DynaLogger HF+/HF+s

PN 101112 | NCM 9027.89.99 | HS 902789 (stainless steel base)
PN 101110 | NCM 9027.89.99 | HS 902789 (aluminum base)

Datasheet Jun. 2024

Overview

The **HF+/HF+s** wireless sensor is designed to identify symptoms of failure modes or defects in machinery and equipment in a **wide variety of field applications.** Due to its **wide frequency spectrum**, the **HF+** delivers complete monitoring in terms of triaxial vibration and temperature for **low to high speed equipment.** In addition, the solution has an **online platform**, with no need for local installation, with various tools to help analyze the data and enable constant monitoring of asset health.

The **HF+/HF+s** IoT sensor has two monitoring modes: spectral/waveform and telemetry. The band-configurable **telemetry monitoring** includes various metrics such as: acceleration, speed and displacement in RMS, peak, peak-peak and crest factor, as well as skewness, kurtosis and contact temperature. In **spectral monitoring**, different tools can be used: spectrum, waveform (linear, circular and orbital), frequency filters, cepstrum, spectral envelope (demodulation), autocorrelation and multi-metrics.

IoT solution for wireless monitoring

- Compact sensor with wide frequency range
- Long battery life
- High frequency and amplitude resolution
- More than 40 telemetry metrics that can be applied in different frequency bands up to 13 kHz (under development)
- Low speed applications (up to 10 RPM)
- Sensor with low spectral noise
- Truly simultaneous triaxial measurement
- Remote sensor update

Main assets monitored

- Motors
- Pumps
- Fans
- Reducers
- Rollers and brakes
- Compressors and chillers
- Wind turbines
- Bearings in high and low speed assets

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Technical specifications	
Model	HF+s (stainless steel base) HF+ (aluminum base)
Dimension	39 x 39 x 35 mm
Weight	97 g (HF+s) 73 g (HF+)
Housing material	Lexan™
Pin and base material	Stainless steel or aluminum
Color	Blue
Fixing	Glued or screwed
Visual signaling (LED)	Red / Green
Accelerometer	Triaxial MEMS
Acceleration impact limit	10.000 g in 0,2 ms
Operating temperature[1,2]	-10°C ≤ T ≤ 84°C
Operating temperature certified for use in explosive atmospheres	-10°C ≤ T ≤ 79°C
Certification	
Homologation / Certification	ANATEL/CE/ACMA/FCC/IC/INMETRO
Degree of Protection	IP66/IP68/IP69
Explosive atmosphere	Ex ma IIB T6 Ga Ex ta IIIC T85 °C Da
Battery	
Voltage	3 V
Autonomy[3]	5 years
Continuous monitoring (Telemetry)	
Monitoring interval	1 to 60 min
Metrics monitored ***Under development**	Acceleration RMS, Peak* and Peak-Peak*
	Velocity RMS, Peak* and Peak to Peak*
	Displacement RMS, Peak* and Peak-Peak*
	Acceleration Skewness*
	Acceleration Kurtosis*
	Acceleration Crest factor (FC)*
	Acceleration Crest factor + (FC+)*
	Contact temperature
Temperature resolution	0,01°C
Frequency band (factory standard)	34 Hz to 13 kHz
Frequency bands (under development)	3 Hz to 13 kHz (adjustable)
Monitoring profiles[4]	2 profiles
Frequency response (± 3 dB)	7,6 kHz
Amplitude range	Up to ±16 g
Memory[5]	51.200 samples (adjustable)
Communication and System	
Bluetooth	BLE 5.3 / 2400 – 2483,5 MHz
Range[6]	100 m
RF output power	0,4 dBm
App communication	Android and Ios

1 - It is possible to monitor assets whose temperature exceeds 84°C, especially assets with intermittent characteristics and an ambient temperature lower than 24°C. However, Dynamox does not provide a guarantee in this case. Condition specific for application outside explosive atmospheres. 2 - Application at temperatures below 0°C has an impact on battery life. This effect worsens the lower the temperature, with an estimated 50% reduction in service life in applications at -20°C. Condition specific to applications outside explosive atmospheres. 3 - Estimated value for a standard monitoring condition with 1 or 2 spectral samples per day, telemetry intervals of 5 to 30 minutes and operating temperature between 20°C and 60°C. 4 - Monitoring profiles can be understood as a set of vibration metric configurations (in velocity, acceleration and displacement) in a given frequency band. 5 - Each telemetry metric corresponds to the allocation of a sample in memory. In practice, the time it takes to fill the memory depends on the sample interval and the number of metrics configured. Remember that when data is collected (App or Gateway), the memory is emptied. 6 - Open field reference. The Bluetooth communication distance may vary depending on obstacles, interference and the device (cell phone or Gateway).

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Spectral and waveform monitoring

Analysis tools	Spectrum
	Frequency filters
	Envelope (demodulation)
	Cepstrum
	Spectral waterfall
	Autocorrelation
	Circular and orbital waveform
	Advanced metrics: multiband RMS, peak-peak, kurtosis, FC, FC+, carpet energy and RMS envelope
Frequency response (± 5%)	7 kHz
Frequency response (± 3dB)	7,6 kHz
Spectral noise density	< 75 µg/√Hz
Sampling rate	Up to 26 kHz
Min. frequency resolution	0,006 Hz (8 bits) and 0,012 Hz (16 bits)
Min. resolution in amplitude[1]	16 mg (8 bits) and 61 µg (16 bits)
Amplitude range	Up to ±16 g
Lines of resolution (LOR)	98.304 (uniaxial) and 32.768 (triaxial)
Maximum Frequency	571 Hz to 13 kHz (adjustable)
Max. acquisition time[2]	172,2 s (uniaxial) and 57,3 s (triaxial)

Spectral measurement settings

Simultaneous triaxial

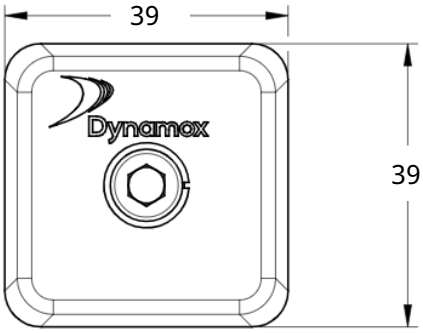
Max. Freq. (Hz)	Duration (s)						RPM min.[3]
13.145	0,08	0,16	0,31	0,62	1,25	2,5	24,0
6.572	0,16	0,31	0,62	1,25	2,5	5,0	12,0
2.629	0,4	0,8	1,6	3,1	6,2	12,5	4,8
1.314	0,8	1,6	3,1	6,2	12,5	24,9	2,4
571	1,8	3,6	7,2	14,3	28,7	57,3	1,0
LOR	1.024	2.048	4.096	8.192	16.384	32.768*	-

Uniaxial

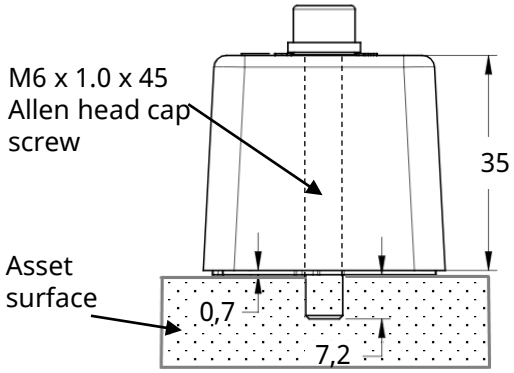
Max. Freq. (Hz)	Duration (s)								RPM min.[3]
13.145	0,08	0,16	0,31	0,62	1,25	2,5	3,7	7,5	8,0
6.572	0,16	0,31	0,62	1,25	2,5	5,0	7,5	15,0	4,0
2.629	0,4	0,8	1,6	3,1	6,2	12,5	18,7	37,4	1,6
1.314	0,8	1,6	3,1	6,2	12,5	24,9	37,4	74,8	0,8
571	1,8	3,6	7,2	14,3	28,7	57,3	86,0	172,0	0,3
LOR	1.024	2.048	4.096	8.192	16.384	32.768	49.152	98.304*	-

1 - The calculated amplitude resolution is based on the accelerometer's digital output in µg/LSB or mg/LSB.
2 - Check setting in the 'Spectral monitoring settings' table.
3 - Minimum RPM based on the longest acquisition time considering the monitoring of one complete turn of the axis.
* - Setting available with 8 bits of amplitude resolution.

Geometrical dimensions



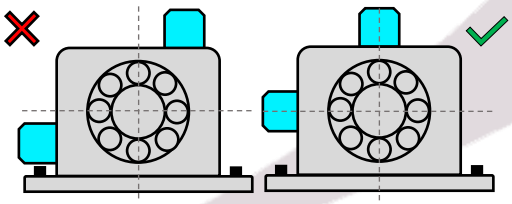
Dimensions in millimeters



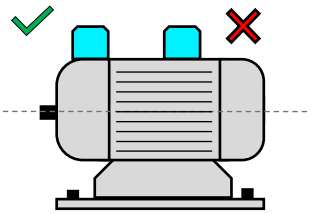
Quick assembly guide

- Define the critical points on the machines to be monitored to install the sensors;
- Only one sensor needs to be installed per monitoring point, as the devices are triaxial;
- Avoid installation in areas of the housing that lack rigidity. For example: fins, covers and guards. Try to install them in rigid parts of the machine, preferably near the bearings;

- Align one of the sensor axes with the actual machine axis. These axes are shown in the diagram above and on the body of the devices. A detailed installation guide can be found on the Dynamox support website.



As far as possible, it is recommended to install it centrally in the component.



Installation in fins and covers is not recommended. Note: For motors, the recommendation is to install one sensor on the coupled side and another on the opposite side for complete monitoring.

In terms of mounting types, the HF+/HF+s sensor can be:

Screwed: M6 screw with a length that allows for a minimum depth of 7.2 mm in relation to the perforated surface. Use a pressure washer and apply a torque of 11 N-m.

Glued: After cleaning the area, apply adhesive glue to cover the entire base of the sensor. Dynamox recommends 3M adhesives DP8810, DP8710 and DP420.

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