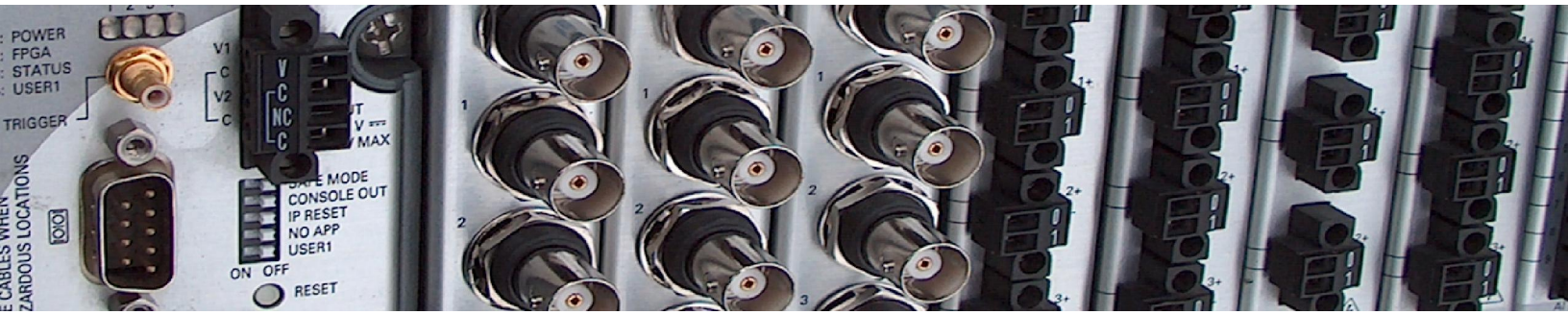
DIGITLINE

MONITORING, TESTING AND DIAGNOSIS EQUIPMENT AND SERVICES



DPP171215

DBX-40

ROTOR BALANCING EQUIPMENT

Rotor balancing methods are based on the relation between mass imbalance and the rotor response.

Even when this relation is nonlinear, if the balancing is done in small enough steps, it allows superposition theory based algorhytms to be applied: the sum of individual imbalance responses is equal to the response of the entire imbalance. Starting from this principle, the coefficient of influence method allows characterization of the machine-rotor assembly by quantifying the response to a set of calibration weights.

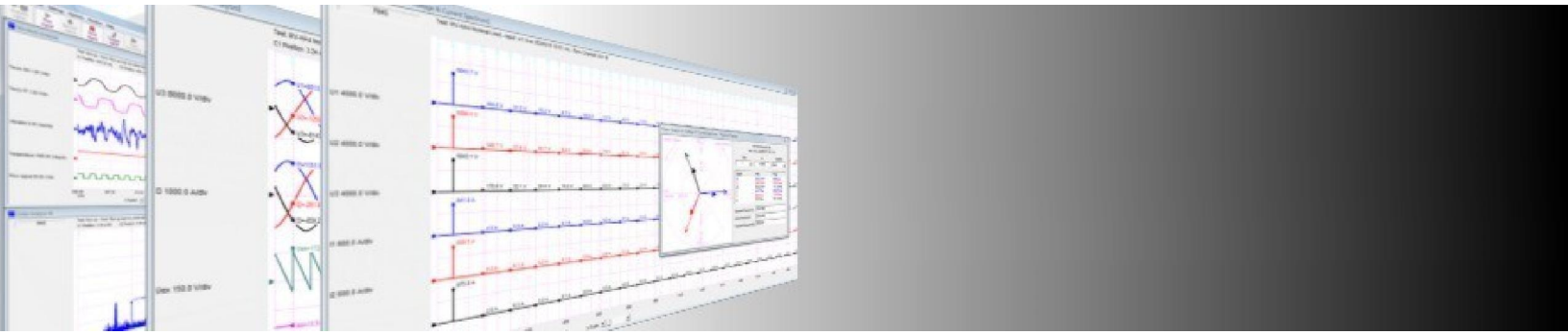
The result of the calibration consists of a series of numerical values known as influence coefficients.

For calibration of the balancing machine, in case of a new rotor, three starts are required in order to measure the initial vibrations and vibrations corresponding to the calibration weights successively mounted on the two planes.

Electrical cabinet

Balancing procedures following the calibration operation on the same rotor type can be performed by measuring only the current response (single start).

One of the main features of the measuring equipment used in rotor balancing is the sensitivity to the imbalance signal. This depends on the dynamic range, the sampling rate and the processing and analysis functions.

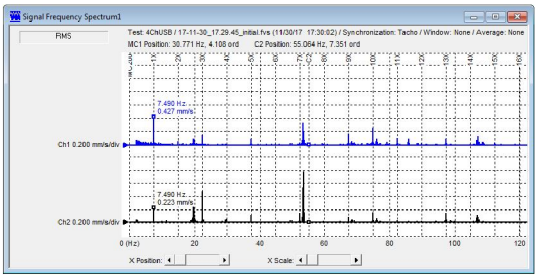


Characteristics

The DBX-40 is designed to accurately measure the imbalances and calculate the balancing solution by the influence coefficinet method.

It is composed of:

- Metal cabinet, 1 pc.
- Vibration transducers, 2 pcs.
- Speed and phase transducer, 1 pc.
- Angular position transducer, 1 pc.
- Data acquisition module, 1 pc.
- Angular position calculation module, 1 pc.
- Computing system, Windows operating system, balancing software, 1 pc.
- Touch-screen monitor, 1 pc.
- Cable and Connector Set, 1 pc

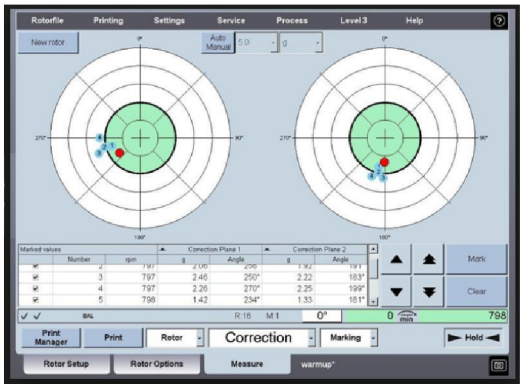


The frequency spectrum, synchronized with the tacho signal, indicates the exact level of the imbalance and the state of the balancing machine

The data acquisition is done with a 24-bit resolution, simultaneous sampling, programmable acquisition buffer in the range 1024 - 264144 S, adaptive sampling rate at the rotational speed and the constructive characteristics of the balancing machine (programmable in the range 1 – 12.8 kS / s / ch).

High resolution allows detection of vibration due to imbalance at very low levels.

The large acquisition buffer provides high frequency resolution, increasing the sensitivity of the machine to the imbalance signal by narrowing the bandwidth and thereby reducing the noise whose frequency is not strictly equal to the rotation frequency.



The operating interface displays in polar and table format, the current sequence, solution and balancing results

The DBX-40 software performs measurements in the frequency domain using Fast Fourier Transform (FFT). To increase the sensitivity to the imbalance signal, the frequency spectra of the measured vibrations are filtered by vector calculations. This type of filtering operates on the orthogonal components of the vibration vector and not directly on the vector, thus leading to

the elimination of parasitic components even inside the bandwidth (centered on the rotation frequency).

Variations in the rotational speed during a measurement result in a rise in the bandwidth on which the imbalance occurs and, as a result, produce a loss of useful signal energy in the side spectal lines (leakage FFT). To eliminate these losses, the DBX-40 software compute the instantaneous rotation speed profile and performs the necessary corrections so that the energy of the useful signal is constantly found within the same spectral line (see *Order Analysis*).

The effective value of an alternating signal is calculated, according to the definition, on an integer number of periods. A deviation from this condition also leads to the occurrence of the FFT leakage phenomenon. To eliminate this influence, an automatic adjustment of analysis buffer is performed so that it corresponds strictly to the integer number of cycles indicated by the tacho signal.

Since the rotor response, at the same mass imbalance, is dependent on the rotational speed, the balancing software monitors the speed value during the calibration / balancing operations and warns against deviations beyond the programmed limits.

The high frequency range provides the necessary support for the diagnosis of the machine by identifying its specific frequencies, shocks or frictions and automatic signaling of their level.

Specifications

- Input: - analog: 2 vibration, 1 tacho
  - pulse type: angular position measurement
- Resolution of analog digital converter: 24 bits
- Sampling type: simultaneous
- Acquisition rate: programmable in the range 1-12.8 kS / s / ch
- Self-adaptive anti-aliasing filters
- Frequency band: 5.12 kHz
- Frequency resolution: programmable in the range of 500 to 120,000 spectral lines
- Measurements and calculations in frequency domain and order domain
- Filtering in time domain: LP, HP, BP, FIR type with programmable order and frequency
- Filtering in frequency domain: vector averaging on a programmable number of spectra
- Calculation of calibration weights, recommendations for their value and position
- Calculation and display of influence coefficients
- Storing the influence coefficients in files, for each type of rotor
- Automatic or manual load of the specific influence coefficients for each balanced rotor type
- Options for weight type (add or remove) and distribution mode (continuous or discreet)
- Options for storing or removing calibration weights
- Calculation functions for changing radius, combining or splitting weights
- Warning at speeds outside required limits

- One or two planes balancing
- Static or dynamic solution
- Calculation of residual imbalance
- Calculation of quality limits according to applicable standards in force
- Metric or English measurement units
- Rotational speed monitoring
- Monitor the condition of balancing machine
- Warning when preset limits are exceeded
- Report generation
- Computing system: industrial PC type, Windows OS, balancing software
- Monitor: industrial touchscreen
- Power supply: 85-264 Vac/ 47-63 Hz, 120-370 Vdc, max. 1.5 A
- Storage temperature: -40 to +85 ° C
- Operating temperature: -10 to +55 ° C
- Ambient vibrations: 0.3 grms, 5 - 500 Hz, random
- Humidity: 20 - 90%, non-condensing

Documents:

- User manual
- Maintenance instructions
- Installation CD
- Quality certificate
- Warranty certificate
- Software licenses