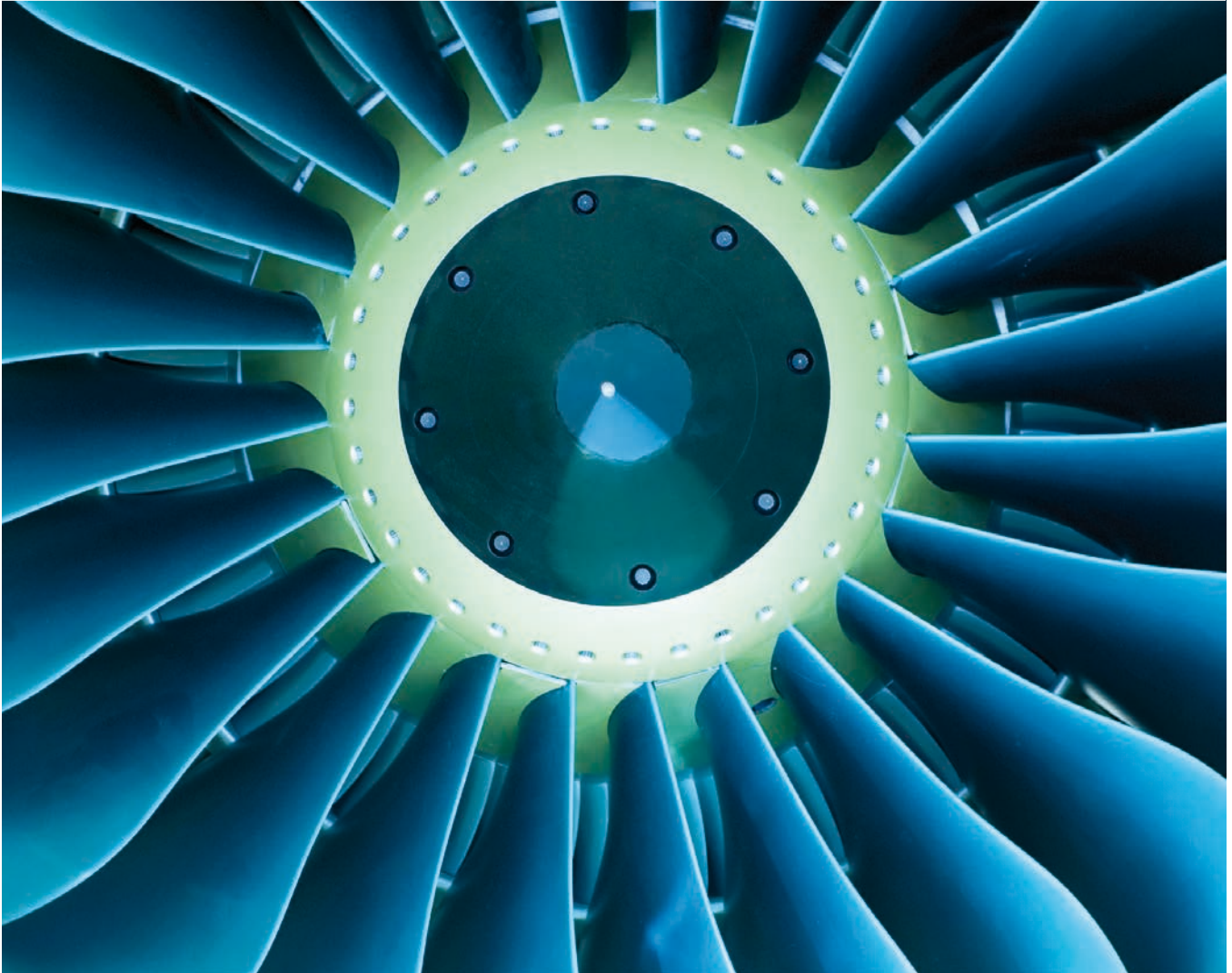


# Rotating Machinery Analysis



m+p Analyzer provides a complete package of data acquisition and analysis tools for capturing and understanding noise and vibration induced in rotating and reciprocating machines by their motion.

Fixed and variable speed machines are accommodated as are both structural vibration and condition monitoring diagnostics. Multiple tacho inputs can be processed for accurate speed tracking during analysis. Spectral mapping, order tracking, time history, orbit analysis, balancing and envelope analysis are all available.

## Spectral Mapping

A cost effective solution for investigating run-up and run-down vibration uses m+p Analyzer's real-time measurement

system and the built-in online and offline 3D waterfall and colour map viewer. Time-based capture of spectra can be augmented using an analog tacho input to provide RPM steps and if a tacho is not available, a simple tool will track using a dominant order response from the spectra.

XYZ + order cursors on the 3D chart read off RPM, frequency and amplitude information and the chart calculator computes order and frequency tracks directly from the waterfall data. Rotational and structural resonance components can be easily identified and quantified.

The advanced rotate module is fully synchronized to a tacho input for fixed RPM step analysis at any resolution and the analysis can accommodate the highest rates of change and high-speed machines.

## YOUR BENEFITS

- Flexible time, frequency and order domain analysis
- Narrowband and 1/3 octave analysis from vibration and microphone sources
- Analog and digital tachometer inputs to suit any available sensor
- Spectral mapping for simple identification of order and resonant responses
- Order tracking for detailed analysis
- Orbit analysis, 1 and 2 plane balancing, envelope analysis
- RPM and time-based measurements cover all variable and constant speed machines

The Throughput to Disc time history recording is useful for post-processing in difficult measurement conditions where the offline post-processing wizard includes a spline fit tool to overcome noisy tachometer signals followed by comprehensive spectrum and order tracking analysis.

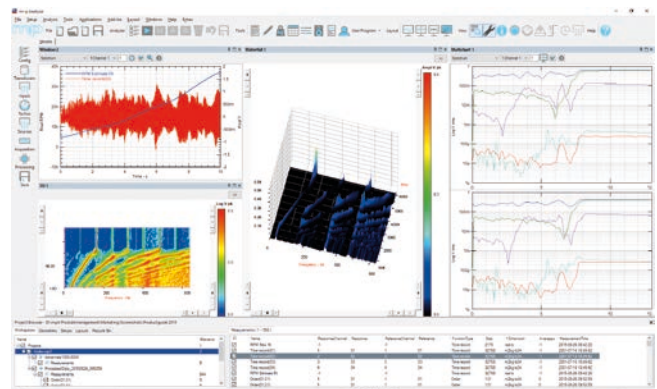
### Order Tracking

Tachometer signals can be measured on both analog and high-speed digital counter inputs with order tracks computed from spectral data or using digital tracking filters for the highest resolution. Tachometer pulse ratios can be used to compute any number of different order numbers in parallel. There are no restrictions on fractional order numbers that can be included so complex engine and gearbox order components are quickly identified.

The advanced TVDFT (Time Variant Discrete Fourier Transform) algorithm is applied for the computed order tracking analysis. This algorithm provides the benefits of both the computation speed of the FFT based order tracking and the precision of the resampling technique.

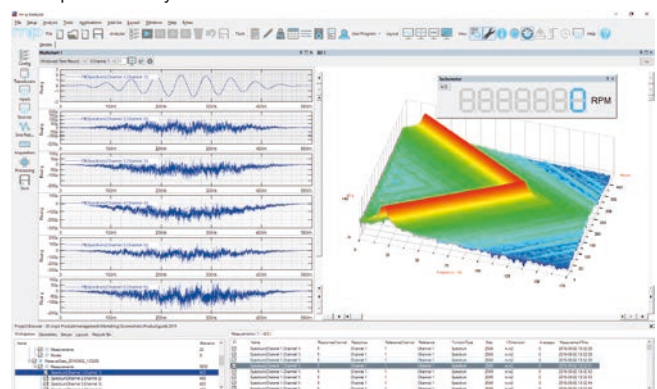
### Orbit Analysis

Online orbits can be displayed and monitored on a standard two-channel orbit diagram chart. Single rotations as well as multiple rotations are calculated and averaged over time. For advanced analysis a throughput recording including a tachometer or TDC signal can be post-processed using the orbit analysis wizard. This provides averaging, filtering and order based orbit displays with a replay feature for visualizing changes over a change in machine speed. A simple configurable bandpass filter allows removal of unwanted signals and noise.



2D and 3D displays of rotational data

Run up/down analysis

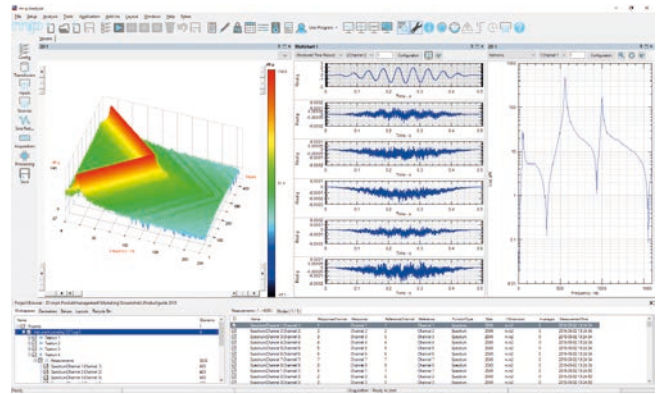


### Condition Monitoring

At the heart of machine condition metrics are acceleration, velocity and displacement measurements which can all be derived from a single sensor with time histories of peak, pk-pk and rms values in any engineering unit displayed. Both short-term measurements over seconds to long-term monitoring over days and weeks are possible. Flexible pre-filtering of signals meets the standard metrics available for different groups of machines.

History and trends can be based on machine speed or, when running at constant speed, with time-based logging. Both cases providing time history statistics, spectrum and order analysis with both amplitude and phase results. All these functions are available in parallel for complete and immediate online results and flexible post-test diagnostics.

Balance, bearing condition and performance characteristics can be evaluated meeting the requirements of the numerous standards in this area such as ISO 13373, ISO 7919, ISO 10816, VDI 2056, ISO 2372, NF 90-300/310, BS 4675 or the API acceptance testing series etc.



Multichart viewers

Condition monitoring of compressors

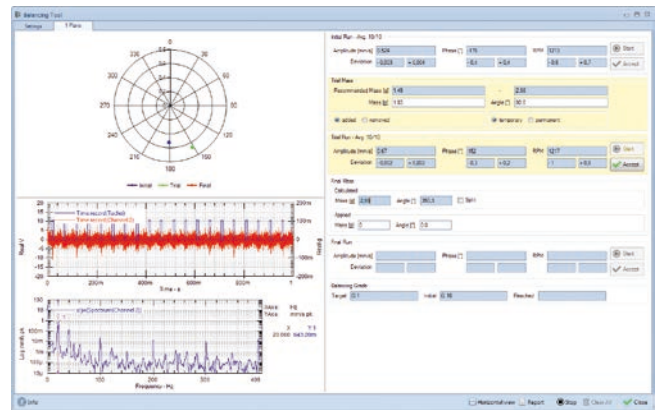


### Balancing

Rotating machines are often subject to high vibrations caused by unbalance, therefore balancing is important in the manufacture and maintenance process of machines to reduce these vibrations. m+p Analyzer provides single- and dual-plane balancing procedures. The task-oriented user interface enables simple test setup, acquisition, analysis and correction. Comparative results can be displayed from any previous data. For reporting purposes, a result sheet can be saved for each balancing procedure.

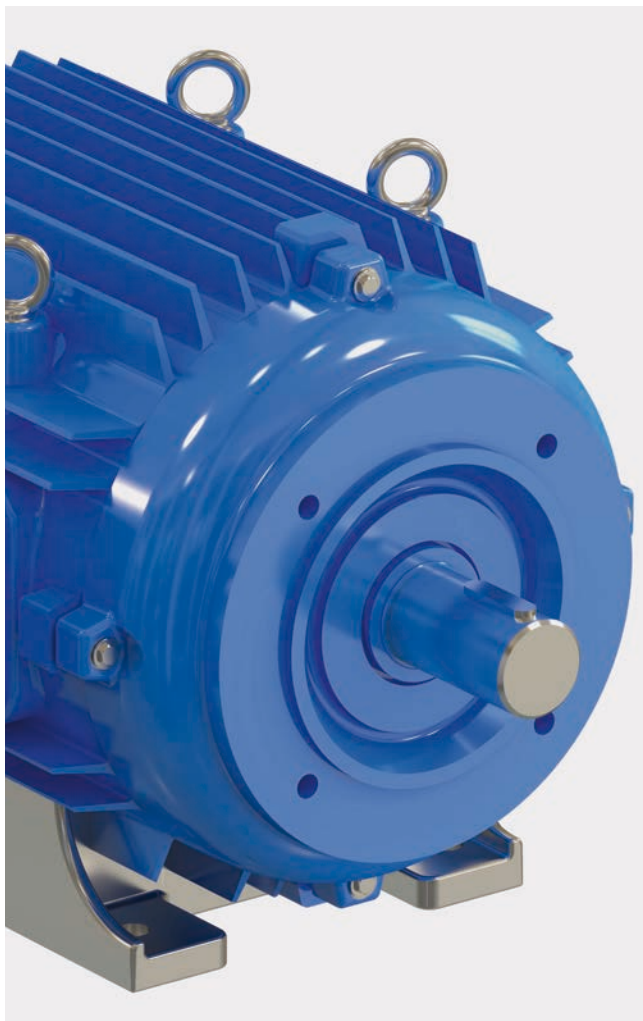
### Bearing Fault Detection and Diagnosis

Envelope analysis is a sensitive indicator of defects and can predict the location of developing faults. It is used as a diagnostics tool for ball and cylindrical roller bearings. Defects on a rolling-element bearing exhibit peaks of characteristic frequencies or orders in the power spectrum of the envelope signal. Time based condition monitoring of this data together with overall levels can also predict failure time and hence assist in maintenance scheduling.

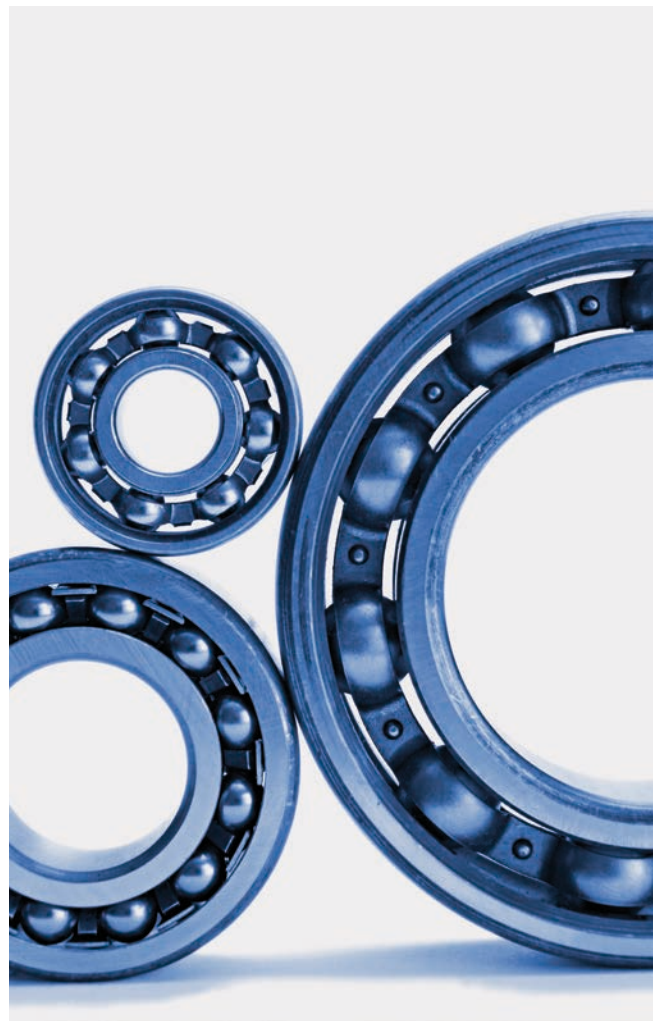


Trial run for calculating the balancing masses

Balancing the rotor of an electric motor



Envelope analysis of rolling-element bearings: detection of cracks in race and ball/roller defects





## **m+p international**

Founded in Hannover, Germany in 1980, m+p international develops and manufactures test and measurement systems for vibration testing, dynamic signal analysis, multi-channel data acquisition and monitoring and test stand engineering. Our product reputation and broad experience coupled with valuable user feedback have led to significant market share in numerous key industries worldwide.

The company has its headquarters in Hannover, Germany with sales/marketing subsidiaries in New Jersey (USA), England, France and China, along with representatives and agents in many countries.

Learn more on the full range of m+p international products and services and their applications. Select the m+p literature library on our website and download the desired product literature.

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