Connecting the Inspector 400 Ultrasonic Probe to the SKF Microlog CMVA 60

By Torsten Bark • SKF

How to connect – components required

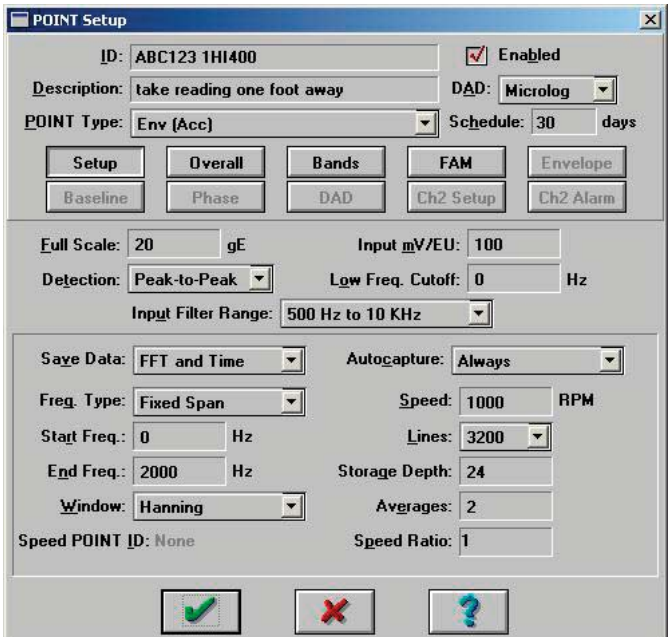
- SKF Microlog CMVA 60
- Inspector 400 kit CMIN 400-K, includes:
  - Ultrasonic probe
  - Headset
  - Connection cable, CMAC 8600-10 1,8 m *(6 ft.)* input/output cable, 1/8 in. male phono plug to male BNC connector
  - 1-2 connector, book cassette adapter

Note: 1-2 connector is not needed if probe is exclusively used only with one device at a time, either with the SKF Microlog or the headset.

Fig. 1. Components for connecting the Inspector 400 ultrasonic probe to the SKF Microlog CMVA 60.

The connection cable was built with a miniature phono plug that should be inserted into the audio output located at the back of the ultrasonic detector. The other end of the cable terminates with a standard BNC connector, which connects to the SKF Microlog's BNC input using a standard BNC adapter. Use the 1-2 connector if you wish to use a headset and the SKF Microlog at the same time (→ **fig. 1**).

The test using the Inspector 400 kit and the SKF Microlog CMVA 60 for bearing defect detection was conducted on a rotor kit. Bearings with small inner race defect, outer race defect and no defect were used for data collection.



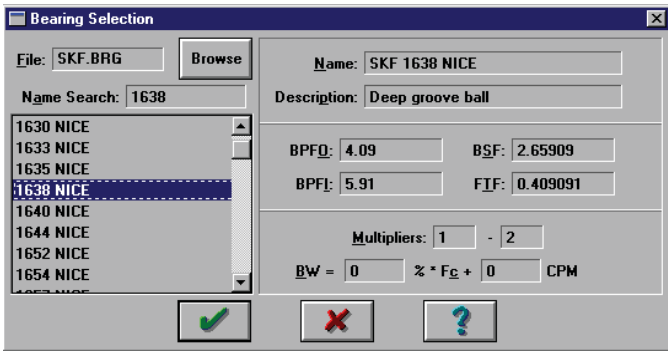


Fig. 2. Example of an ultrasonic point setup.

Fig. 3. Bearing information.

Graphical results

I. SKF 1638 nice bearing with no defects (good bearing)

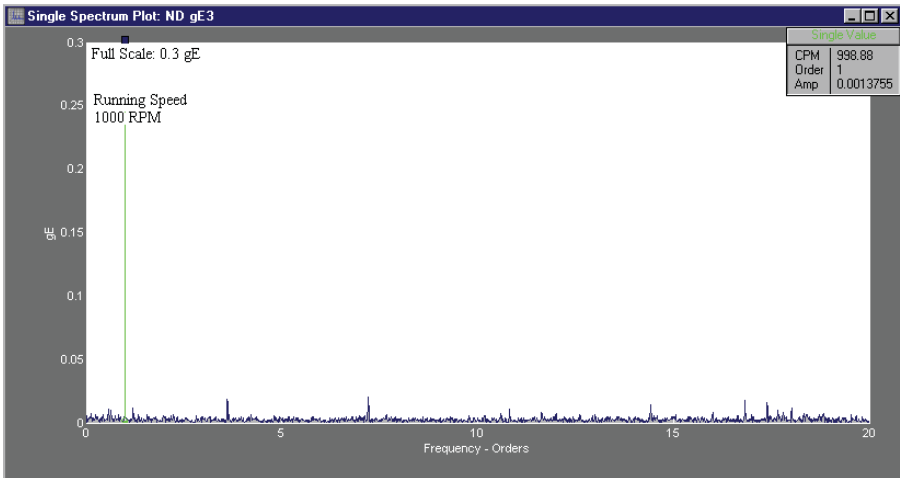


Fig. 4. Acceleration sensor, enveloped acceleration (gE3). Note: Valid spectrum for a "good bearing".

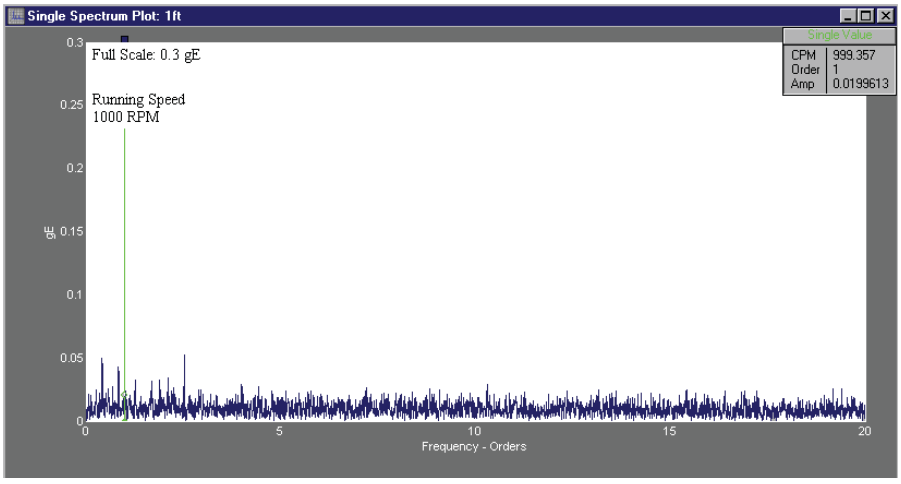


Fig. 5. Ultrasonic probe, 0,3 m (1 ft.) away, enveloped acceleration (gE3).

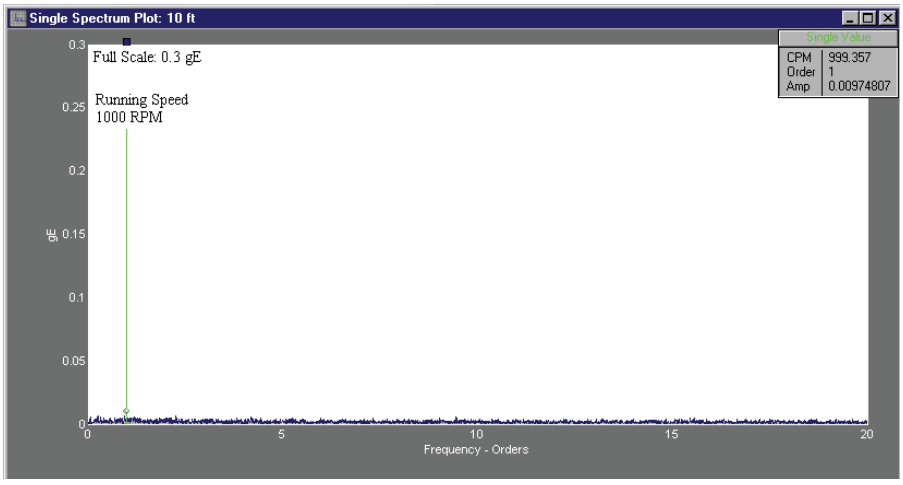


Fig. 6. Ultrasonic probe, 3 m (10 ft.) away, enveloped acceleration (gE3).

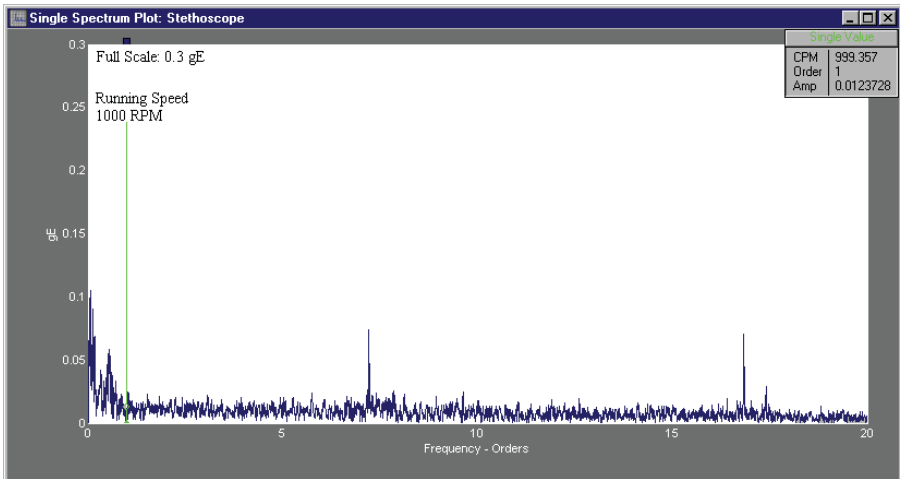


Fig. 7. Ultrasonic probe, stethoscope, enveloped acceleration (gE3).

II. SKF 1638 nice bearing with an inner race defect

Fig. 8. Acceleration sensor, enveloped acceleration (gE3). Note: Inner race defect and some looseness detected.

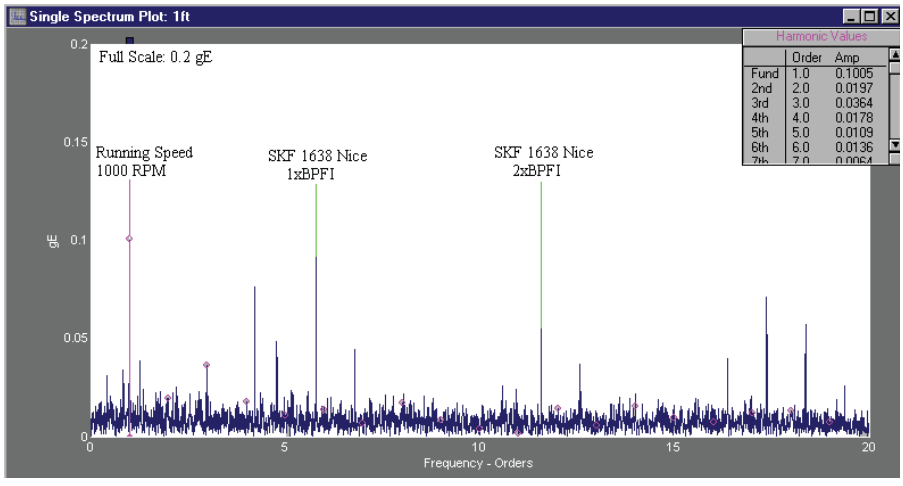


Fig. 9. Ultrasonic probe, 0,3 m (1 ft.) away, enveloped acceleration (gE3).

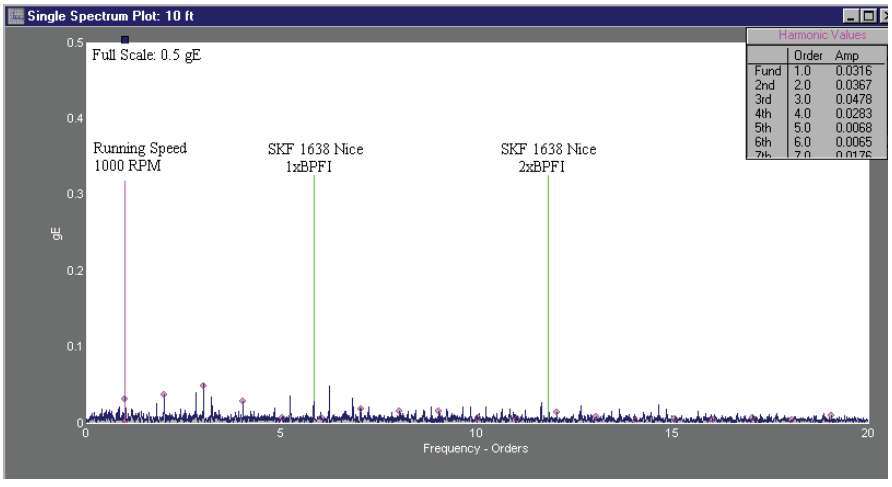


Fig. 10. Ultrasonic probe, 3 m (10 ft.) away, enveloped acceleration (gE3) at 1 000 r/min. Note: Inner race defect hard to detect in 3 m (10 ft.) distance.

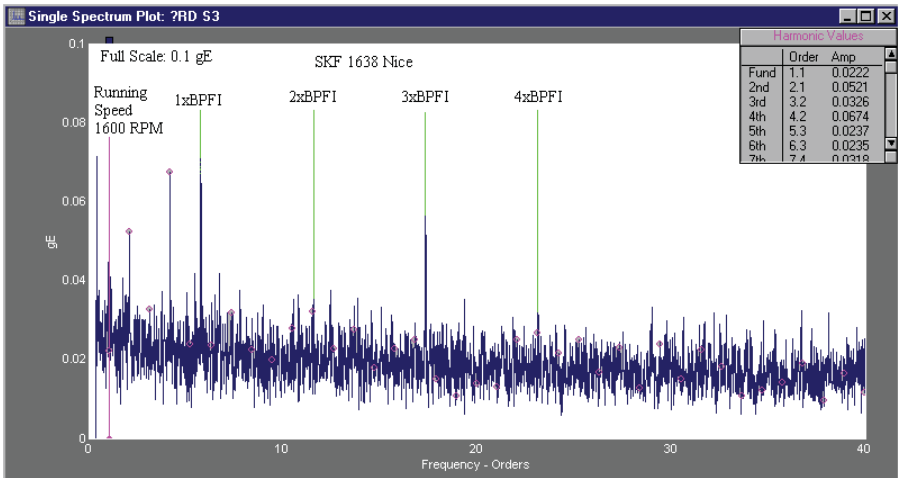


Fig. 11. Ultrasonic probe, 3 m (10 ft.) away, enveloped acceleration (gE3) at 1 600 r/min and 40 orders. Note: Inner race defect clearly visibly at higher speeds and 3 m (10 ft.) away.

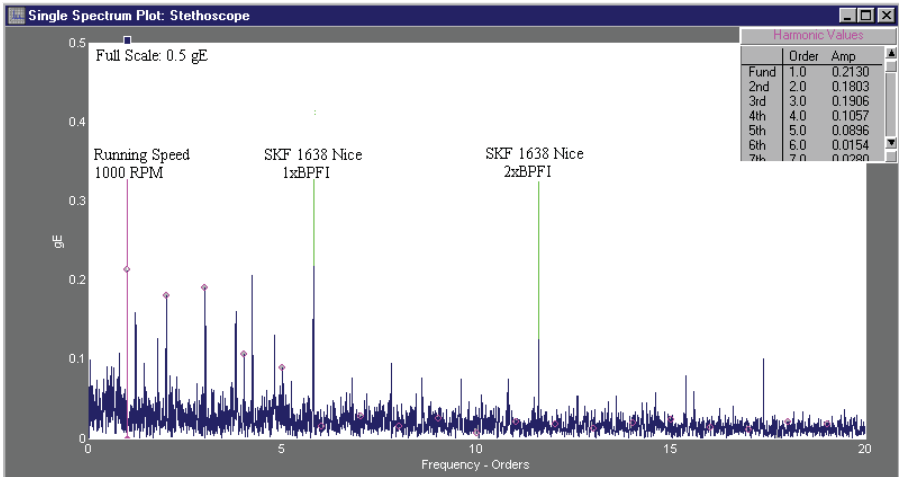


Fig. 12. Ultrasonic probe, stethoscope, enveloped acceleration (gE3).

III. SKF 1638 nice bearing with an outer race defect

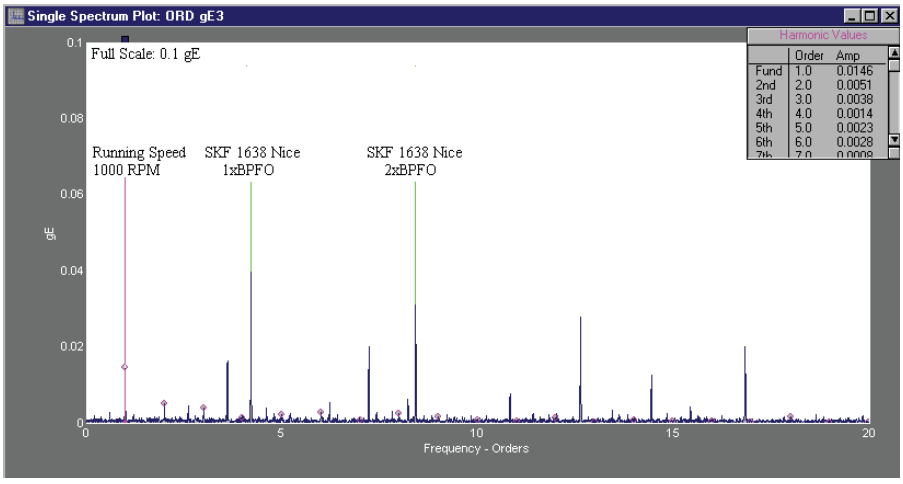


Fig. 13. Acceleration sensor, enveloped acceleration (gE3).

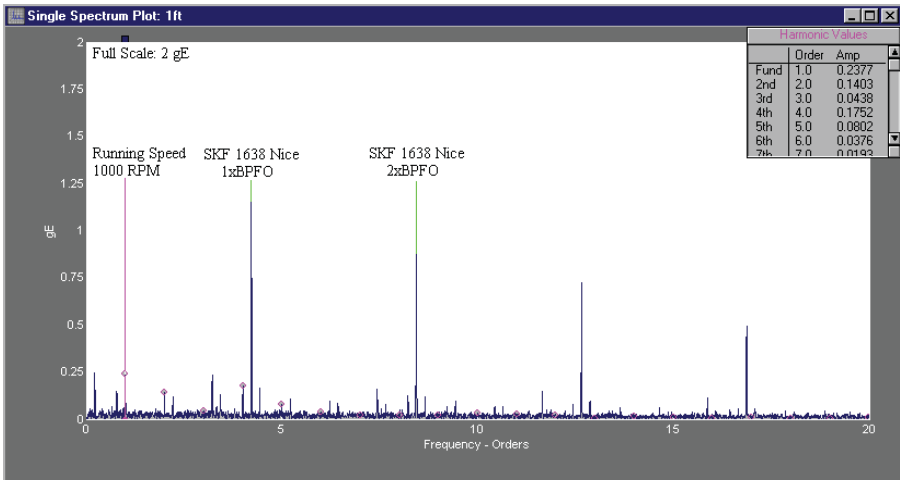


Fig. 14. Ultrasonic probe, 0,3 m (1 ft.) away, enveloped acceleration (gE3).

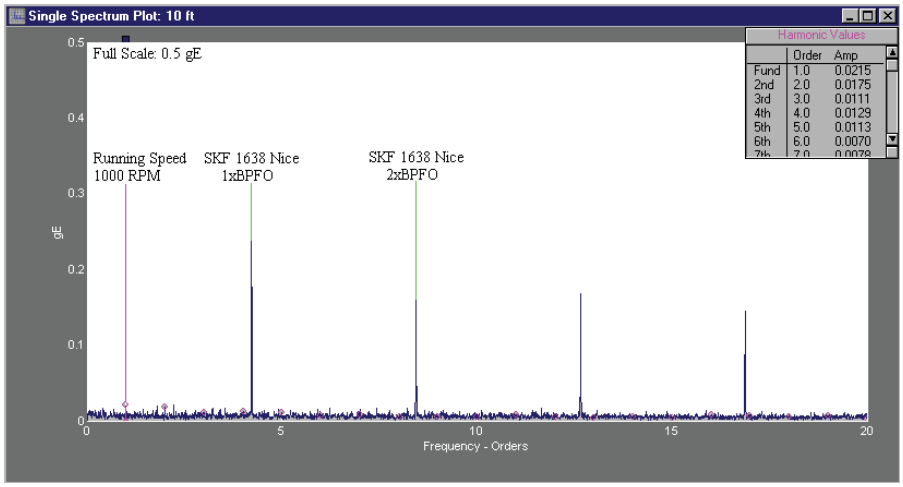


Fig. 15. Ultrasonic probe, 3 m (10 ft.) away, enveloped acceleration (gE3).

Summary

Supplementing vibration testing with spectral analysis of the output signal from the Inspector 400 can be a helpful tool when used for the analysis of bearing and other types of mechanical faults. The Inspector 400 is an ultrasonic instrument detecting frequencies centered at 40 kHz, ±20 kHz. The ultrasonic signals are then demodulated to produce an audible signal, which is heard using the headphones or viewed using the SKF Microlog. The amplitudes of the spectrums not only depend on the vibration, but also depend on the medium the signals are traveling through. As a result, the data is not easily scalable and therefore difficult to trend. Nevertheless, by using the SKF Microlog, the spectral data can be analyzed and the cause of the machine problem determined. The bearing defect frequencies can be heard and their spectrum viewed even by taking the data 3 m *(10 ft.)* away. Practically, the machine analyst could rapidly scan the machine with the Inspector 400 and the headset. When an unusual sound from a bearing is detected, then a SKF Microlog measurement will provide the analyst with useful data.

For the usual data collection including trending, the SKF Microlog and an accelerometer is still the best choice.

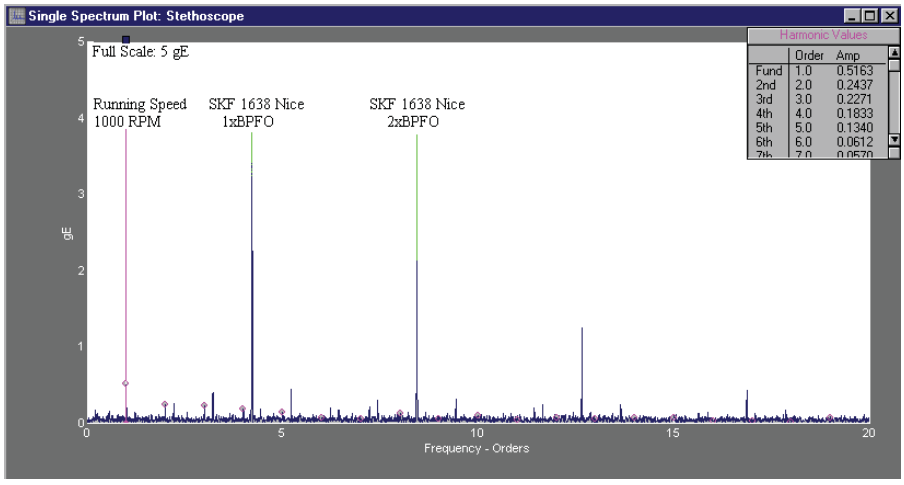


Fig. 16. Ultrasonic probe, stethoscope, enveloped acceleration (gE3).

Please contact:

SKF USA Inc.
Condition Monitoring Center – San Diego
5271 Viewridge Court · San Diego, California 92123 USA
Tel: +1 858-496-3400 · Fax: +1 858 496-3531

Web: www.skf.com/cm

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