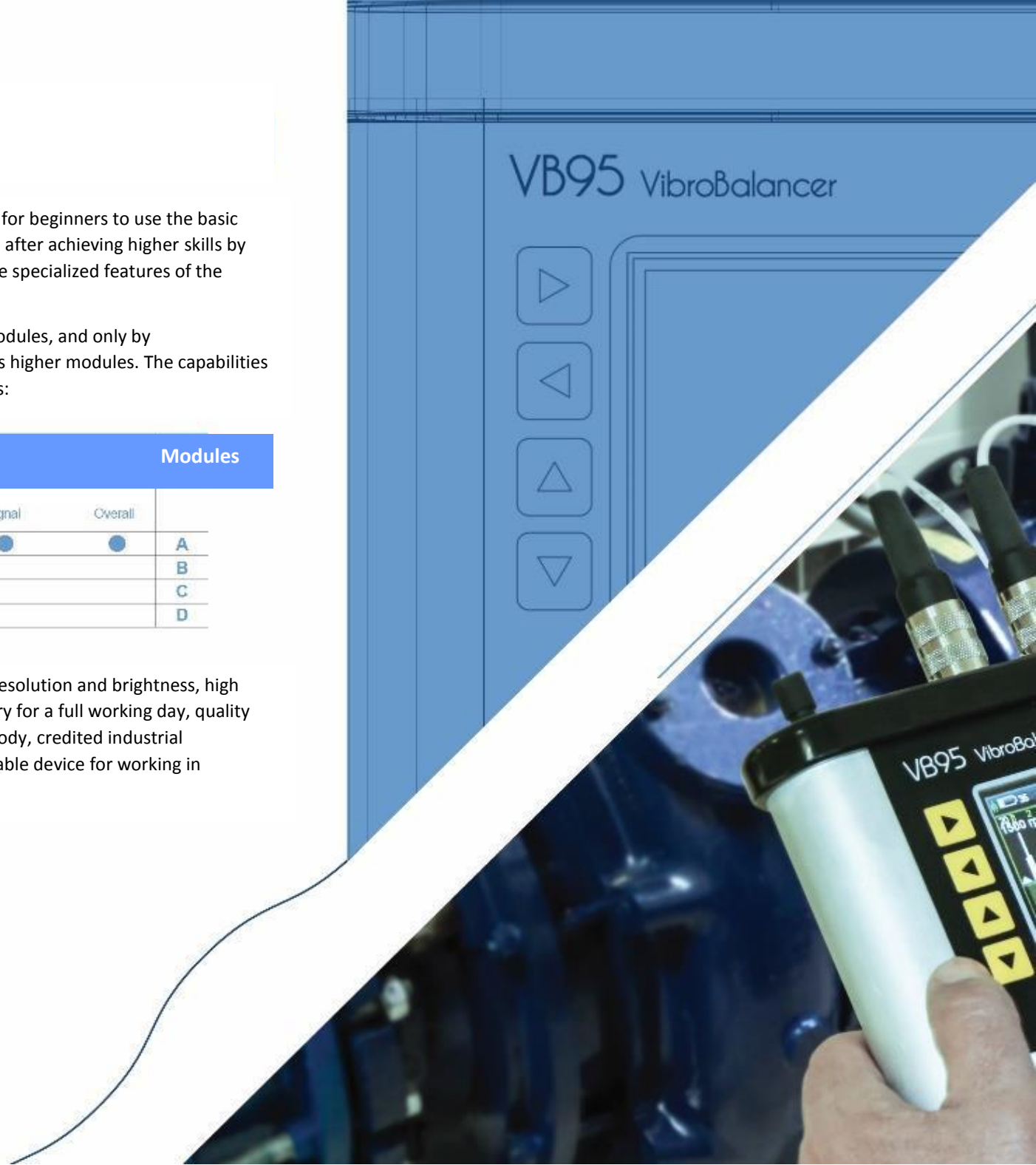
The modular design of the VB95 has made it possible for beginners to use the basic features of the device easily and at a lower price, and after achieving higher skills by ordering more advanced modules, they can use all the specialized features of the device.

No hardware changes are required to upgrade the modules, and only by reprogramming the device will it be possible to access higher modules. The capabilities of the device with different modules are as followings:

Analysis Levels						Modules
Turbo Balance	Animation	Run Up	Balance	Signal	Overall	
				●	●	A
			●			B
	●					C
		●				D

Combination of full color graphics display with high resolution and brightness, high quality sealed keyboard, rechargeable internal battery for a full working day, quality cables and industrial connectors, robust aluminum body, credited industrial accelerometers all together provide users with a reliable device for working in industrial environments.

VB95 VibroBalancer



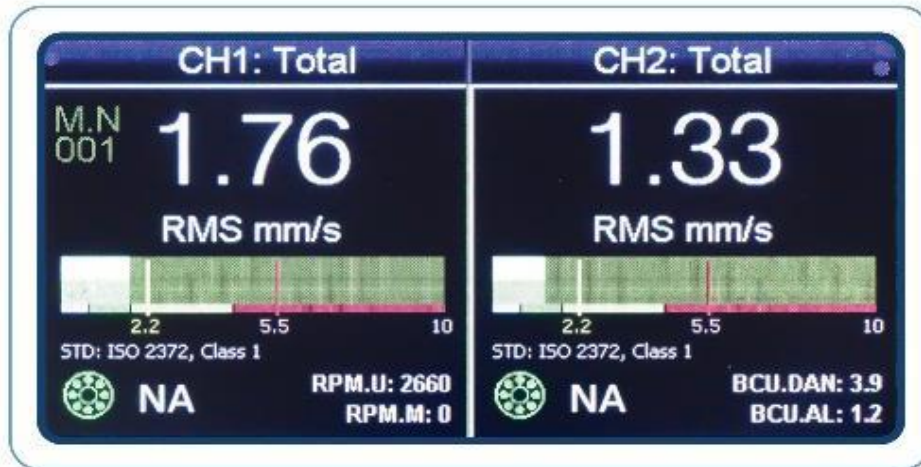
Unbalance detection in Overall display!

Hardware status LEDs

In VB95, three graphical LED are used for compression of each button, sampling and tachometer trigger action detections so that any hardware defects in the above cases can be seen and detected.

Internal battery

The VB95 has two internal batteries that, with each full charge, are able to provide the energy needed for one day operation without the need for power connection. The batteries are charged inside the device.



Vibration severity assessment according to standard levels

Total Vibration and standard levels

Vibration standards such as ISO 2372, ISO 10816, ISO 20816 are the criteria for evaluating the vibration of all machines. Overall vibration measurement in the range of 1 Hz to 1 kHz (10 to 10 KHz) in terms of velocity rms has made it possible to evaluate the vibration limits with this standard levels. The values of this standard are saved in the device and by selecting machine class, the user will have the four areas of the machine status and the relevant warning and danger limits.

These limits are displayed in colored areas with warning and danger limits in the bar graph form so the condition of machine will be graphically in front of the user's eyes.

Machine rotation speed

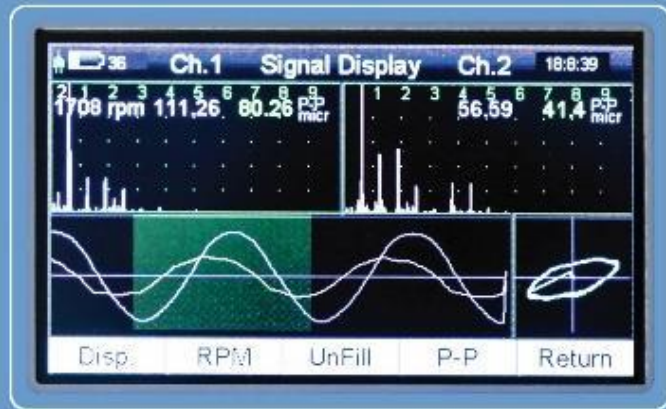
User can directly measure the rotational speed using tachometer sensor or enter it manually. Manually entering the speed is very useful in cases where it is not possible to measure with tachometer sensors. This feature enables user to scale frequency spectrum display based on rotational speed orders and simplify the analysis as much as possible, and in the total display he/she could be able to compare 1X amplitude against total vibration amplitude (even without tachometer sensor).

Averaging

In cases where the amplitude of the vibration fluctuates, it is very useful to use averaging to achieve repeatable measurements.

Simplicity and fast measurement

The VB95 has two vibration measuring channels and a tachometer measuring channel for rotational speed and phase reference.



Complete fault diagnosis tools

Detection and repairing the ongoing failures of bearings, gears, shafts, couplings, etc. can prevent further significant damages. Using VB95, it is possible to detect and trend defects in their initial stage, and by using the frequency spectrum, time waveform and orbit of shafts and bearings, the main root cause of vibration can be identified in the best way.

Bearing orbit

One of the most important applications in troubleshooting is the use of bearing orbit, which unfortunately has not been widely used so far. The VB95 is able to measure the motion of the bearing in two orthogonal directions and show its motion orbit by measuring the two seismic sensors (accelerometers) and integrating it.

1X Filtered and Unfiltered Orbit and displaying them simultaneously is a very useful diagnostic tool. VB95 is capable of displaying orbit even without a tacho sensor. One of the important features of this type of orbit display is detection of relative body motions without using tacho sensor. This is a great help in detection difference between imbalance, misalignment, coupling, shaft bending, etc.

All on one screen

Display of frequency spectrum, time waveform and orbit shape all in one screen provides the user with a complete view of the vibration condition of the machine.

Frequency spectrum

The most powerful diagnosis tool is the frequency spectrum, which allows troubleshooting with tools such as harmonic, order and zoom. Displaying rotational speed orders in the frequency spectrum that measured by tacho sensor or entered manually makes the task of fault detection analysis easier.

Time waveform

In many cases the frequency spectrum alone cannot able to detect defects. Here the displacement time waveform is a great help in identifying defects. VB95 provides displacement signal for diagnosis low frequency defects by measuring vibration velocity and integrating.

Shaft orbit

The most common method of journal bearing fault diagnosis with proxy sensors is to measure the movement of the shaft relative to the bearing, which is complemented by an orbit display. The VB95 has the ability to connect to proxy sensors transmitter or monitor output and display the vibration signal, time waveform, frequency spectrum and orbit.



Field Balancing / Easy and professional

Field Balancing

Most of the root cause of vibration in rotating machinery is related to rotor unbalance, and the fastest and least expensive way to solve this problem is to do on-site balance.

One-plane and two-plane balancing by applying trial masses and calculation of influence factor is the most common field balancing method. With this method, there is no need to dismantle the rotor from the machine and send it to the balancing shop, installation errors are compensated in the balance, and there is no limit to the dimensions and weight of the rotor.

The balancing process with the VB95 is very simple and routine. But the advanced features of the device allow the user to control the various steps for a professional balancing job. VB95 stores data step by step, and the calibration data of each balance can be retrieved at any other time.

Phase averaging

Phase averaging can increase imbalance vector calculation accuracy and is also very useful in distinguish between mechanical and electrical defects too. When there are more than one source of vibration such as vibration transmitted from other machine, phase averaging will be helpful. This method can easily replace the time averaging technique.

Balancing features

- Single plane balance
- Two-plane balance
- Fast and accurate calculation of amplitude and phase and averaging
- Polar display for different balance stages
- Table of different balance stages
 - Allowable unbalance value calculations according to ISO 1940 standard
- Correction mass decomposition and resultant
- Calibration storage for subsequent balances jobs
- Ability to change specifications in any stage
- Calculation of balance job success rate
- Speed changes protection during balancing steps
- Stage vector history.

Field Balancing



Run Up and Cast Down

Extraction amplitude and phase during starting and shutting down the machine

Running Up and Casting Down Analysis

Critical speeds and resonance characteristics of flexible rotors is one of the major challenges for large turbo machineries. Critical speed can be distinguished by recording the amplitude and phase of 1X vibration during startup at different speeds. The location of the amplitude peak and the 180 degree phase change show the critical speed of the rotor. Changing this speed can be a sign of a crack in the rotor.

In addition, some defects of medium size machines can be identified and distinguished from other defects in the analysis of start-up and shut down, such as unbalance from electrical faults.

One of the unique features of VB95 is the display of orbit in addition to amplitude and phase in different rotating speeds. This feature can provide useful information about the machine vibration behavior.



Machine Animation

Innovative approach in detecting bearings and shafts motion for low frequency fault diagnosis.

Phase Analysis

In many cases, low-frequency defects occurred in early rotational speed harmonics are confused with each other. Imbalance, misalignment, looseness, shaft bending, electrical defects are some of these faults. One of the most important challenges for vibration analysis experts is how to distinguish these defects from each other. The most common method of distinguishing these defects is phase analysis, in which the shape of the motion is estimated by measuring the amplitude and phase of different parts of the machine and bearings. The simplest method is to measure several horizontal, vertical and axial directions around the bearings and evaluate their phase changes with each other.

VB95 provides users with phase analysis information by determining the amplitude and phase in the common format.

Operational deflection shape (ODS)

In the machine structures vibration analysis, instead of simple phase analysis, the more advanced method of operational deformation shape (ODS) analysis can be led to more reliable result. In this method, by measuring the amplitude and phase of different points relative to a reference point, their ratio is obtained and entered in a software developed for animating measured points. User can see animation motion of structure and detect weak points or elements. In this method, user is only able to see the movements in specific harmonics 1X, 2X, 3X, .. and will not see the overall movement.

Machine animation

TSC develop an innovating technique to obtain the movement of the bearings and the deformation of the corresponding shaft. By measuring several point around the bearing, each bearing has three pairs and a total of 12 pairs of motion wave measurements. Using motion calculation algorithms, VB95 is able to display the slow-moving vibrating motion of the bearing and shaft of the two coupled machine in three dimensions. This method, although similar to ODS, but it is differs from it in that its focus on the deformation of bearings and shafts. The motion extraction method is also different from the ODS method and the motion processing includes all frequencies and harmonics and has been used to show the real bearing motion in three dimensions.



Tavator Sepahan Co
Street 12, No 308, ISTT, Esfahan, Iran
P.O Box: 8415683229
Tel: +983133932080, Fax: +983133932079

www.tavator.com

info@tavator.com