

# Technical Information

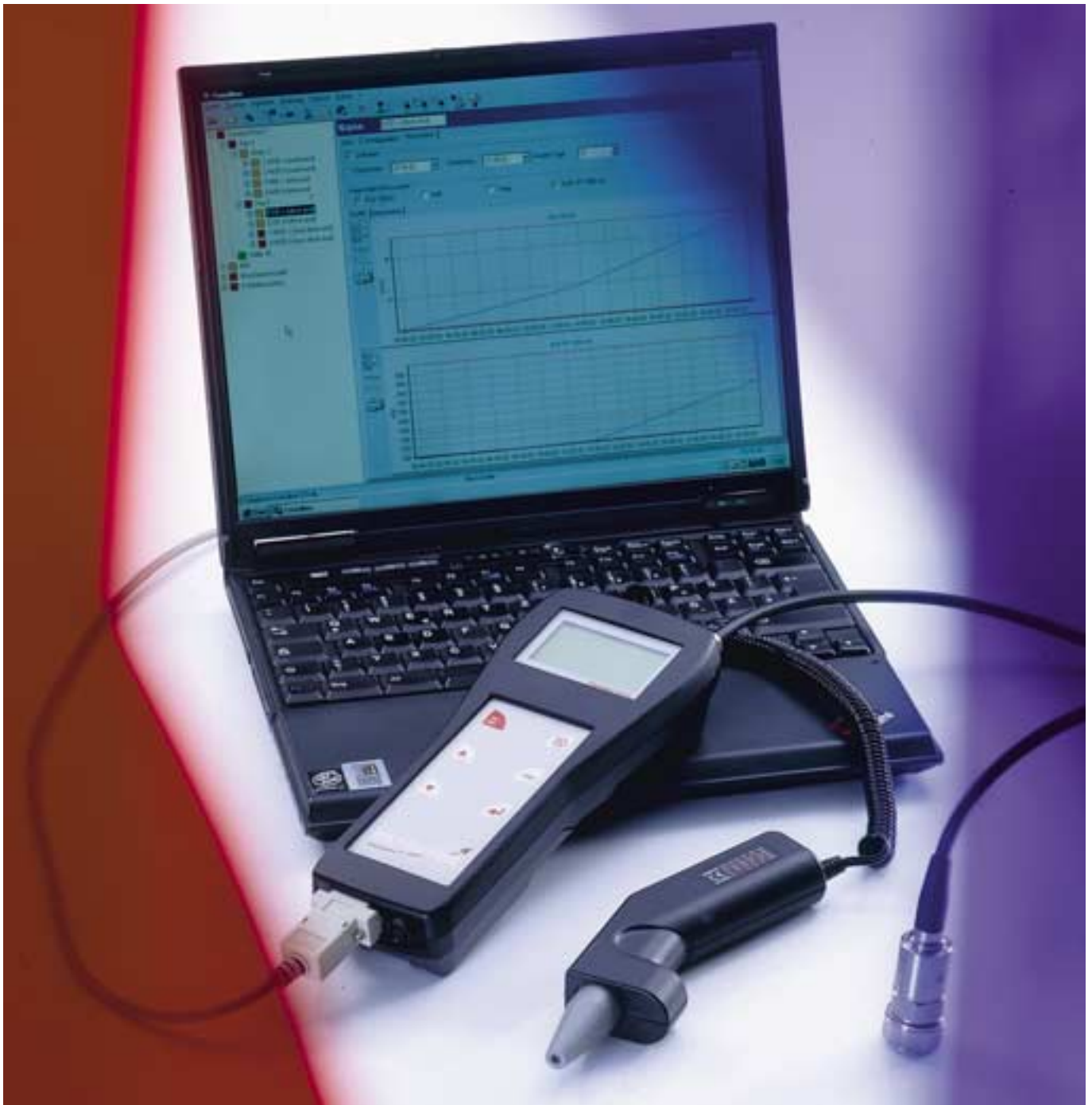
**FAG**

Maintenance  
Products

TI No. WL 80-62 E

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## Detector II – the „mobile phone“ among the data collectors



# Application · Condition-based maintenance · Principle of operation

## Application

The Detector II is a vibration measuring instrument and data collector rolled into one. Together with the PC software Trendline it was developed for measuring data in the offline monitoring of production plants. The Detector II is user friendly, very easy to operate and very light in weight. This makes the Detector II the ideal instrument for monitoring large production plants where long distances have to be covered on a measuring round.

With this device users can determine vibration accelerations and vibration velocities in free definable frequency bands.

Machine vibrations according to ISO 10816 can be monitored as well as the condition of rolling bearings with the principle of demodulation detection method. Moreover, raw signals and demodulated signals can be saved for more detailed analyses of the vibration signals in the time domain and in the frequency domain. Imbalances and faulty alignment can be detected as well as rolling bearing damage or gearing defects.

In addition, the device features a separate temperature sensor.

## Condition-based maintenance

Condition-based maintenance means recognizing damage on time, having set schedules for repairs, optimally utilizing the life of a bearing, and reducing costs considerably – in particular the costs resulting from production loss. The purchase cost of a diagnosis device, which is a must for this kind of maintenance, pays off in no time at all especially if you opt for the reasonably-priced, easy-to-operate and handy Detector II.

The device is also suitable for personnel without any knowledge of vibration measurement. Handling the device is uncomplicated and can be learned quickly. The user can generate individual “measuring rounds” and is then systematically guided from measuring point to measuring point. The acceleration sensor can be attached to the machine by means of its magnetic base. The user can at any time leave a previously specified „measuring round“ and easily add additional measuring points on site. The data are measured and saved simply by pressing a key.

## Principle of operation

The Detector II measures vibration signals at previously specified measuring points by means of a sensor and calculates the RMS values of vibration velocity,

vibration acceleration and demodulated acceleration. These values, which characterise the condition of a machine or machine component, are described in more detail in the table on page 6. Frequency bands spanning 2 Hz to 20 kHz with any desired frequency width and center frequency can be defined and monitored. The Detector II features a dynamic memory management unit; and the basic device „FIS.DETECTORII.SET“ can save up to 24 time signals.

With an expanded memory the „FIS.DETECTORII.SET.1MB“ can save up to 116 time signals.

With an infrared sensor plugged into the Detector II, the device can even be used for non-contact temperature measurements. After a measuring round the measured values are transferred to a computer where they are evaluated, analysed and graphically displayed by means of the Trendline software.



# Principle of operation · User friendly

The configuration contains the exact positions of the measuring points within the plant to be monitored. It also contains the sensor sensitivity and the threshold values for main alarm and pre-alarm for every measuring point.

The configuration is generated by means of the Trendline software and transferred to the Detector prior to a measurement.

The pickup sensor has to be securely attached as close as possible to the point to be monitored. As a rule, it is affixed by means of the screwed-on magnetic base. If this is not possible, e.g. with an aluminium housing, a small iron plate or washer with the size of the magnetic base is attached at the measuring point, for example by means of a hard-curing instant adhesive (e.g. cyanoacrylate adhesive).

On the Detector II this measuring point is selected in the configuration, and the measurement is started. During the measurement the speed must be constant (at least  $120 \text{ min}^{-1}$  is required to deter-

mine the characteristic value for  $V_{\text{sel}}$  and  $600 \text{ min}^{-1}$  to determine the characteristic value in accordance with ISO 10816). The device records the sensor signals within the previously selected bandwidths and calculates the characteristic values.

For every configuration the Detector II compares the newly measured characteristic values with the threshold values for a main alarm and for a pre-alarm specified for this measuring point. If one of these threshold values is exceeded, this is indicated by the device. After a measuring campaign the saved values are transferred to the computer.

By means of the trend analysis the user can estimate when an alarm is likely to be triggered. When an alarm is triggered, an alarm report can automatically be generated and printed. To ensure comparability of the values, they must be recorded under identical conditions. After a initial reference measurement, several measurements are conducted at regular intervals.

## E-mail button on the Detector II

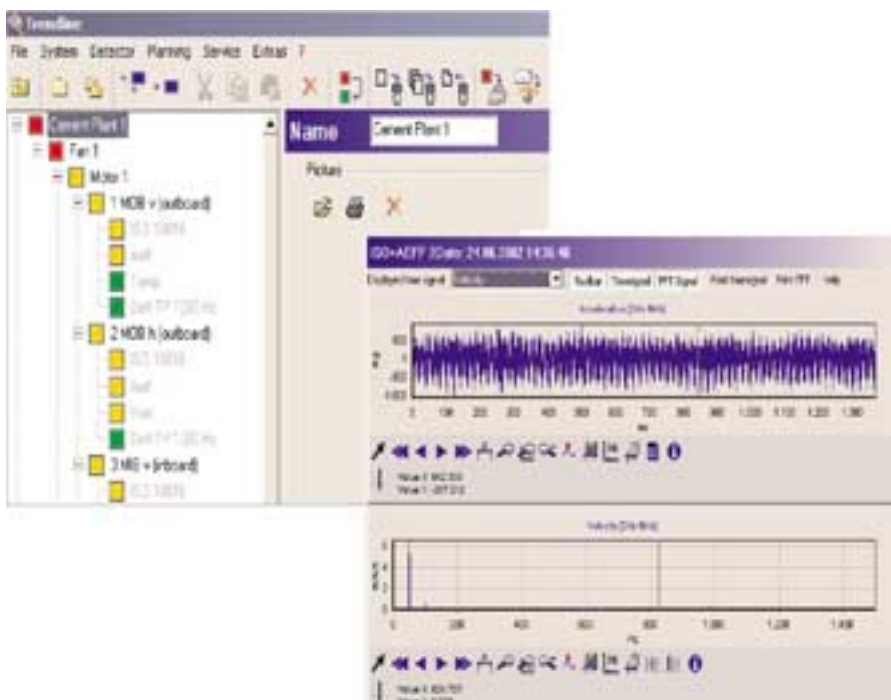
One particularly helpful feature of the software, especially for users with only little experience in the field of vibration measurement, is the e-mail button. The user simply sends at the touch of a button measured data to a vibration expert by e-mail. In this way an external diagnosis expert can be consulted in a simple manner for tricky analyses. Our F'IS service department is always happy to help you with such analyses!

## User friendly

The display of the Detector II shows all the information needed to operate the device:

- selection of the measuring point,
- user guidance during measurements,
- the measuring results,
- the system settings.

The Detector is easy to operate, with just six keys of the **foil keyboard**.



# Features · Order code and scope of delivery

## Features

- **if you wish: you collect data, we make a remote diagnosis**
- portable, handy, user friendly diagnosis device
- light weight (450 g)
- operation with one hand via 6 keys
- foil keyboard, protected from dust and splash water
- working temperature 0 to 50 °C
- automatically switches off after ca. 2 minutes if no key is pressed
- monitoring functions:
  - general vibration condition,
  - rolling bearing condition,
  - data acquisition of up to 1200 measuring points,
  - headset jack for acoustic noise evaluation
- saving and display of up to 4 measuring values permits easy condition evaluation
- simple PC trend graphics software with database for WIN 95/98/NT/2000
- sensor cable length up to 50 m possible

## Order code and scope of delivery

Order code:

**FIS.DETECTORII.SET**  
(Detector set with 256 kByte RAM)

or

**FIS.DETECTORII.SET.1MB**  
(Detector set with 1 MByte RAM)

## DETECTOR II

### Scope of delivery:

- Basic device with storage battery
- Acceleration pickup with magnetic base
- Temperature sensor
- Power pack
- PC data cable
- Operating instructions
- Protective bag
- PC software Trendline
- Case

## Accessories

- Additional attachable bag for the acceleration pickup holder
- Sensor extension cables (5 m or 15 m) available on request.



## Selection of characteristic values

Characteristic values and signals that can be selected for every measuring point	Measuring range / resolution	Frequency range	Display on
<b>Characteristic value: vibration severity according to ISO 10816</b> (VDI 2056) (broadband RMS value of vibration velocity) for a general evaluation of the machine condition in accordance with ISO 10816	<b>ISO 10816</b> = 0 – 999.9 mm/s	10 Hz – 1 kHz	Detector and PC
<b>Characteristic value: vibration severity (freely selectable)</b> (RMS value of vibration velocity, e.g. for detecting imbalances and faulty alignment)	$V_{sel} = 0 - 999.9 \text{ mm/s}$	Freely selectable between 2 Hz and 1 kHz	Detector and PC
<b>Characteristic value: acceleration</b> (broadband RMS value of vibration acceleration, e.g. for monitoring gears)	$A_{eff} = 0 - 25 \text{ g}$	2 kHz - 20 kHz	Detector and PC
<b>Characteristic value: acceleration (freely selectable)</b> (e.g. for selective monitoring of gearings)	$A_{sel} = 0 - 25 \text{ g}$	Freely selectable between 2 Hz and 20 kHz	Detector and PC
<b>Characteristic value: demodulated signal, 100 Hz/1000 Hz</b> (RMS value of the demodulated signal up to 100/ 1000 Hz, e.g. for monitoring the rolling bearing condition)	$D_{eff/TP100/1000Hz} = 0 - 25 \text{ g}$	0 Hz – 100 Hz/ 0 Hz – 1000 Hz	Detector and PC
<b>Characteristic value: demodulated signal 100 Hz/1000 Hz (freely selectable)</b> (e.g. for selective monitoring of the rolling bearing condition)	$D_{sel/TP100/1000Hz} = 0 - 25 \text{ g}$	Freely selectable 0 Hz – 100 Hz/ 0 Hz – 1000 Hz	Detector and PC
<b>Time signal of vibration acceleration</b> up to 1 kHz, 4096 values	+/- 25 g	2 Hz to 1 kHz	PC
<b>Time signal of vibration acceleration</b> up to 20 kHz, 4096 values	+/- 25 g	2 Hz to 20 kHz	PC
<b>Demodulated signal</b> up to 100 Hz, up to 1 kHz	+/- 25 g	0 Hz to 100 Hz 0 Hz to 1 kHz	PC
<b>Frequency spectrum (Fast Fourier Transformation, FFT)</b> of the time signal of the vibration velocity up to 1 kHz	+/- 999.9 mm/s, Resolution: 0.73 Hz	2 Hz to 1 kHz	PC
<b>Frequency spectrum (Fast Fourier Transformation, FFT)</b> of the time signal of the vibration acceleration up to 20 kHz	+/- 25 g, Resolution: 14.6 Hz	2 Hz to 20 kHz	PC
<b>Frequency spectrum (Fast Fourier Transformation, FFT)</b> of the time signal of the demodulated signal, optionally up to 100 Hz or up to 1 kHz	+/- 25 g, Resolution: 0.073 Hz (for 100 Hz) 0.73 Hz (for 1 kHz)	0 Hz to 100 Hz or 0 Hz to 1 kHz	PC
<b>Measuring point temperature</b>	<b>Temp</b> = - 15 °C to 240 °C	-----	Detector and PC

On a PC the user can specify for every measuring point if, and under which conditions, certain time signals are to be saved as well. Three different time signals can be measured, i.e. vibration acceleration (2 Hz – 1 kHz, 3 kHz scan rate), vibration acceleration (2 Hz – 20 kHz, 60 kHz scan rate) and demodulated signal (0 Hz – 100 Hz/1 kHz; 300 Hz/3 kHz scan rate). The Detector can save up to 24 time signals (basic device) or 116 time signals (with an expanded memory).

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# Technical data

<b>Device designation</b>	Detector II, order code <b>FIS.DETECTORII.SET</b>
<b>Dynamic random access memory</b>	with an expanded memory: <b>FIS.DETECTORII.SET.1MB</b> max. 1200 measuring points without time signals, basic device: 256 kbyte, up to 24 time signals can be saved, with an expanded memory: 1 Mbyte, up to 116 time signals can be saved
<b>PC interface</b>	RS 232, baud rate: 38.2 kbps or 57.6 kbps
<b>Display</b>	illuminated graphics display (LCD), 128 x 64 pixels, dimensions: 55 x 33 mm
<b>Inputs</b>	BNC jack for ICP acceleration pickup, sensitivity [mV/g] can be adjusted as required, 9-pin jack for pyrometer (IR temperature sensor), 9-pin DIP jack with RS232 interface for supplied PC data cable, battery charger jack
<b>Output</b>	jack for headset with 3.5-mm jack plug (walkman), signal: envelope
<b>Detector languages</b>	switchable: German, English, French, Dutch, Italian, Turkish, Spanish, Portuguese, Swedish and Finnish, Please inquire about the availability of other languages
<b>Keyboard</b>	6 soft keys
<b>Manual</b>	currently in German and English
<b>Power supply</b>	rechargeable NiMH storage batteries
<b>Operating time</b>	ca. 8 hours (continuous use)
<b>Temperature range</b>	0 ... +50 °C (working temperature) -20 ... +70 °C (transport and storage temperature)
<b>Dimensions</b>	230 x 70 x 45 mm (L x W x H)
<b>Mass (basic device)</b>	ca. 450 g
<b>Protective bag</b>	two compartments, black nylon, 2 transparent windows, openings with velcro fasteners, velcro holders for cable and sensor, carrying strap
<b>PC software (Trendline)</b>	runs under WINDOWS 95/98/NT/2000 - configuration of the Detector II via RS232 interface - hierarchic factory and measuring point manager, can also generate machine graphics - generation of as many measuring rounds on PC as required - integrated database for saving the measured values - graphic presentation of the measured values and their development, trend analysis and trend extrapolation - presentation of the recorded time signals - presentation of the FFT of the time signals - report generator for alarms and measured values - available in German and English, availability in other languages will be indicated on inquiry
<b>Temperature measurement</b>	IR temperature sensor, handheld device for non-contact temperature measurement, measuring range -15 ... +240 °C (1 mV/°C/°F), spectral range 8 – 14 µm, smallest target 2.5 mm, distance ratio 4 : 1, plugs into DETECTOR II

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## **FAG Detector II -**

the „mobile phone“ among the data collectors

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