# The SKF Microlog series catalogue

The industry's premier portable,
handheld data collector and analyzer

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# SKF Microlog series

## Data collector and analyzer

Unmatched versatility, reliability and functionality have made the SKF Microlog Analyzer series the premier choice for portable, hand-held condition monitoring units.

Designed to help users establish or upgrade an existing condition monitoring program, SKF Microlog Analyzers handle the tasks required to perform predictive maintenance on rotating machinery in countless industries.

## Data capture from a range of sources

SKF Microlog Analyzers automatically collect both dynamic (vibration) and static (process) measurements from almost any source, including handheld and magnetically mounted accelerometers, permanently mounted vibration sensors or on-line monitoring systems. Temperature measurements can be collected with a non-contact infrared sensor or with a contact probe.

## State-of-the-art operating technology

With robust, high-speed data processors and optimum data storage capacity, SKF Microlog Analyzers are equipped to operate within today's most advanced computerized maintenance management systems. Units are supplied with a range of individual modules and accessories for specific types of analysis required to meet their plant's monitoring needs.

## SKF Microlog model

- SKF Microlog Analyzer AX series (CMXA 80)

# Contents

# SKF Microlog Analyzer AX series

## CMXA 80

### Advanced data collector / FFT analyzer

The SKF Microlog Analyzer AX is the most advanced large screen route based analyzer offered by SKF today. The SKF Microlog AX's features allow you to capture a wide range of vibration data quickly.

The analyzer provides the flexibility to support applications that are most important to your company's specific predictive mainte-nance program. Developed for use in a wide range of industries, the SKF Microlog AX series is approved for use in hazardous environ-ments requiring Class I Division 2 certification.



*SKF Microlog AX is a full-featured, four channel, high performance route and non-route portable data collector/FFT analyzer.*

### Key features

- Simultaneous triaxial or four channel measurements for fast data collection
- Fast processor for real time rate and display updates
- Rugged, dust / waterproof IP 65 design for reliability in industrial environments
- Rechargeable lithium battery supports eight hours of continuous data collection
- Large 6.4 in. VGA color display for easy viewing and analysis in any light

### SKF Microlog Analyzer AX series

The SKF Microlog AX facilitates easier, more powerful condition monitoring by analyzing vibration signals and process variables using four channel non-route measurements and one or two plane static or dynamic couple balancing applications over a range of 0,16 Hz to 80 kHz (10 to 4 800 000 CPM). Bearing assessments are carried out using the industry proven SKF Acceleration Enveloping (gE) technol-ogy. The SKF Microlog AX utilizes the latest advances in analog and digital electronics, including digital signal processing (DSP) and high resolution sigma-delta A/D converters, to provide both speed and accuracy in the data collection process.

### Modular approach offers seamless expansion

The modular design of the SKF Microlog AX series offers customers the option to upgrade and expand functionality without having to buy another instrument. Accessories are inter-changeable between models. The SKF Microlog AX is shipped with the full SKF Microlog suite of modules installed. To add additional functionality, units can be upgraded to more advanced models, simply purchase optional accessories.

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# Specifications

## Performance characteristics

| | |
|---|---|
| Acceleration, velocity, and displacement from hand-held or installed vibration sensors or monitoring systems: | • AC / DC sensors<br>• Pressure sensors<br>• Temperature sensors<br>• Keyboard entry: Measurements read from indicators or installed instruments entered in engineering units<br>• Universal tachometer<br>• Visual inspections: Added to measurement as coded notes |
| Enveloper (demodulator): | With four selectable input filters for enhanced bearing and gear mesh fault detection |
| gE filter selections: | • 5 Hz to 100 Hz<br>• 50 Hz to 1 kHz<br>• 500 Hz to 10 kHz<br>• 5 kHz to 40 kHz |
| Input parameters: | • Tachometer: TTL / analogue programmable to ±25 V<br>• RPM range 1 to 99 999<br>• Tachometer power supply output +5 V at 100 mA |
| Input over-voltage protection: | • AC ±50 V peak<br>• DC ±50 V sustained |
| Dynamic range: | >90 dB (24 bit ADC sigma-delta) |
| Input connectors: | • CH1: Six pin Fischer CH1, CH2, CH3, CH4 (labeled R) (ICP/AC/DC input), strobe out<br>• CH2: Six pin Fischer CH2 and CH3 (ICP/AC/DC input), +5 V tachometer out<br>• USB HOST/CHR: Seven pin Fischer R (ICP/AC/DC input), USB HOST, audio out<br>• USB DEV/TRIG/PWR: Seven pin Fischer USB DEV, charger, external trigger aux, +5 V tachometer out |
| Input signal range: | ±25 V maximum |
| Signal: | RMS/Peak/Peak-Peak/True Peak/True Peak-Peak |
| Transducer check: | Bias Voltage Integrity (O/C and S/C detection) |
| Auto range: | Yes |
| Frequency range: | DC to 80 kHz |
| Bearing condition: | gE |
| FFT resolution: | 100 to 25 600 lines |
| Time block length: | 256 to 65 536 samples |
| Alarms: | Overall, Spectrum and Exponential (Peak and RMS level) |

## Measurement

| | |
|---|---|
| Range: | • Route measurements: DC to 80 kHz<br>• Non-route measurements: DC to 80 kHz |
| Averaging: | 1 to 255 time averages, 1 to 4 096 spectral averages |
| Averaging type: | RMS, Time, Peak Hold, Exponential |
| Cursor: | Fixed and cursor lock. Single, harmonic and peak pick. |
| Trigger modes: | Free run or external trigger (trigger slope and amplitude) |

## Measurement

| | |
|---|---|
| Resolution: | Programmable 100, 200, 400, 800, 1 600, 3 200, 6 400, 12 800 and 25 600 lines |
| Measurement windows: | Hanning, flat top, hamming and rectangular |
| Measurement parameters: | Acceleration, velocity, displacement, gE, temperature, phase, voltage, user specified |
| Measurement types: | Overall, spectrum, time waveform, cross phase, orbits, shaft centerline |
| Multi-point automation: | Up to 12 measurements can be listed for one button push automated data collection at each measurement location |
| Accuracy: | ±2.5% of full scale range |
| Data display: | • Single and dual channel spectrum, single and dual channel time, phase table, process, orbit, cross channel phase<br>• Simultaneous spectrum, time waveform, peak hold averaging<br>• Up to 12 bands (fixed or order base) downloadable from host software |

## Power AX

| | |
|---|---|
| Battery: | • Li-ion 6 600 mAh with integral gas gauging<br>• Eight hours continuous operation minimum |

## Physical data

| | |
|---|---|
| Dedicated keys: | Up, down, right, and left two enter keys for right and left hand operation, four function keys |
| Hot keys: | Peak find, harmonic, expand |
| LCD screen: | 6.4 in. VGA color transflective TFT LCD screen for indoor and outdoor use, 640 × 480 pixels resolution, 16-bit color |
| Case: | EN60529, IP 65 (dust- and waterproof) |
| Weight: | 1, 6 kg (3.5 lb.) |
| Size (height × width × depth): | 220 × 220 × 71 mm (8.7 × 8.7 × 2.8 in.) |
| Drop test: | 1.2 m (4 ft.), to MIL STD 810F specifications (with stand retracted) |

## Environmental

| | |
|---|---|
| Certifications: | • **Special conditions per certifications**<br>• CE rated<br>• CSA, Class I, Division 2, Groups A, B, C, D, temperature code T4@Ta = 50 °C |
| IP Rating: | IP 65 |
| Temperature ratings: | • Operating temperature: –10 to +50 °C (14 to +122 °F)<br>• Storage temperature: –20 to +60 °C (–4 to +140 °F) |
| Humidity: | 10 to 90% relative humidity, non-condensing at 0 to +50 °C (32 to +122 °F) |
| Vibration: | MIL STD 810 transportation |

# Specifications

| System, data storage | |
| --- | --- |
| Internal storage: | 120 MB (capable of storing approximately 4 000 spectra) |
| SD card: | Can support up to 16 GB |
| Communication: | USB 2.0 |
| User indicator: | Blue, green, amber and red LED's |



*SKF Microlog AX provides fast data collection and analysis. The large screen facilitates viewing in any light.*

- USB communication / power splitter straight cable, 2 m (*6.6 ft.*) [CMAC 5095]
- SD slot cover
- Battery [CMAC 5092]
- Universal power supply [CMAC 5090]
- Carry case
- Soft case [CMAC 5071]
- Two (2) hand straps [CMAC 5072]
- Shoulder strap [CMAC 5073]
- Two (2) screen protectors
- Fischer and audio connector cover set
- 16 GB SD Card

## Hazardous environments

### CSA, Class I, Division 2, Groups A, B, C, D certified kits

The CMXA80-F-K-SL is certified for use in hazardous areas with the addition of CSA-approved, general-purpose industrial sensor [CMSS 793-CA] replacing the two CMSS 2200 accelerometers (must be purchased separately).

# Ordering information

## SKF Microlog AX-F model data collector / FFT analyzer

**The SKF Microlog AX-F [CMXA 80-F-K-SL-ND] standard kit includes:**

- CMXA 80-F unit, programmed for four channel non-route measurements, two channel or simultaneous triaxial route analyzer with FFT Analyzer, Balancing, Recorder, Run up Coast down, Frequency Response Function, Spindle Assessment, Sensor Setup, Idler Sound Monitor and Conformance Check modules installed
- One (1) accelerometer [CMSS 2111] with 2 m integrated cable and magnetic mount
- Two (2) accelerometers, general purpose, low profile, side exit, industrial, non-NI, with $1/4$-28 and M6 mounting studs [CMSS 2200]
- Two (2) accelerometer coiled cables, 1,8 m (*6 ft.*) [CMAC 5209]
- Two (2) medium duty magnetic bases, 35 mm (*1.5 in.*) diameter [CMSS 908-MD]
- CD-ROM, user manuals, utilities, asset information page and literature

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## Optional accessories for AX series

A number of accessories are available to complement the SKF Microlog Series. For technical details or information on any item, please contact your local SKF sales representative. Specifications and photographs of the SKF Microlog series accessories are available in the SKF Microlog Accessories catalog.

### Hardware kits

- Laser tachometer kit [CMAC 5030K]
- Laser tachometer kit with ATEX certified tachometer [CMAC 5030K-Z2]
- Modal hammer kit for use on structures with a mass of 210 g (7.6 oz.) and above [CMAC 5056]
- Modal hammer kit without accelerometers [CMAC 5059]
- Optical phase reference kit [CMSS 6155XK-U-CE]

### Battery and power supply

- Universal power supply [CMAC 5090]
- AX battery for use in ATEX and non ATEX units [CMAC 5092]

### Accelerometers

- Accelerometer, general purpose, low profile, side exit, industrial, non-NI, with ¼-28 and M6 mounting studs [CMSS 2200]
- Accelerometer, general purpose, low profile, side exit, industrial, non-NI, with M8 mounting stud [CMSS 2200-M8]
- Accelerometer, ATEX approved, 100 mV/g sensitivity, general purpose, industrial [CMSS 793-EE]
- Accelerometer, CSA approved, general purpose, industrial [CMSS 793-CA]
- Accelerometer, small footprint with integrated cable [CMSS 2111]
- Accelerometer, ATEX approved, intrinsically safe (IS), top exit, 100 mV/g sensitivity, industrial [CMSS 2210]
- Medium duty magnetic base, 35 mm (1.5 in.) diameter [CMSS 908-MD]
- Small magnetic base, 24.4 mm (1.00 in.) diameter [CMAC 109]

## Cables

### Accelerometer cables

- Accelerometer coiled cable, 2 m (6.6 ft.) [CMAC 5209]

### Tachometer cables

- BNC tachometer straight cable, 1 m (3.3 ft.) [CMAC 5211]
- Laser tachometer kit, straight cable, 2 m (6.6 ft.) [CMAC 5214]
  - for laser tachometer kit CMAC 5030K (sold individually)

### Extension cables

- CHX signal input straight extension cable, 5 m (16.4 ft.) [CMAC 5036]
- CHX signal input straight extension cable, 10 m (32.8 ft.) [CMAC 5037]
- Tachometer straight extension cable, 10 m (32.8 ft.) [CMAC 5044]
  - for use with laser tachometer kit CMAC 5030-K

### Miscellaneous cables

- Cable converter, two pin MIL to BNC [CMAC 3715]
- USB communication / power splitter straight cable, 2 m (6.6 ft.) [CMAC 5095]
- Fischer to BNC signal input straight cable, lightweight for hammer kits, 1 m (3.3 ft.) [CMAC 5023]
- Fischer to BNC signal input cable [CMAC 5088]
- Fischer to BNC coiled signal input cable [CMAC 5093]
- Splitter, four channel, two (2) required [CMAC 5079]
- Power / trigger splitter straight cable, 30 cm (11.8 in.) [CMAC 5032]
- Audio headphone straight cable [CMAC 5078]

### Miscellaneous accessories

- AX shoulder strap [CMAC 5073]
- AX hand strap [CMAC 5072]
- AX soft case, protective screen and pouch [CMAC 5071]

# SKF Microlog module suite

## Analysis modules designed for ease-of-use and versatility

SKF puts the power of knowledge engineer-
ing into your hands with advanced vibration
monitoring technologies that have made the
SKF Microlog series of analyzers the premier
choice for portable hand held condition
monitoring.

   Designed to handle a wide range of tasks
required for analysis of rotating machinery
in countless industries, SKF Microlog prod-
ucts offer customers the flexibility to select
individual modules for specific types of
analysis.

### SKF Microlog analysis modules

- Route
- Balancing
- Data Recorder
- FFT Analyzer
- Conformance Check
- Run up Coast down
- Frequency Response Function
- Spindle Test
- SKF Idler Sound Monitor
- Sensor Setup

The SKF Microlog series of analyzers are
available in pre-configured kits that include
modules designed to meet specific industry
requirements. Each SKF Microlog is shipped
with the full SKF Microlog suite of modules
installed.

**SKF Microlog analysis modules**

| Module | AX-F |
|---|---|
| Route | ✔ |
| Balancing | ✔ |
| Data Recorder | ✔ |
| FFT Analyzer | ✔ |
| Conformance Check | ✔ |
| Run up Coast down | ✔ |
| Frequency Response Function | ✔ |
| Spindle Test | ✔ |
| SKF Idler Sound Monitor | ✔ |
| Sensor Setup | ✔ |

**Legend:** (✔) Standard

# Route

## Route based data collection for your plant based maintenance program

Trending vibration data from critical and non-critical machines in your plant is essential to reduce unplanned downtime and maintenance costs. The SKF Microlog Analyzer "Route" module allows users to carry out routine data collection, using a multi-parameter approach, to collect and trend data to help diagnose machinery faults. Users can set up single channel, dual or simultaneous triaxial measurements. Your SKF host software's ROUTE feature allows you to build measurement collection sequences (ROUTEs) to help users perform the most efficient data collection. SKF Microlog ROUTE data collection is a very easy process, in fact, once you begin data collection, you need only press the Enter button repeatedly to sequentially collect data for every measurement POINT in your ROUTE.

A ROUTE is a list of measurement POINTs arranged in sequence for the most efficient data collection. The advantage of ROUTE data collection is that measurements can be sequenced for the most efficient data collection regardless of their location in your measurement database hierarchy. This method also allows a measurement POINT or POINTs to appear in many different ROUTEs, and provides for a ROUTE statistics report.
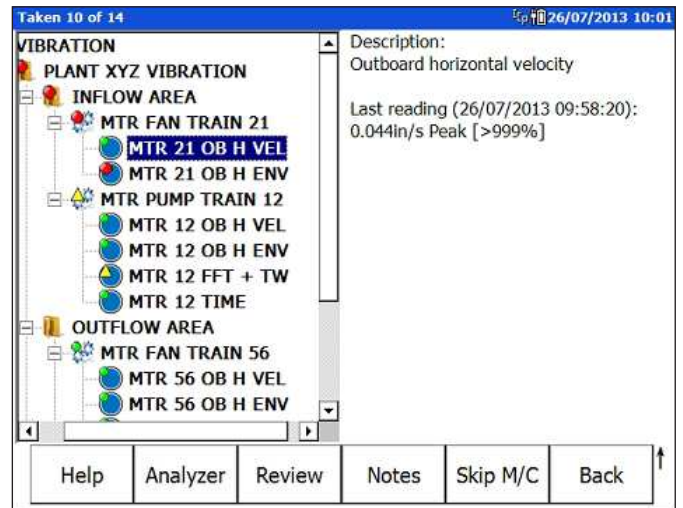


*Figure 1. ROUTE POINTs with alarm indicators.*

## Features

- Use of SKF's gE enveloped acceleration vibration measurement(s) to determine bearing condition.
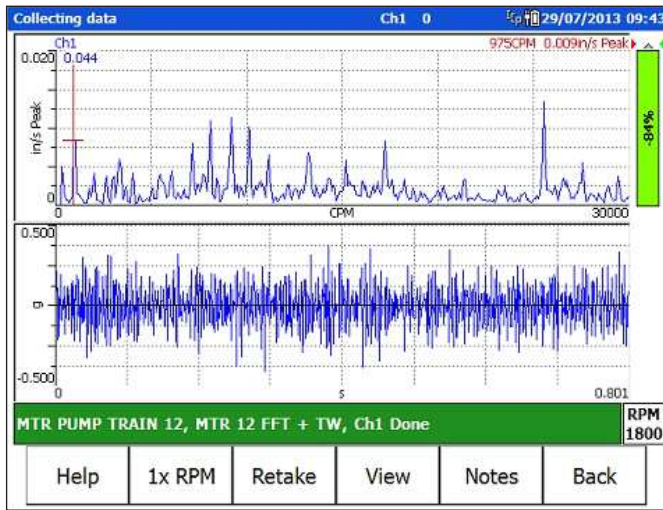- Collect, view and review Spectral and Time data simultaneously.

- Set alarms and thresholds to indicate machine problems.
- Use harmonic markers to rapidly locate integral orders in relation to their fundamental (1x) – simple, harmonic and fixed.
- Peak find.
- Y-axis graph scaling adjustment allows you to re-scale the plot to get a closer look at low amplitude components.
- Orbit POINTs display the shaft's most recent orbit data for the two input channels (CH1 and CH2). This can be used to show the movement of the shaft within the bearing.
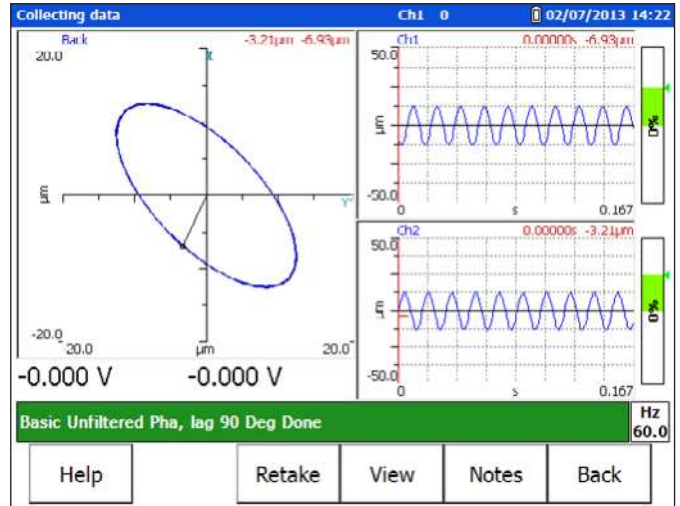


*Figure 2. Spectrum and Time data.*



*Figure 3. Orbit data.*

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- Manual Process measurement entry.
- Add coded notes to points or machines.



*Figure 4. Coded notes.*

- Spectral Banding provides alert and danger alarms on both peak and overall spectral values within a defined frequency band.
- The SKF Microlog data collector allows the user to configure up to 12 measurements for automatic data collection at one measure-ment point. Using the same sensor, the user need press only one button to sequentially collect all pre-configured MPA measurements.
- Speed tagging allows for very accurate speed values for dynamic SKF Microlog measurements, even in variable speed machinery.
- Display expansion reveals characteristics that may be hidden by the display mode or by the resolution without changing data col-lection parameters.
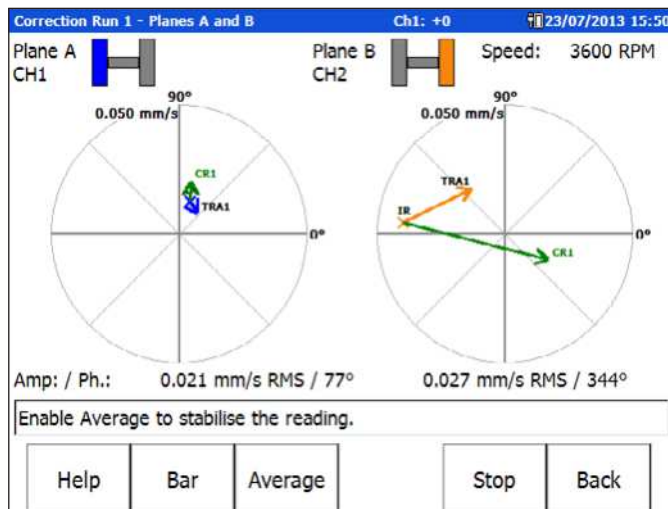
![Balancing icon] # Balancing

Unbalance is defined as: "The uneven distribution of mass about a rotor's rotating center line". The rotating center line can be defined as the axis about which the rotor would rotate if not constrained by its bearings. A secondary center line, often referred to as the geometric center line (the physical center line of the rotor) also exists. When these two center lines coincide, the rotor will be in a state of balance. When they are apart, the rotor will be unbalanced.

## Easy-to-use, on screen guidance

The SKF Microlog Balancing module resolves single plane, two plane and static-couple balances with high precision on rotating machine parts such as rotors for electric motors, fans, turbines, propellers and pumps. Includes two plane balance with prognosis, users can start with a two plane balance and after the initial trial weight run, the SKF Microlog calculates what the residual imbalance would be if you switched to a single plane balance. Clear, comprehensive setup menus and display screens with graphical data representations promote ease of operation. The Balancing module allows you to save your balance jobs for quick re-balancing of the same machine at future dates, or to review past balancing data.

The SKF Microlog is designed to interface with laser tachometers, optical tachometers, or stroboscopes for balancing phase measurements. Using the Balancing module, vibration and phase readings are taken to establish the magnitude and position of the unbalance force. The SKF Microlog then prompts the operator where to attach the correct amount of compensation weight – or where and how much material to remove. The result returns the center of gravity to the center line of the shaft and reduces vibration. Color coding of the balance data indicates when the desired balance level (user defined) has been achieved.

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Once a balancing job has been completed the solution is saved in the Balancing module. The file containing all the relevant details about the balance from initial to final amplitudes, to weights and angles can be imported into SKF's Analysis and Reporting Manager.

## Key features

- High precision one or two plane balancing
- Balance both slow and fast rotating machines
- Ability to resolve balance weights and trial weight estimator
- Easy to follow interface with graphical outputs

## Benefits of properly balanced machinery

- Minimize structural stress
- Minimize vibration
- Reduced noise levels
- Increased machine and bearing life
- Increased safety
- Lower operating costs

## Specifications

| | |
|---|---|
| Number of planes: | One or two (simultaneous or sequentially) dynamic or static and dynamic |
| Input signal types: | Accelerometers, velocity transducers and displacement probes |
| | Manual data entry |
| Measurement parameters: | Acceleration, A–V, A–D, velocity, V–D, displacement |
| Measurement units: | English, metric |
| Balance weight positions: | Polar (360°), fixed component (for fan blades, etc.) |
| Functions: | • Fixed weights and vibration levels<br>• Trial weight calculator<br>• Save partially completed runs<br>• Fix position of resultant weight location as number of positions/angle for fan balancing |

# Data Recorder

## Digital signal recordings for post-process analysis

The Data Recorder module enables the SKF Microlog to act as a digital signal recorder, allowing you to record a machine's raw vibration signal (time waveform) as a Microsoft Windows .WAV audio file. The .WAV file can be imported into SKF's Analysis and Reporting Manager to post-process the measurements as if you were performing measurements on the machine in real time. Data can be order tracked, time or sample based with selectable windows, sample sizes and much more. The SKF Microlog can capture up to four channels.
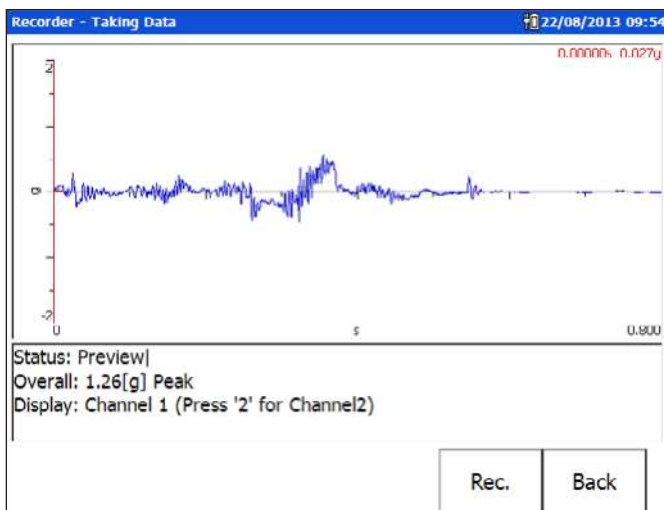


## Examples for use include:

- Analysis of very low speed machinery.
- Capturing intermittent events, and transient vibration signals from non-steady state machinery.
- With a problem machine that can't be run for any length of time without resulting in additional damage, the vibration signal can be recorded as .WAV data while the machine is run for a short time. The machine can then be shut down to avoid further damage and the recorded .WAV file played as many times as required to perform vibration analysis measurements on the machine's recorded vibration signal.

- For ship propulsion systems, instead of spending hours of gas turbine drive time taking analysis measurements at the ship's maximum speed, the ship can be run up to full speed, a five minute .WAV file recorded at full speed, then run back down and hours of analysis measurements can be performed on the recorded vibration signal, saving a lot of costly fuel!
- Signals may be obtained from numerous sources, including; accelerometers, microphones, pressure sensors, strain gauges, current shunts, tachometers, etc. If the data is transferred to a PC, files can be sent via email back to base. As such, if an operator or service engineer is unable to diagnose a problem on site, data can be sent for analysis by an expert.

## Specifications

| Input signal options: | Up to four channel input for all models |
|---|---|
| Frequency ranges: | <ul><li>Channel 1: 0 to 20 kHz maximum frequency range (minimum $F_{max}$ of 2 Hz)</li><li>Channel 1 and Channel 2: 0 to 10 kHz maximum frequency range for each channel (minimum $F_{max}$ of 2 Hz)</li><li>Channel 1 and Tachometer: 0 to 10 kHz maximum frequency range for each channel (minimum $F_{max}$ of 2 Hz)</li><li>Channels 1 and 2 and tacho 7.5 kHz</li><li>Channels 1, 2 and 3 and tacho 7.5 kHz</li></ul> |
| Data file format: | .WAV files |

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# FFT Analyzer (Including Bump Test functionality)

## View up to 25 600 lines of FFT resolution

The FFT Analyzer module allows you to quickly set up spectral / phase measurements for analysis. The user has the option to select up to four channels (model dependent), up to 25 600 lines of resolution and 80 kHz $F_{max}$ (single Channel). Data may be stored in the SKF Microlog for future review, and can be transferred to the host computer in comma separated value format (.csv) for import and analysis into the Analysis and Reporting Manager or spreadsheet applications such as Microsoft Excel. .

The friendly user interface displays spectrum and phase information in a simple, easy to understand format. By providing a phase vector reading (needed to diagnose some machine faults) an operator can build an understanding of the relative motion of individual parts of the machine. Placing sensors, and setting up and taking measurements can all be performed without the need to stop the machine. A tachometer reference is not required as the phase measurement may be taken by cross-referencing channels one and two, allowing for analysis of machinery with buried or covered shafts, such as gear boxes and pumps.

Easy to use predefined measurement settings can be used with the press of one button for immediate analysis, or can be modified to users own requirements. These include Bump Test, Orbit and Cross Phase to name but a few.

## Specifications

| | |
|---|---|
| Input signal types: | Accelerometers, velocity transducers, displacement probes |
| Y axis scaling units: | • Acceleration (g, m/s²), A-V (single integration), A-D (double integration)<br>• Velocity (IPS, mm/s), V-D (single integration)<br>• Displacement (µm, mil)<br>• gE, time |
| Measurement types: | Spectrum, time waveform, phase, orbit |
| Display: | • X axis: Hz, CPM<br>• Y axis: Linear, log and log dB |
| Input signal range: | ±25 V maximum |
| Signal scaling: | RMS, peak, peak to peak, true peak, true peak to peak |
| Bearing condition: | gE |
| Averaging: | • Exponential, RMS, peak hold or Time Synch<br>• Overlap: User definable % |
| High pass filters: | Off / 0,36, 1,1, 2, 10. 70, 200, 600, 2 500 Hz |
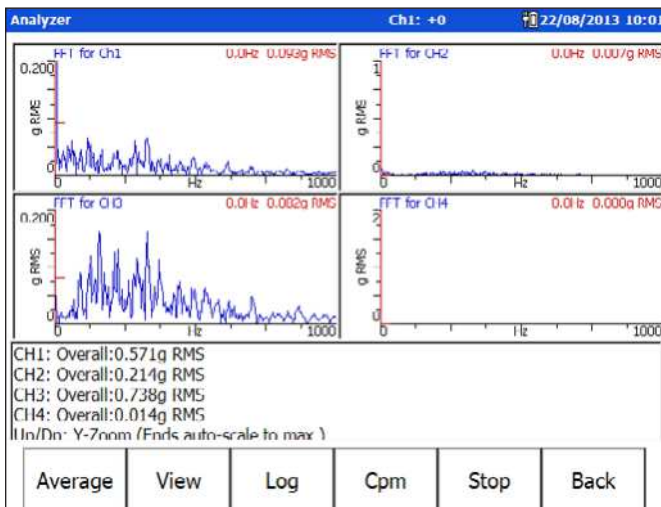
# Conformance Check

The Conformance Check module transforms the SKF Microlog into a tool for inspection and maintenance. An automated assessment compares vibration levels with established limits and a pass or fail indication is displayed to show whether the product complies with predefined quality indicators or required standards. Conformance Check has the ability to assess up to 64 individual fault criteria simultaneously and provide an on-screen indication if a warning or alarm level is reached.

## Easy pass / fail indication



By following simple on-screen instructions, an automated vibration assessment indicates the quality and / or health of your pump, motor or rotating mechanical device. This instant assessment enables you to quickly determine if your machinery is operating within its specified limits. The Conformance Check also allows your quality and installation personnel to check that the product complies with your predefined quality indicators and that your finished product meets the required standards, both at final assembly and after initial installation. To assist the user in attaching the transducer to the correct location, a picture of the machine showing the locations can be added to the test template.

## Data analysis

In addition to displaying a simple color coded grading of machinery health, measurement data can also be selectively recorded and stored in the SKF Microlog as required. All recorded data can be transferred to the desktop PC environment enabling test results to be uploaded into the Analysis and Reporting Manager or Microsoft Excel for more detailed analysis and presentation of results.

The Analysis and Reporting Manager assigns Check to Conformance data to the asset, allowing post install baseline readings.

## Standards for testing machinery

Machinery conformance may be determined with SKF test standards that are established in accordance with existing industry standards, for example ISO, API, NEMA and IEEE; or users can develop their own compliance test templates based upon custom conformance criteria specific to their business.

The templates can be loaded into the SKF Microlog, automatically setting up your pass/fail limits, facilitating proper machinery testing to meet the correct requirements. Each test template can also be used to form the basis of your own "custom" standard. Limits can be easily altered as required using a PC application included with the Conformance Check module.

If you require custom test templates and do not have available resources to create them, SKF is here to help. We can provide custom test templates. Simply tell us the specified vibration limits you need to measure and we will create a dedicated application specifically for your maintenance routines.

## Specifications

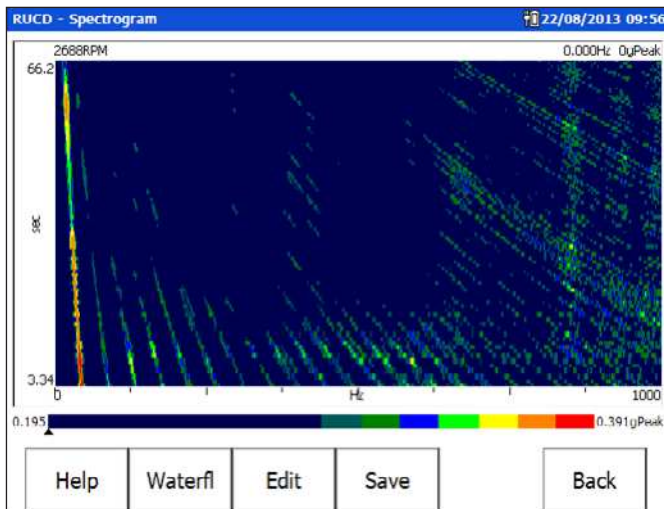| Measurement parameters: | 64 bands |
|---|---|
| Severity ratings: | 1 to 8 grades |
| Input signal types: | Accelerometers, velocity transducers, displacement probes or volts (supports triaxial accelerometers), microphones, dynamic pressure sensors |
| Measurement types: | Acceleration (g, m/s$^2$), velocity (IPS, mm/s), displacement (µm, mil, thou), gE |
| Input signal range: | ±25 V maximum |
| Signal scaling: | RMS, peak, peak to peak, average and dBs |
| Averaging: | • Exponential or RMS<br>• Overlap: User definable % |
| High pass filters: | Off/0,36 Hz/1,1 Hz/2 Hz/10 Hz/70 Hz |
| | Octave and $1/3$ octave band analysis A, B, and C weighting filters |

# Run up Coast down

## View machine vibration data during a complete power cycle

The Run up Coast down module analyzes data from machines where noise or vibration levels are changing with speed, time or load (applications that cause transient phenomena) to establish the critical / resonant speeds of a machine. The module simultaneously acquires a vibration and a tachometer signal and stores the data as a time waveform (.WAV file) for further analysis. The result of the analysis can be presented in a variety of formats: Bode, Nyquist, waterfall, color spectrogram or tables. The data may be stored in the SKF Microlog for future review, and can be transferred to the host computer in comma separated value format (.csv) for import and analysis into the Analysis and Reporting Manager or spreadsheet applications such as Microsoft Excel.

In the Analysis and Reporting Manager raw signals can be post processed allowing users to in-depth investigate machine power cycles.

## Specifications

| | |
|---|---|
| Signal Input: | Accelerometers, velocity transducers, displacement probes, user defined engineering units (EU's), V AC |
| Y axis scaling units: | Metric or imperial. Un-integrated, integrated or double integrated units. Examples: g, m/s$^2$, mm/s, in/sec, µm, mils |
| Analysis types: | Bode, Nyquist, waterfall, color spectrogram, table format |
| Display: | • X axis: Hz, CPM or orders<br>• Y axis: Linear, log |
| Input signal range: | ±25 V maximum |
| Signal scaling: | RMS, peak, peak to peak |
| High pass filters: | Off / 0,36, 1,1, 2, 10, 70 Hz |



## Key features

- User selectable number of pulses per revolution (including non integer numbers)
- Simultaneous display of any three orders (including non integer orders) and overall value or any four orders without an overall (Bode and Nyquist)
- The analysis and display takes place on the SKF Microlog, where results can be produced immediately while the operator is on site

# Frequency Response Function

## Structural analysis through modal testing and display

The Frequency Response Function (FRF) module is designed to enable a user to quickly establish a structure's properties (accelerance, apparent mass, mobility, impedance stiffness or compliance) by performing modal analysis using a calibrated hammer for the excitation. The FRF module can also measure and display the transfer function (ratio) between two transducers while a machine is running. Graphical representation of the modal parameters can aid in the characterization of a structure. The SKF Microlog clearly displays the FRF phase and coherence. Measurements can be exported to the Analysis and Reporting Manager for further viewing and analysis of the Operating Deflection Shapes (ODS). Third-party software can also be used to display and animate the spatial response of a structure in slow motion, overall motion and the motion of one part relative to another.



## Key benefits

- Simplified menus help to quickly and easily set up for a structural test
- The FRF module speeds up a modal test by using algorithms to automatically set the input range for the hammer, transducer and time
- Automatic setting of FFT window (rectangular or force and response)
- The FRF module has the ability to automatically detect and reject double hits or overloaded data
- Measure the transfer function between two transducers while a machine is running
- Display of coherence as color, such as the FRF is red where coherence is below the user defined limit

SKF Modal Analysis Hammer kits are available for use with the Frequency Response Function module. Reference model CMAC 5056 in the SKF Microlog accessories catalog.

## Specifications

| | |
|---|---|
| Signal input types: | • Modal analysis:<br>  – Channel 4 = Modally tuned hammer<br>  – Channels 1, 2 and 3 = Accelerometers, velocity transducers or displacement probes<br>• ODS analysis: Channels 1, 2 and 3 = Accelerometers, velocity transducers and displacement probes |
| Y axis scaling units: | • Accelerance: g/N, $m/s^2$/N, g/lbf, $m/s^2$/lbf<br>• Apparent mass: N/g, $N/m/s^2$, lbf/g, $lbfm/s^2$<br>• Mobility: ips/N, mm/s/N, ips/lbf, mm/s/lbf<br>• Impedance: N/ips, N/mm/s, lbf/ips, lbf/mms<br>• Compliance: mil/N, µm/N, mil/lbf, µm/lbf<br>• Stiffness: N/mil, N/µm, lbf/mil, lbf/µm |
| Display: | • FRF magnitude phase and coherence<br>• Y axis: Linear, log and log dB |
| Input signal range: | ±25 V maximum |
| Frequency range: | 20 kHz |

SKF

# Spindle Test

As world leader in the manufacturer of rolling bearings, SKF operates a multitude of machine tools worldwide. Originally based on experience in our bearing production factories, spindle engineering units and super precision bearing knowledge, SKF has developed a global concept consisting of detailed machine tool refurbishment procedures, acceptance criterias, specialized equipment, adapted business processes and global knowledge sharing systems for spindles. The SKF Spindle Assessment kit has been developed in conjunction with the SKF Machine Tool Precision Services and is designed to perform nine tests on machine tool spindles:

1 Imbalance
2 Mechanical condition
3 Bearing condition
4 Tool nose run out
5 Clamp force (ISO, HSK)
6 EM distance
7 Belt tension
8 Speed accuracy
9 Resonant frequency
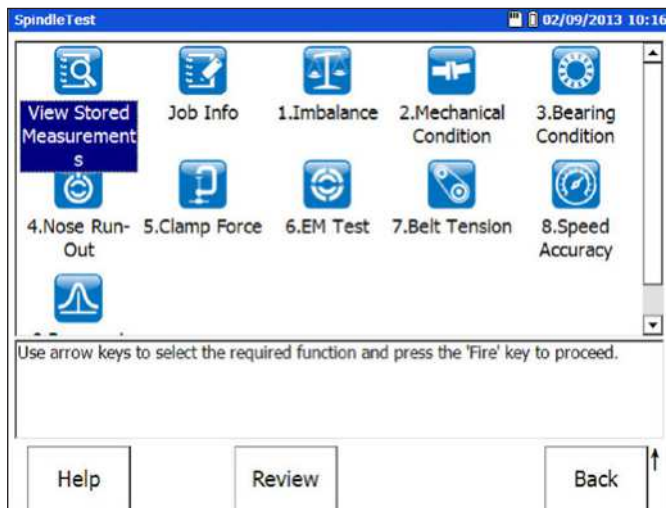
The easy-to-follow instructions, written by experts in spindle analysis, guide the user in assessing the general condition of a wide variety of spindles under various operating conditions, from spindles mounted in machine tools to those mounted in test rigs. Irrespective of whether your spindle is used for roughing, finishing, critical or ultra finish machining, the colorful display will show you if your spindle is still operating within boundaries set by the experts using an easy to read traffic light indicator system. The resonant frequency test has been taken directly from our world leading vibration analysis instruments to help you get the right answer the first time.

## Specifications

| | |
|---|---|
| Measurement parameters: | 64 bands |
| Severity ratings: | 1 to 8 grades |
| Input signal types: | Accelerometers, velocity transducers, displacement probes or volts (supports triaxial accelerometers), microphones, dynamic pressure sensors |
| Measurement types: | Acceleration (g, m/s$^2$), velocity (IPS, mm/s), displacement (µm, mil, thou), gE |
| Input signal range: | ±25 V maximum |
| Signal scaling: | RMS, peak, peak to peak, average and dBs |
| Averaging: | • Exponential or RMS<br>• Overlap: User definable % |
| High pass filters: | Off/0,36 Hz/1,1 Hz/2 Hz/10 Hz/70 Hz<br><br>Octave and $^1/_3$ octave band analysis A, B, and C weighting filters |

# SKF Idler Sound Monitor

## Detect conveyor idler faults with the SKF Microlog Idler Sound Monitor kit

In many industries, conveyors are an important part of a material handling system especially in mining and cement industries. Failure of an idler can lead to belt damage, expensive downtime and lost production. The SKF Idler Sound Monitor Kit was developed for early detection of faults in conveyor support and return idlers. Using acoustic enveloping technology, the SKF Idler Sound Monitor distinguishes between the sounds of a good idler and a faulty one. It can detect faulty idlers earlier and more reliably than, for instance, when a maintenance worker walks the length of the conveyor belt to listen or look for problems. The kit also provides shorter measurement time and earlier fault detection than a thermographic camera.

With the SKF Idler Sound Monitor module, the screen of the SKF Microlog displays a simple to understand "traffic light" visual alarm:

• Green for OK
• Yellow to indicate a "suspect" idler
• Red to indicate a "bad" idler
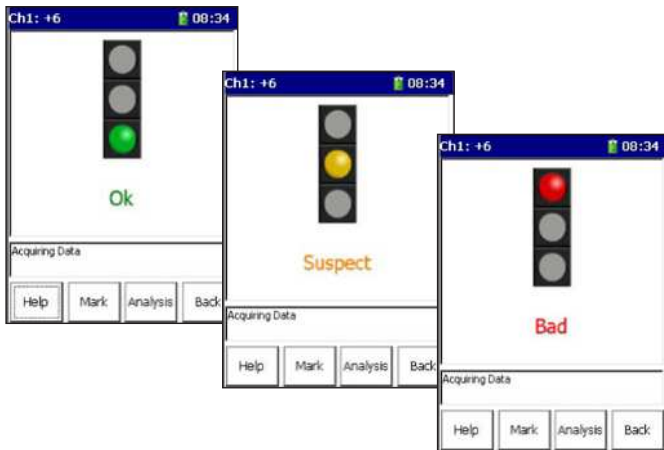


It is so easy to use that even inexperienced workers are able to detect faults with minimal training.

When a faulty idler is identified, the FFT Analyzer module allows you to quickly set up spectral / phase measurements for further fault detection. FFT Analyzer module data may be stored in the SKF Microlog for future review, and can be transferred to the host computer in comma separated value format (.csv) for import and analysis into the Analysis and Reporting Manager or spreadsheet applications such as Microsoft Excel.

With reliable detection up to 3 meters (10 feet) away while walking the belt (under optimal conditions), the SKF Idler Sound Monitor provides maintenance workers with a safe to use and objective tool for idler inspection. The Idler Sound Monitor serves as an alternative to traditional "walk arounds" that depend on the skill of the worker to listen and recognize a faulty idler. The instrument can be used with one hand, and therefore, complies with safe procedures for three-point contact while working in a plant or mine.

## Benefits

• Early detection of faulty conveyor idlers
• Helps avoid unplanned downtime
• Helps avoid costly belt damage and hazardous repairs
• Offers safer, easier inspection compared to traditional conveyor belt walk arounds
• Can be used as part of an operator driven reliability (ODR) maintenance program
• FFT Analyzer module for further diagnosis

## Measurement overview

SKF Idler Sound Monitor "listens" to each roller's sound and simulta-neously applies four acoustic measurements that are preset to best detect idler faults for typical conveyor conditions. These measure-ments are set up to monitor the types of sound emitted by conveyor idler rollers and filter out other unwanted sounds. The four tech-niques used to analyze data and detect faults are:

**1** gE True Peak
   – Detect impact type vibration
**2** gE Root Sum Square (RSS) overall
   – Detect overall magnitude of impact vibration
**3** Kurtosis
   – Detect whether vibration signal is a hiss, crackle, rumbling
**4** Harmonic Activity Indicator (HAI)
   – Bearing har-monic activity
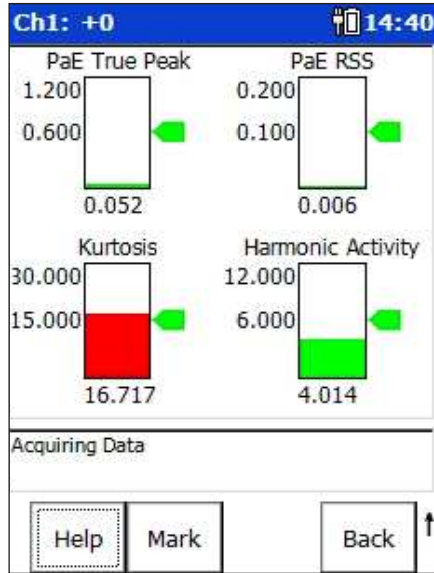


In addition to the simple traffic light display, customers also have the option to display each measurement value.

### Software options

• The SKF Idler Sound Monitor data can be transferred to the host computer in comma separated value format (.csv) for import into spreadsheet applications such as Microsoft Excel or into Microsoft Word tables.

⚙ # Sensor Setup

The Sensor setup module provides users with a set of predefined SKF Microlog Analyzer accessories with set parameters attributed to that particular accessory. Users can also add their own sensors to the Sensor Setup module with particular parameters related to their own sensors based on calibration data. Any of these sensors can then be selected from the set up section within the modules without having to enter the parameters each time they take a measurement. Note that this is not applicable to the Route module.
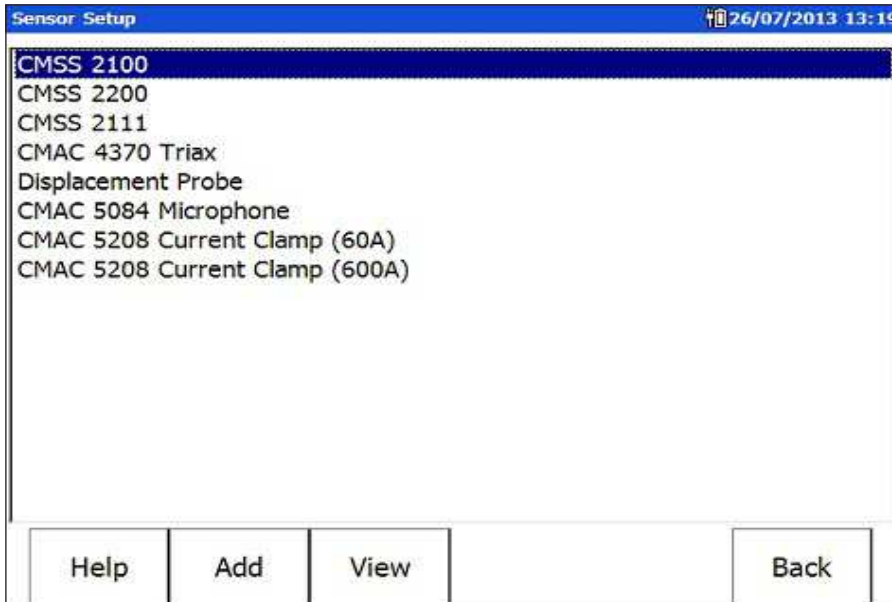


*The SKF Microlog AX series Sensor Setup screen showing default sensors.*

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