



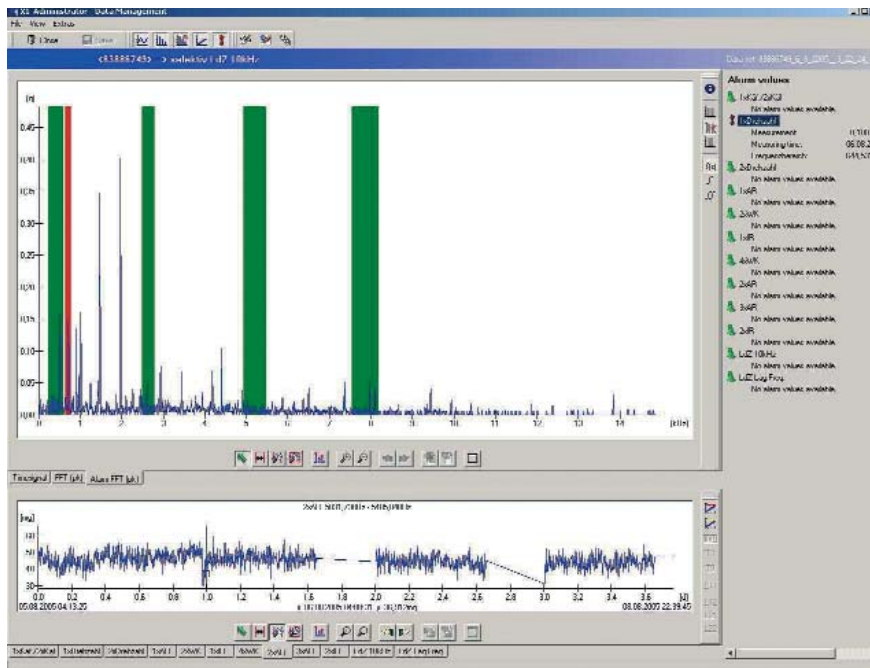
Product Information

# Westfalia Separator **WEWATCH**<sup>®</sup>

Condition Monitoring System  
for Separators and Decanters

# Centrifuge Monitoring with Vibration Monitors

Digital, frequency-selective vibration monitoring



Frequency-selective vibration monitoring with individually adjustable frequency bands.

Reliability of equipment is today one of the most important tasks in the operating industry. An optimal utilization of production plants can only be achieved through maximum availability. In the past, operators usually evaluated the condition of machines intuitively. However, the increasing complexity of machines calls for measuring methods that permit an objective assessment. Vibration diagnosis is one such method. It helps operators to diagnose damage at an early stage and enables them to initiate suitable measures while the plant is still operative.

To this end, the machine noise is measured by means of a sensor and evaluated by a vibration monitor. Faulty or damaged machine parts cause, as a rule, additional vibration. A discrete damage on a rolling bearing, e.g. pitting in the raceways, generates, when cycled, a periodic series of individual shock pulses. These shock pulses induce structural resonances of the bearing or of adjacent machine parts. The pulse frequency or damage frequencies are determined by the bearing geometry and are proportional to the bearing's speed.

## The difference to conventional systems

Conventional vibration monitors usually yield a sum level that is compared with a previously defined threshold value. If this threshold value is exceeded, an alarm is triggered. This type of vibration monitoring does not suffice to reliably monitor the condition of complex machines with numerous components since the broad-band RMS value (= root mean square) changes only in the final stage of a damage. Moreover, this method does not work effectively with alternating speeds.

## Early detection of damages

Detection of damage at an early stage is only possible with frequency-selective monitoring since minor damage or faults cause an increase in the amplitudes of individual, characteristic frequencies. Only by means of this method is condition-related

maintenance feasible. So the frequency-selective method permits monitoring of specifically selected machine parts.

The examination of envelope signals is particularly suitable for the detection and analysis of shock pulses such as are caused, for example, by gear damage and rolling bearing damage.

Damage can be identified at an early stage by characteristic patterns in the frequency spectra of machine vibrations.

In order to detect rolling bearing damage at an early stage, the envelope spectrum is calculated from the vibration signal. This signal is then broken up into its frequency components. By defining narrow frequency bands, the amplitudes of these components can be monitored. The characteristic value is referred to as selective RMS value.

# Westfalia Separator **WEWATCH**<sup>®</sup> Digital Vibration Monitoring

## Operation of the system

With the Westfalia Separator WEWATCH<sup>®</sup> system Westfalia Separator offers vibration monitoring for applications where permanent frequency-selective monitoring is desired but the utilization of more complex systems is out of the question for cost reasons.

Various signal conditioning modules with an integrated sensor supply and an amplifier with auto ranging permit connection of all commonly used acceleration, speed and displacement sensors. The signal is sent to an A/D converter via a programmable anti aliasing filter. The downstream digital signal processor carries out a Fast Fourier Transformation (FFT) in real time and breaks the signal up into its fre-

quency components. This permits monitoring of amplitudes within very narrow, defined frequency bands for previously defined threshold values and triggering of an alarm if these values are exceeded.

The RMS value is used to evaluate the raw signal.

The vibration acceleration envelope signal is obtained through a suitable configuration of the Westfalia Separator WEWATCH<sup>®</sup> device. The frequency spectrum of the envelope signal is evaluated with the LDZ value. This enables the system to distinguish, for example, between the frequency components measured for outer ring, inner ring, rolling elements and cage.

# Westfalia Separator **WEWATCH**<sup>®</sup>

## Monitoring of Process Parameters

For monitoring in time domain, various characteristic values such as:

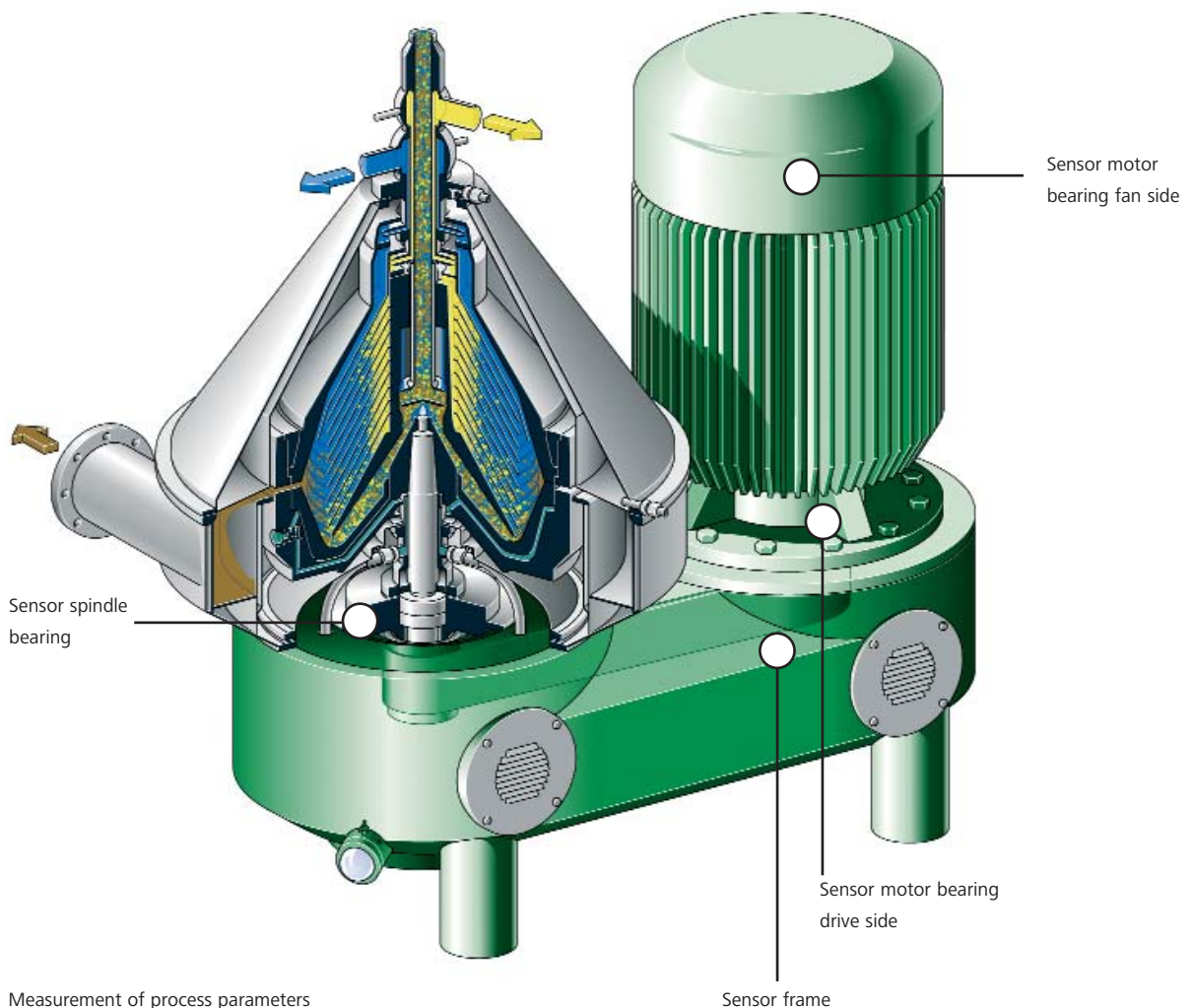
- RMS (Root Mean Square)
- Peak value
- Peak-to-peak value
- Steady component
- Crest factor

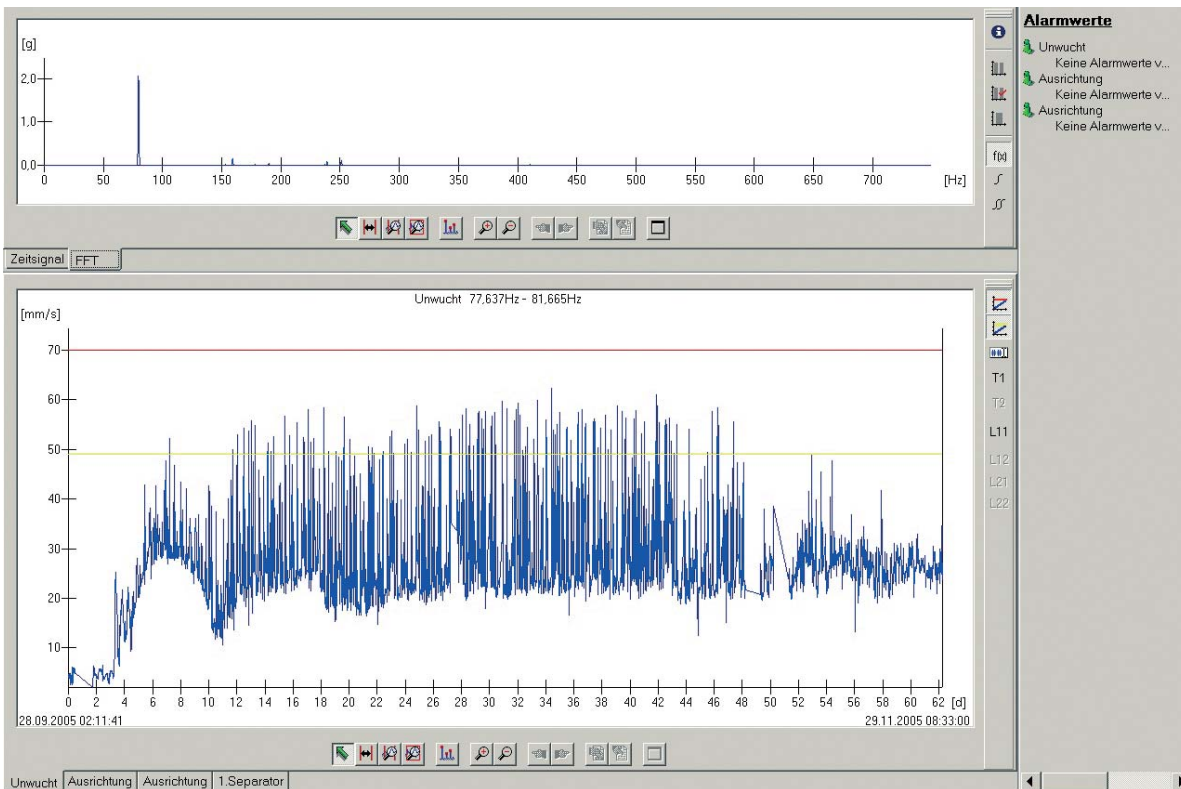
can be calculated from the Westfalia Separator WEWATCH<sup>®</sup> device. The characteristic values are a yardstick of the intensity of the measured quantity with the selected frequency band.

Operating complex plants means not only to monitor vibration parameter in order to increase reliability. Condition monitoring also means to measure process parameters in order to increase the efficiency of the whole process. The task is to get more products out of the same amount of raw material.

Those parameters can be:

- Feed capacity
- Product temperature
- Motor power
- Pressure values
- Qualitative parameters





Pre- and Main-Alarm

## Remote Monitoring with Westfalia Separator WEWATCH®

Rely on the experience of the OEM centrifuge producer

### Pre- and Main-Alarm:

In practice, e.g. the speed-dependent tracking of the frequency bands and the setting of load- and speed-dependent alarm thresholds is effected in this way. Thus the Westfalia Separator WEWATCH® system offers features which were not offered before by vibration monitors but only by considerably more expensive online systems. There are two types of adjustable threshold values: pre-alarm and main alarm thresholds. Each of these alarm thresholds can activate a switching relay.

A main alarm delay can also be programmed to suppress brief exceedances of the threshold values. Two analogue outputs display the characteristic value levels they were assigned to or report the alarm status to a process control unit. A "traffic light" display in the front plate of the housing with green, yellow and red lights immediately indicates the monitoring status. Additional information is provided for the user on a two-line LCD display.

## Remote Monitoring with Westfalia Separator WEWATCH®

Westfalia Separator WEWATCH® vibration monitors with a remote-monitoring function permit users to reliably identify damage and faults on machine parts without requiring the presence of a diagnosis expert. Westfalia Separator WEWATCH® devices automatically report changes via telecommunication lines to the operator, the plant builder or the service provider, regardless of in which place on Earth they are used. Advantages of remote monitoring with Westfalia Separator WEWATCH® Worldwide:

- Cost-effective monitoring of plants
- Presence of vibration expert no longer required
- Permanent availability of monitoring data
- Immediate activation of alarms via telecommunication lines

Measured data can at any time be called up from a distance and analysed by the Westfalia Separator diagnosis experts. This permits a cost effective, condition-based maintenance. Remote monitoring saves time-consuming and expensive journeys, prevents unplanned downtimes and increases the availability and operational reliability of machines.

# Communication with the Westfalia Separator **WEWATCH**<sup>®</sup> Diagnosis Experts

## Communication with the Westfalia Separator **WEWATCH**<sup>®</sup> diagnosis experts

Westfalia Separator **WEWATCH**<sup>®</sup> can be used with:

- Fixed modem
- Mobile phone modem
- Satellite modem
- LAN connection
- WLAN connection
- GPRS modem
- UMTS modem

24-hour availability

The Westfalia Separator **WEWATCH**<sup>®</sup> system can automatically issue an alarm if a threshold value is exceeded. The alarm can also be activated via SMS or e-mail.

Westfalia Separator **WEWATCH**<sup>®</sup> devices are delivered in rail housing for installation in switch cabinet or as a 19" slide-in module. On request we can also offer the system in a protected housing with an integrated communication device.



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- Starch Technology and Industrial Biotechnology
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