



Asset Health Condition Report - Fan AIR 1337

Customer Information

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Asset Information

Asset Name	Fan AIR 1337
Manufacturer	manufacturer AIR
Model No.	AIR-0815
Year of Manufacture	1992

Machine Input

Application Type	Motor
Application Power	< 300 kW
Foundation	Rigid
ISO-Classification	ISO 20816-3
Recording Date	16.10.2025 08:42:00
Coupling	Direct
Line Frequency	Variable Frequency Drive
Sensor Position	Application Side



Service/Maintenance Information

Op. Hours Since Last Service	259763 h
Last Service	22.05.2025
Next Planned Service	07.07.2060
Measurement Reasons	Routine measurement after repair

For any product information, found inconsistencies, contact us at support.diagnostic@ifm.com.

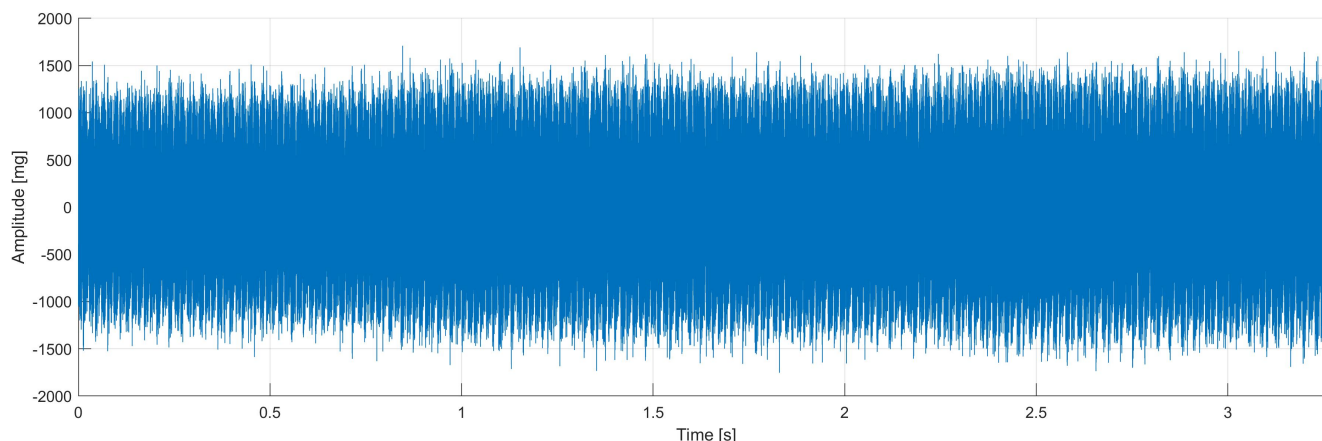


Signal Sanity Check

✓ OK

Machine Speed (User Input) 950 rpm
Estimated Machine Speed 938 rpm
Machine Speed Sanity Check ✓ OK (User input speed tuned: 937 rpm)

Raw Acceleration Time Waveform



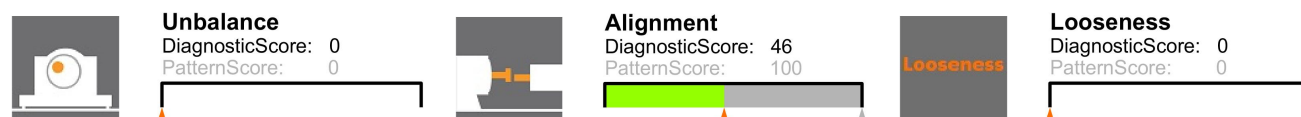
Used Signal Portion: $\approx$ 3.3 s of total 10.0 s

Diagnostic Level Overview

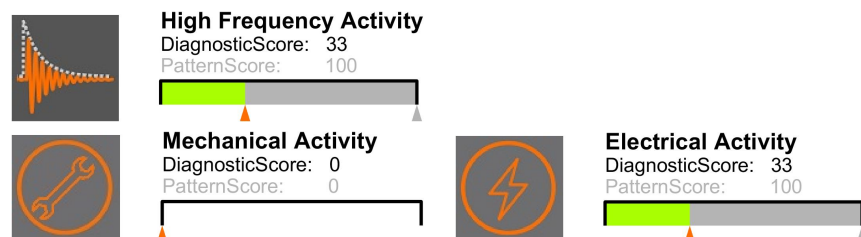
✓ Level 1: Vibration Energy (Total Machine)



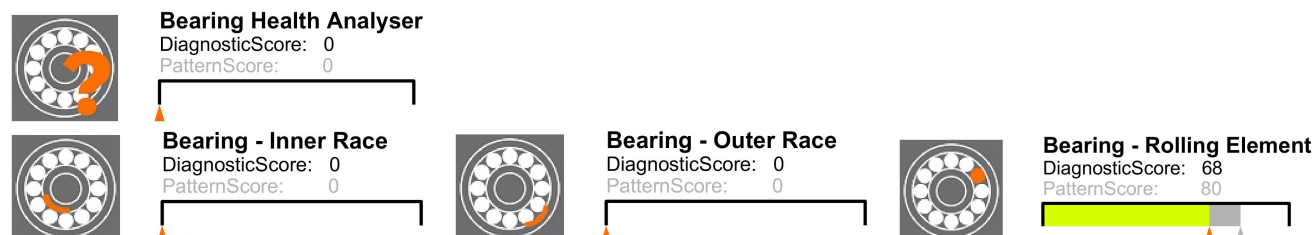
✓ Level 2: Vibration Energy (Fault-Specific)



⚠ Level 3 High-Frequency Signature



⚠ Level 4: Automated Bearing Diagnostics



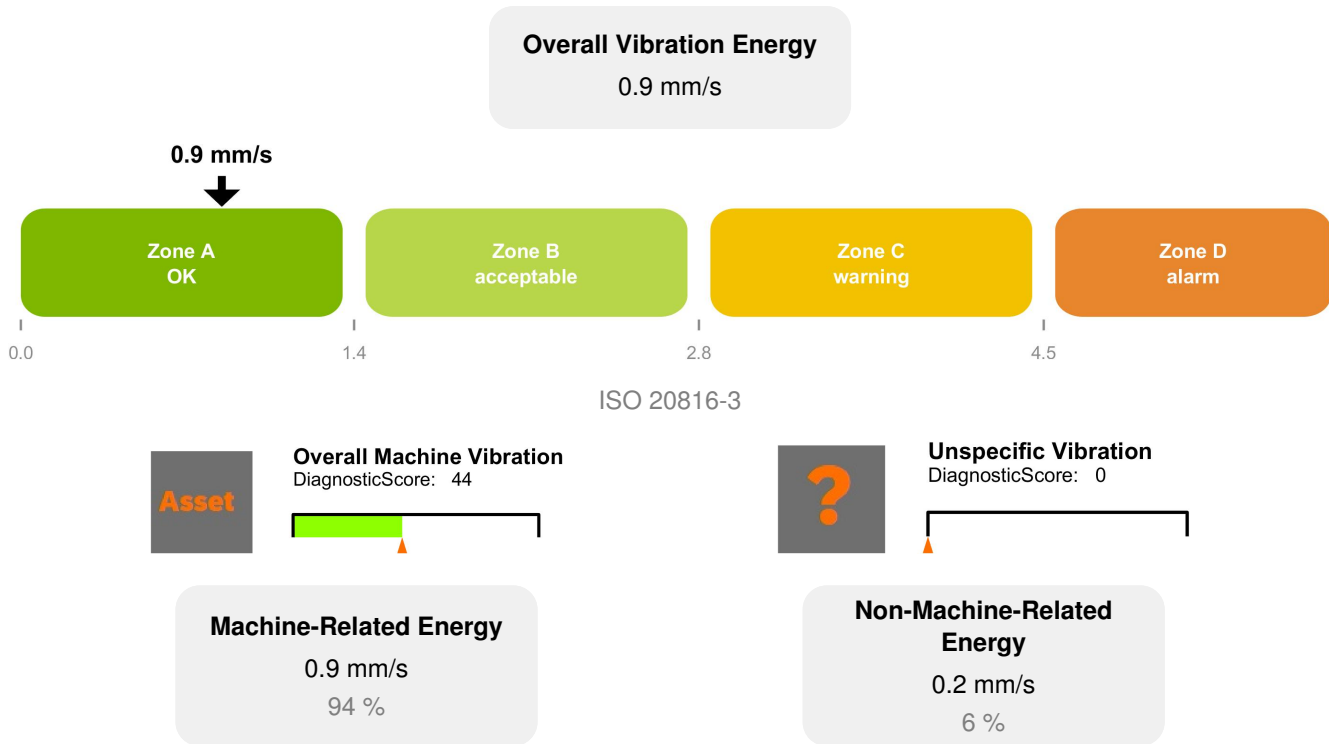


Diagnostic Level 1: Vibration Energy (Total Machine)

✓ OK

This level provides the overall condition to give a quick general impression of the machine.

It answers the question: *Is the overall machine behaviour conspicuous, and can this be attributed to the machine itself or its surroundings?*



Recommendation: ✓

No failure detected.



Diagnostic Level 2: Fault-Specific Vibration Energy

✓ OK

This level provides a more detailed view of the machine condition.

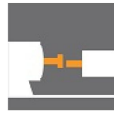
It answers the question: *Can the observed vibration behaviour be linked to common mechanical fault patterns?*



Unbalance

DiagnosticScore: 0

PatternScore: 0



Alignment

DiagnosticScore: 46

PatternScore: 100



Looseness

DiagnosticScore: 0

PatternScore: 0

Unbalance Energy

0.7 mm/s

51%

Alignment Energy

0.6 mm/s

42%

Looseness Energy

0.1 mm/s

1%

Recommendation: ✓

No failure detected.

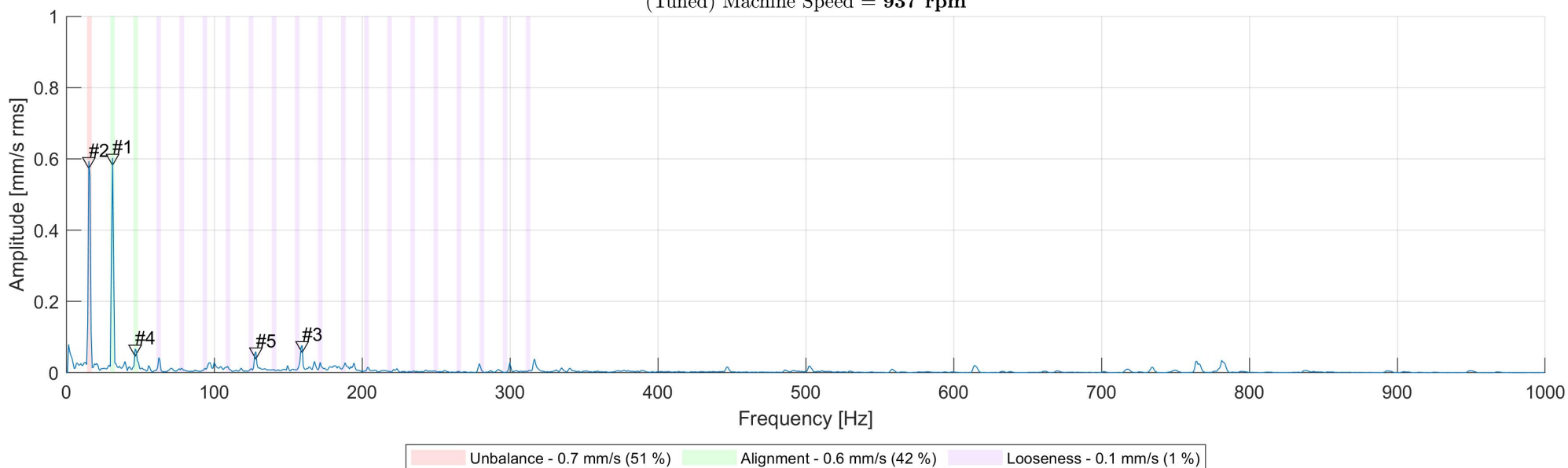


Diagnostic Level 2 Details: Fault-Specific Vibration Energy

This diagram breaks the machine's vibration down into its individual components. Instead of showing one single value, it reveals which parts of the movement occur how strongly – a bit like splitting a sound into its individual tones. This makes it possible to tell different mechanical effects apart and to see where the machine's energy actually comes from.

Machine (Velocity) Spectrum

(Tuned) Machine Speed = 937 rpm



▽ max 5 peaks

#	Frequency	Order	Amplitude
1	31.3 Hz	2.00 X	0.6 mm/s rms
2	15.3 Hz	0.98 X	0.6 mm/s rms
3	159.5 Hz	10.21 X	0.1 mm/s rms
4	46.5 Hz	2.98 X	0.1 mm/s rms
5	128.2 Hz	8.21 X	0.1 mm/s rms

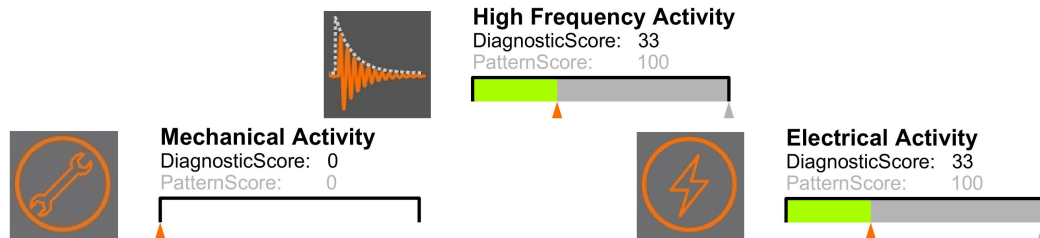


Diagnostic Level 3: High-Frequency Signature

▲ Activity

This level provides an overview about the high-frequency activity (500...6000 Hz).

It answers the question: *Can the observed high-frequency activity be linked to mechanical or electrical sources?*



Band Pass Filtered (500...6000 Hz)

Filtered a-Peak

1697 mg

Filtered a-RMS

765 mg

Filtered Crest

2.2

Filtered Exc. Kurtosis

-1.3

No Filter

a-Peak

1753 mg

a-RMS

766 mg

Crest

2.3

Exc. Kurtosis

-1.3

Recommendation: High-Frequency Signature ▲

High-frequency activity with indications for potential electrical signature found, check the automated bearing diagnostics for details.

Possible Causes:

- Variable frequency drive
- Measurement related (EMC)

Recommended Actions

- Monitor the trend of vibration.
- Compare to similar machine.
- Check for cable routing and grounding.
- Consider frequency-selective approach for bearing monitoring.
- Check variable frequency drive parameters.

Failure Description:

- Not necessarily a failure, might be typical for variable frequency driven machines
- Peaks are dependent on load and/or variable frequency drive parameters
- Non-optimal variable frequency drive parameters for driven motor
- Improper sensor cable routing or grounding

Failure Pattern:

- Complex vibration pattern with multiple sharp peaks ("haystack(s)" in the acceleration spectrum), especially around the switching frequency of the variable frequency drive
- Significant peaks and/or distinct pattern in the envelope spectrum, especially in relation to the line frequency

Alternative Damage Patterns:

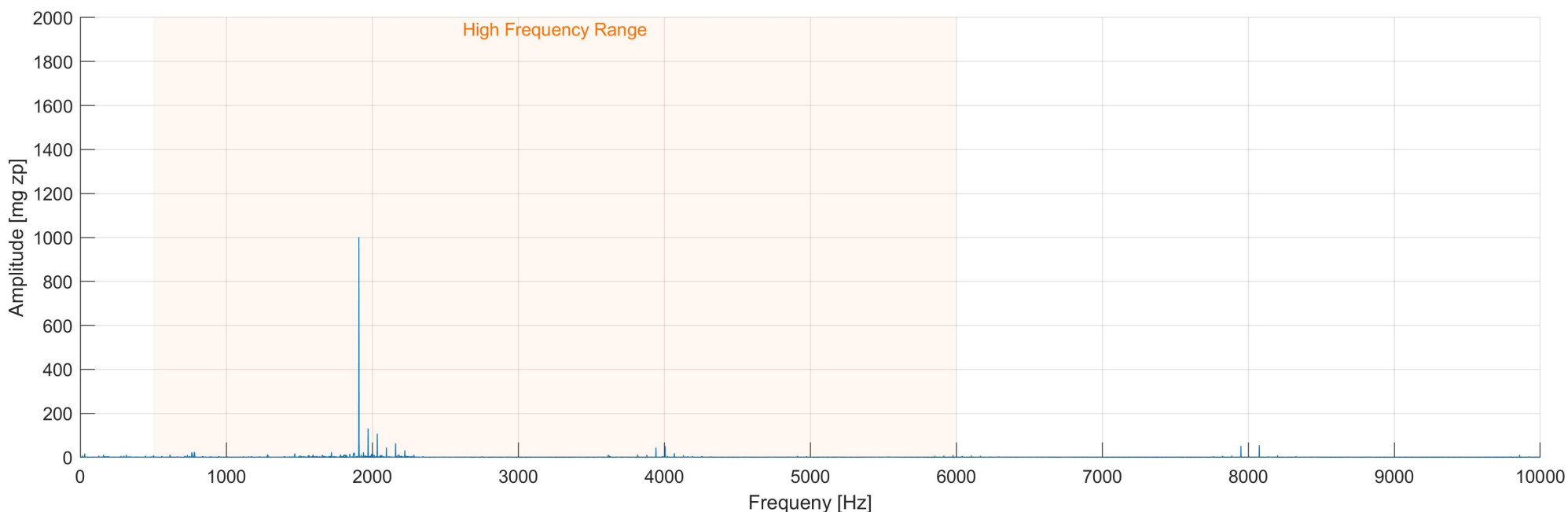
- External vibration from an adjacent machine
- Combination of mechanical and electrical faults
- Bearing or gearing



Diagnostic Level 3 Details: High-Frequency Signature

This diagram shows the high-frequency portion of the signal. Its purpose is to make small, fast vibrations visible that would otherwise be hidden behind the machine's main movement. The highlighted range is the area most sensitive to these early signs, which makes this view a useful tool for detecting potential issues in early stages.

High-Frequency (Acceleration) Spectrum

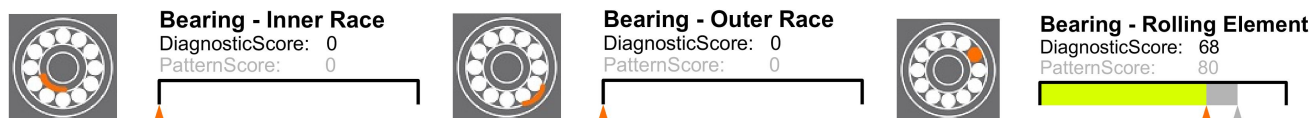




Diagnostic Level 4: Automated Bearing Diagnostics ▲ Pattern

This level provides a detailed view of the high-frequency content with the help of a demodulating technique. It answers the question: *Are there distinct patterns in the envelope spectrum — and can they be linked a mechanical (e.g. bearing) source?*

(User Input) Bearing Diagnostics



Specific Bearing Indicators

Bearing Inner Race 11 mg rms	Bearing Outer Race 36 mg rms	Bearing Rolling Element 162 mg rms
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User Input Bearing SKF 7415

Speed	Inner Race	Outer Race	Rolling Element	Cage
@ 15.61 Hz	4.9480 X 77.25 Hz	3.0520 X 47.65 Hz	3.9830 X 62.19 Hz	0.3820 X 5.96 Hz

Intelligent Bearing Diagnostics



Bearing Signature Energy 0 mg rms

Additional Bearing Indicators

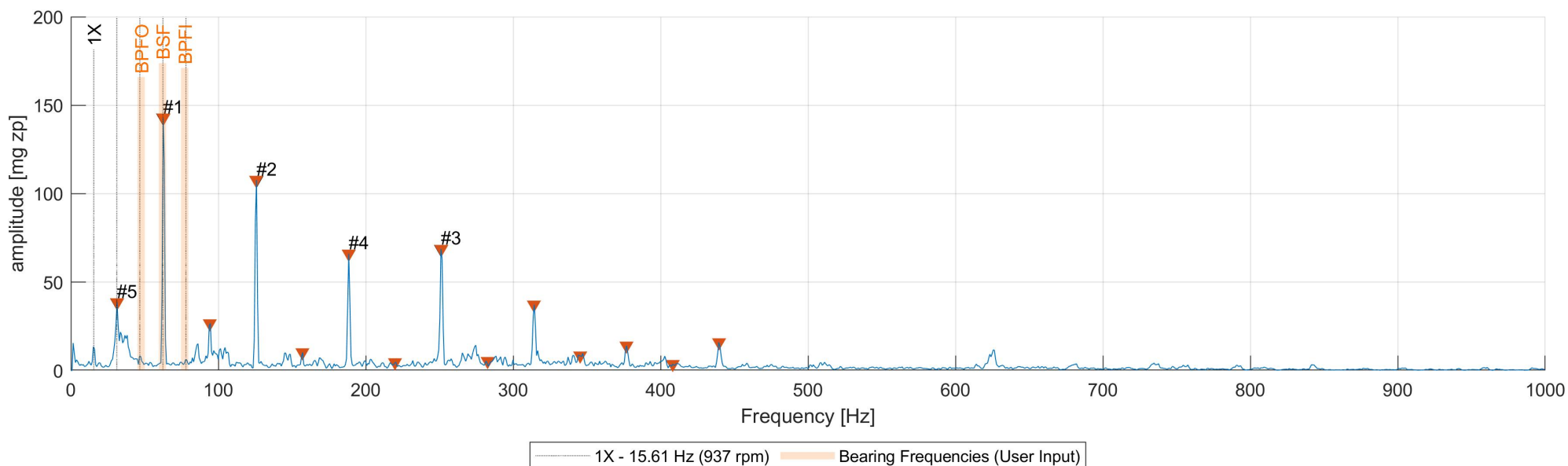
BearingScout™ Generic 203 mg rms	BearingScout™ Specific 110 mg rms	Crest 2.3	Exc. Kurtosis -1.3
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Diagnostic Level 4 Details: Automated Bearing Diagnostics

This diagram shows the envelope analysis - which extracts weak, repetitive impact signals hidden beneath the dominant machine vibration. This is a key method for detecting local bearing defects. The following diagnostic result is based on new algorithm developments and must be taken with caution!

Envelope Spectrum With Automated Bearing Diagnostics



Envelope Energy

0...1000 Hz
185 mg rms
100 %

▼ Pot. Variable Frequency Drive

31.4 Hz $\hat{=}$ 2.01 X
167 mg rms
82 %

▽ max 5 peaks

#	Frequency	Order	Amplitude
1	62.6 Hz	4.01 X	143 mg zp
2	125.9 Hz	8.06 X	108 mg zp
3	251.0 Hz	16.08 X	69 mg zp
4	188.4 Hz	12.07 X	66 mg zp
5	31.3 Hz	2.00 X	39 mg zp



Recommendation: Bearing Signature ▲

Bearing rolling element signature activity detected based on provided bearing user input information.

Detected signature by automated bearing diagnostics does not indicate any bearing-related activity.

Potential electrical signature detected by automated bearing diagnostics.

Possible Causes:

- Overload, shock loading or breakage
- Fatigue/wear and tear
- Insufficient lubrication or contaminated lubricant
- Inadequate sealing
- Corrosion
- Incorrect assembly
- Electrical current passage

Recommended Actions:

- Relubricate according to manufacturer specifications.
- Clean and protect against corrosion.
- Plan and carry out replacement of the rolling bearings at the next planned downtime.
- Check the shape and for position tolerances of the connecting components during repairs.
- Monitor the trend of vibration and temperature levels.

Failure Description:

- Damage to a rolling element or the raceway of the rolling bearing (pitting & cracks)
- Increased play or increased friction

Failure Pattern:

- Amplitude at the rolling bearing damage frequencies in the envelope spectrum
- Transient peaks in the time signal
- Increased temperatures in the bearing in the event of an advanced defect
- Increased vibration acceleration trend

Alternative Damage Patterns:

- Electrical faults
- Gearing



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General Information

DiagnosticScore	Evaluation of pattern and energy forms a certain indicator to describe the machine condition (it is not a probability). Each failure type is a combination of pattern and energy. Pattern without energy, or energy without pattern, respectively, is not assumed to be a specific issue. The energy evaluation is based on the corresponding ISO standard classification in combination with the provided machine speed.
PatternScore	This describes how distinct certain spectral components are and how their distribution aligns with certain failure types.
BearingScout™	Patented bearing demodulation technique to determine the corresponding bearing-associated energy. This can be done generically (without further input) and in specific manners, whereby the specific BearingScout™ will only be calculated if all relevant bearing frequencies (inner race, outer race and rolling element) are provided.
Unspecific Vibration	All non-machine-related components are summarised in this specific failure type, i.e. no relation to the machine speed. An incorrect machine speed, other machines, belt drives and/or resonances can increase this failure type.
High Frequency	This describes the activity in the higher frequency range (500...6000 Hz) and can give indications of certain failure mechanisms, e.g. bearing-related, electrical-related, gearing-related etc. A high DiagnosticScore in combination with a low PatternScore may indicate a high-frequency broadband excitation mechanism, e.g. cavitation, friction and lubrication.
Machine Speed Correction	The provided machine speed is verified and adjusted to the most probable machine speed within a certain frequency range.
Automated Bearing Diagnostics	New ifm diagnostic technology is used for automatical evaluation of patterns within the envelope spectrum, which results in a certain diagnostic result. Additional sanity checks are applied.

Figure Descriptions

Raw Acceleration Time Waveform	Shows the used portion of the time waveform for report generation.
Machine (Velocity) Spectrum	Shows the spectral assignment and energy distribution of the different machine failures.
High-Frequency Acceleration Spectrum	Frequency representation of the acceleration time waveform across the measured frequency range. The high-frequency range for demodulation is highlighted additionally.
HFFT Demodulated Envelope Spectrum with Automated Diagnostics	Shows demodulation spectrum for bearing diagnostics. Dominant low-frequency spectral components are removed to highlight any bearing-related peaks. Additionally, potential spectral patterns are highlighted.