

# ORDER TRACKING

LEARN HOW YOUR ROTATING MACHINERY IS DOING DURING STARTUP, COAST DOWN OR NORMAL OPERATION.



# INTRODUCTION

Unwanted vibrations must be avoided for a long and maintenance-free life cycle for all rotating machinery. Order tracking is a perfect tool to determine the operating conditions such as resonances, stable operation points and identify causes of vibrations. The order tracking method is a true health scan for rotating machines.

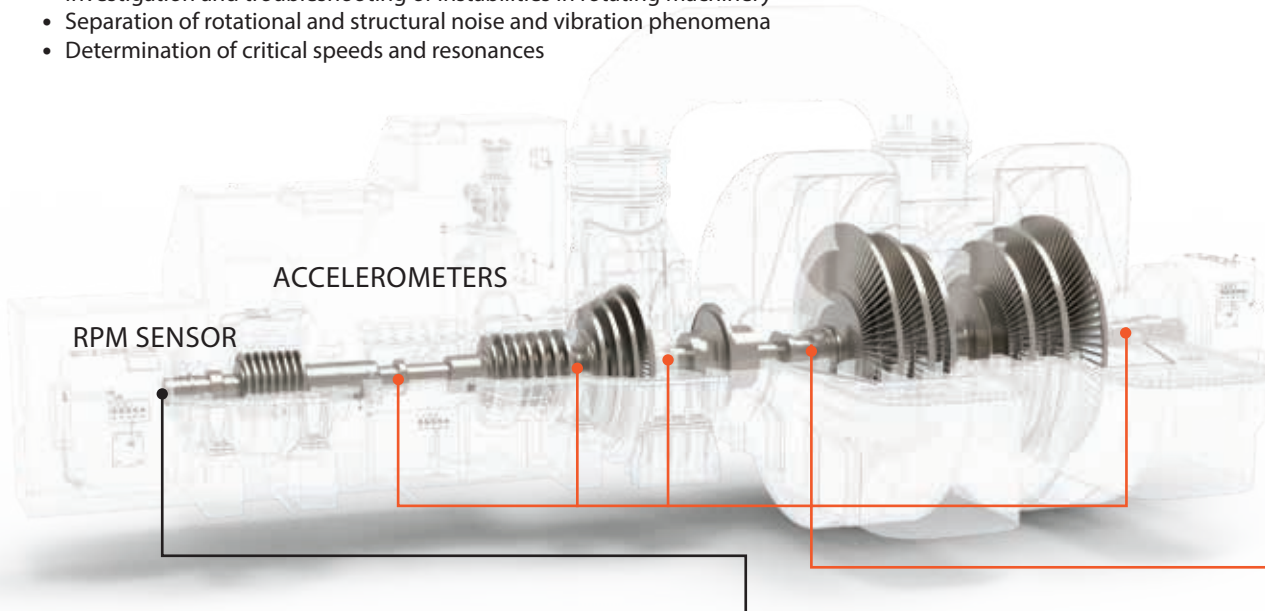
The Dewesoft order tracking is used for e.g. vibration analysis on engines or other rotating machinery, both in development & optimization as well as in diagnostic & troubleshooting instances. Powerful software and handy Dewesoft instruments, make up a smart portable solution for both developers and service engineers.

# APPLICATIONS

Rotating machines are a major and critical component of many mechanical systems throughout the industry. Almost every industrial process uses at least one rotating machine, which is crucial in the production line. Just ask yourself which machine would cause the biggest cost in the event of a failure?

Engines, power trains, turbines, pumps, compressors, electric motors, ventilation units, etc. can be designed and developed, as well as evaluated and maintained by performing order tracking and analysis.

- Investigation and troubleshooting of instabilities in rotating machinery
- Separation of rotational and structural noise and vibration phenomena
- Determination of critical speeds and resonances



# FUNCTIONALITY

Rotating machines produce repetitive vibrations and acoustic signals related to the rotational speed. With variations in the rotational speed, order tracking is the measurement technique to sort out all the signal components that an operating machine generates.

Orders are harmonics of the rotational speed, and evaluating orders is critically important in many types of rotating machines. Typically order tracking and analysis is done on non-stationary data, such as a run-up or coast-down of a machine.

The order tracking method is used to extract the harmonic components related to the rotational frequency of the machine. The machine vibration pattern is a mixture of excitation frequencies, such as unbalance, eccentricity and bearing faults, and relates to the natural frequencies based on the structure and mounting of that machine.

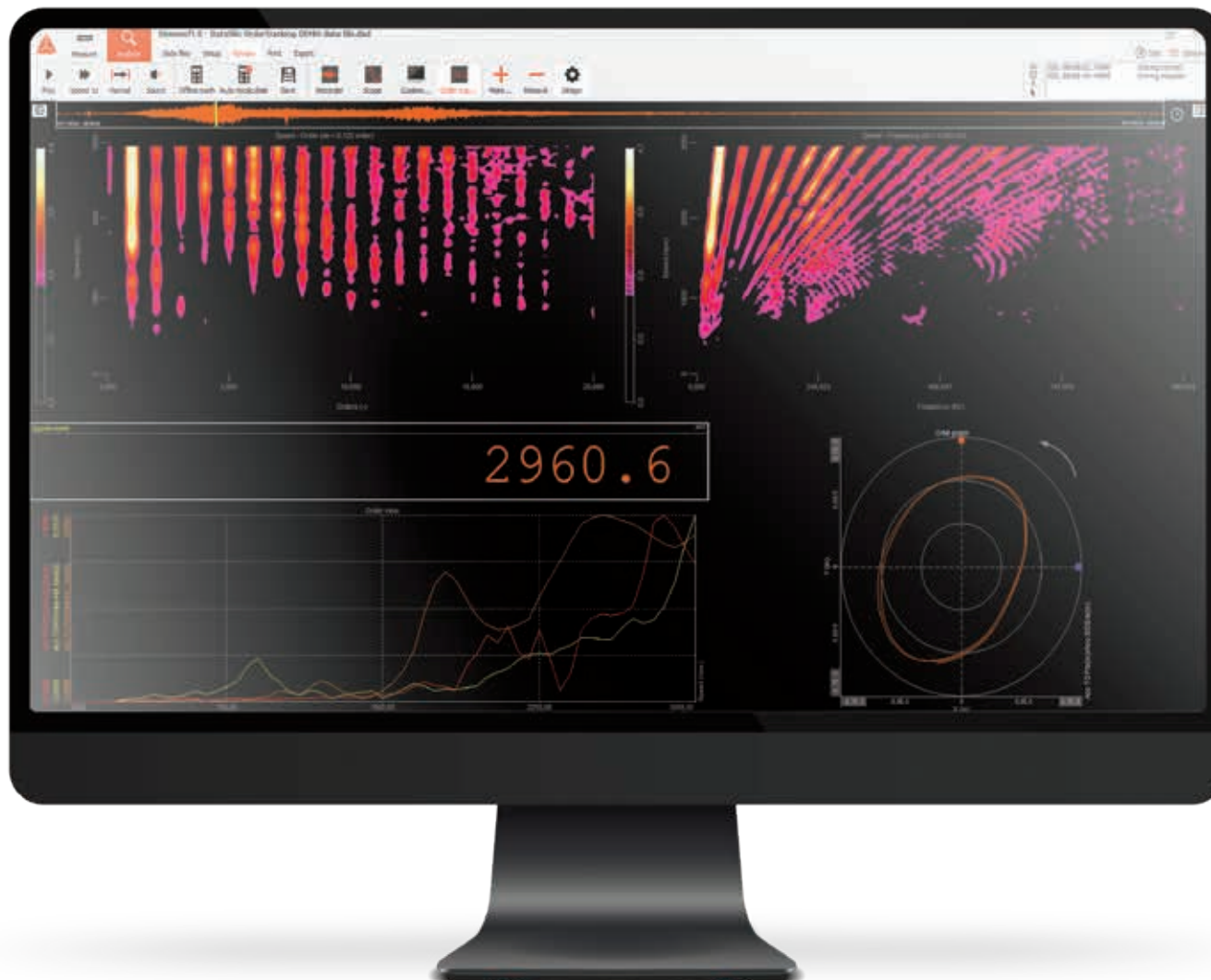
The measured vibration sensor data is calculated according to the angle sensor data and split up into orders, which can be analyzed across the whole rpm range. The powerful visualization and mathematical options provide a clear picture of the machine state and specific harmonic components which determine relations to certain machine faults.

 **DEWESoft® X3**  
SOFTWARE



SIRIUS  
MODULAR

# KEY FEATURES



## DATA AVERAGING AND UPDATE CRITERIA

Based on the Delta-RPM the RPM range is split into blocks/classes. You can calculate by Averaging the data recorded within a class or by using only the data measured at center of the class.

## CAMPBELL DIAGRAM

Visualization of 3-dimensional values on a single plane. The range of values is segmented and each level is represented in a circle, whose radius and color depend on the level's index.

## RICH VISUALIZATION

Frequency and order 3D plots, Nyquist, bode Campbell plots, are available for presentation of the data.

## ADVANCED MATH

Harmonics can be easily extracted with amplitude and phase, available versus rotational speed or time in the run-up or coast down modes.

## FFT SPECTRUM WATERFALL VS. RPM

Observe how the calculated FFT spectrum is changing with rotational speed.

## ANGLE SENSOR SUPPORT

All angle sensors from tacho, encoder, gear tooth, gear tooth with missing or double teeth, tape sensors and others are supported to perfectly determine the angle and rotational speed.

## TIME, FREQUENCY AND ORDER DOMAIN - AT THE SAME TIME

Due to high sampling and advanced alias-free resampling mechanism, data is available in all three domains at the same time on screen and in the file, perfectly synchronized.

## ORDER SPECTRUM VS. TIME

Observe how the order spectrum is changing with time.

## ORDER SPECTRUM VS. RPM

Observe how the order spectrum is changing with rotational speed.

## ORDER EXTRACTION

define which harmonics you want to extract (it is possible to extract time domain or order domain harmonics).

## EXPORT

Data export to most often used formats: UNV, Excel, Matlab, Flexpro, TXT, CSV...).

# SPECS

DAQ SYSTEM - SIRIUS ACC TYPE INPUT		
<b>Inputs</b>		
Input types	Voltage, IEPE	
ADC Type	24bit delta-sigma dual core with anti-aliasing filter	
Sampling Rate	Simultaneous 200kS/sec	
<b>Ranges (Dual Core Low Range)</b>	<b>±10V (±500mV)</b>	<b>±500mV (NA)</b>
Input Accuracy (Dual Core)	±0.1% of reading ±10(1)mV	±0.1 of reading ±1(NA)mV
Dynamic Range@10kS (Dual Core)	140 dB (160 dB)	135 dB (NA)
Typ. SNR@50kS (Dual Core)	107 dB (125 dB)	100 dB (NA)
Typ. CMR @ 50Hz/1kHz	140/120 dB	140/120 dB
Gain Drift	Typical 10 ppm/K, max. 30 ppm/K	
Offset Drift	Typical 0.5 µV/K + 2 ppm of range/K, max 2 µV/K + 10 ppm of range/K	
Gain Linearity	<0.02%	
Inter Channel Phase-mismatch	0.02° * fin [kHz] + 0.1° (@ 200 kS/sec)	
Channel Cross talk	>160 dB @ 1kHz	
Input Coupling	DC, AC 0.1 Hz,1Hz	
Input Impedance	1 MΩ (270kΩ for AC coupling ≥ 1Hz) in parallel with 100pF	
Overvoltage Protection	In+ to In-: 50 V continuous; 200V peak (10msec)	
<b>IEPE mode</b>		
Excitation	2, 4, 8, 12, 16 or 20mA	
Compliance voltage	25 Volt	
Output Impedance	>100 kΩ	
Sensor detection	Shortcut: <4Volt; Open: > 19Volt	
<b>Additional Specifications</b>		
Input connector BNC	BNC	
TEDS support	IEPE mode only	

SOFTWARE: DEWESoft X3	
<b>Recommended</b>	
Processor:	Intel Core i7 with 4 Cores (3rd generation or higher)
RAM:	8 gigabyte (GB)
Hard drive:	Solid-state drive (SSD)
Graphic card:	Compatible with DirectX 11
Display	1280x720 (HD Ready)
Operating system:	Windows 10 64-bit
*Actual requirements may be different due to specific setup configuration.	

TYPICAL CONFIGURATIONS
<b>BASIC Order Tracking :</b>
<ul style="list-style-type: none"> <li>• SIRIUS Mini</li> <li>• 3 x ACC, 1xACC+</li> <li>• 1 x Accelerometer</li> <li>• 1 x Tacho"</li> </ul>
<b>ADVANCED Order Tracking:</b>
<ul style="list-style-type: none"> <li>• SIRIUSi Dual-core</li> <li>• 6 x ACC, 2x ACC+</li> <li>• 8 x Accelerometer</li> <li>• 2 x Tacho" Related products</li> </ul>

RELATED PRODUCTS
<ul style="list-style-type: none"> <li>• FFT</li> <li>• Bearing analysis</li> <li>• Torsional vibration</li> <li>• Balancing</li> </ul>



**LEARN MORE:**  
[dewesoft.com/applications/rotating-machinery/order-tracking](https://dewesoft.com/applications/rotating-machinery/order-tracking)

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