

# VIBRATION MONITORING FOR THE WIND INDUSTRY



**WHEN RELIABILITY MATTERS  
CONNECT TO CONFIDENCE**

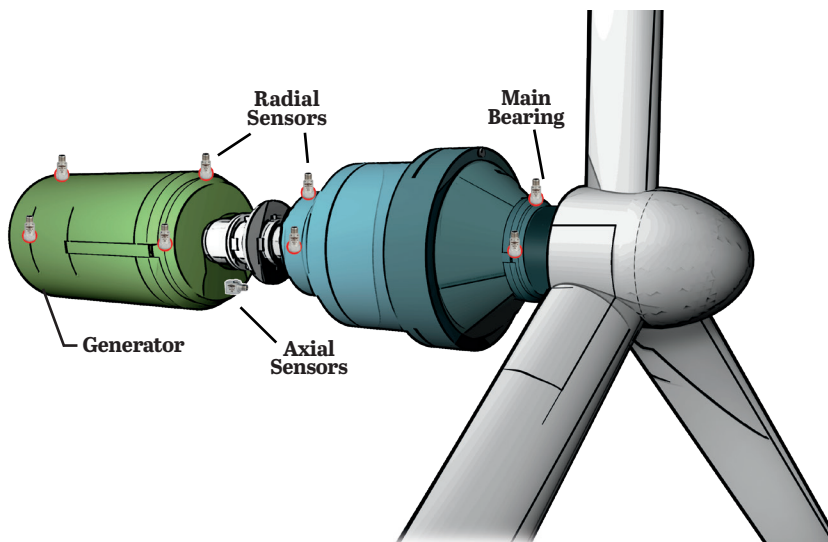
## Introduction

Vibration monitoring for the wind industry is a critical cost-saving and safety measure. Wind turbines consist of many rotating elements, which are subject to wear and tear over time due to constant variations in speed and load. Common faults include: bearing failures, gear wear and tear, blade vibration, electrical problems, imbalance, misalignment, looseness, and resonance. These faults have tremendous replacement costs due to the large size and weight of turbine components. Predictive maintenance can be used to improve reliability, lower replacement costs, and help ensure human safety.



## What We Offer

At CTC, we specialize in providing the highest-quality industrial accelerometers specifically designed to meet the needs of the wind industry. Our products enable effective monitoring of main bearings, generators, and gearboxes used in wind turbines. We offer general purpose, molded, and triaxial accelerometers as well as all related cables, connectors, and mounting hardware.



## General Purpose Accelerometers

For gearbox and generator applications, CTC general purpose accelerometers are recommended. This is because the intermediate shaft and output shaft of the gearbox will have higher rotational speeds and generate higher frequency disturbances relative to the bearings and gear mesh. The output of the gearbox typically rotates at 50 - 60 times faster than the input shaft.

As a result of these increased rotational speeds, CTC general purpose accelerometers can be used. CTC's AC102 Series top exit sensors provide a 100 mV/g output over the range of 0.5 - 13,500 Hz (30 - 810,000 CPM)  $\pm 3$  dB. AC104 Series side exit sensors provide a 100 mV/g output over the range of 0.5 - 10,000 Hz (30 - 600,000 CPM)  $\pm 3$  dB. CTC recommends CB102-A2A cable and connector assembly for use with AC102-1A and AC104-1A. This cable assembly can be fully customized to your desired length.

**AC102-1A**



*Standard Size, Top Exit  
General Purpose Accelerometer,  
100 mV/g,  $\pm 10\%$*

**AC104-1A**



*Standard Size, Side Exit  
General Purpose Accelerometer  
100 mV/g,  $\pm 10\%$*

**CB102-A2A**



*Red FEP Jacketed, Twisted, Shielded  
Pair Cable and Two-Socket MIL-Style  
Polycarbonate Molded Connector*

## TREA Series Triaxial Accelerometers

If triaxial configurations are desired, CTC's TREA330 and TREA331 miniature triaxial accelerometers are the ideal solution for wind turbine monitoring. These sensors feature a low-profile form factor, 100 mV/g output, and are capable of measuring from 0.5 - 15,000 Hz (30 - 900,000 CPM), within a  $\pm 3$  dB tolerance. CTC recommends CB119-J4A cable and connector assembly, which can be fully customized to your desired length.

**TREA330**



*Miniature Size, Side Exit  
Triaxial Accelerometer,  
100 mV/g,  $\pm 5\%$*

**TREA331**



*Miniature Size, Side Exit  
Triaxial Accelerometer,  
100 mV/g,  $\pm 15\%$*

**CB119-J4A**



*Orange FEP Jacketed, Shielded  
4-Conductor Cable and 4-Socket Mini-MIL,  
Polycarbonate Molded Connector*

## Low Frequency Accelerometers

For low speed applications like main bearings, CTC recommends our AC133-1A and AC134-1A 500 mV/g low frequency accelerometers. The larger mV/g output gives the sensor sufficient voltage signals, which will improve its ability to read low amplitude vibration signals down to 0.1 Hz within  $\pm 3$  dB sensitivity tolerance. AC133 and AC134 accelerometers have a frequency response of 0.1 - 10,000 Hz (6 - 600,000 CPM) within a  $\pm 3$  dB tolerance which provides the ability to monitor low frequency and low amplitude vibration levels. These accelerometers are specifically designed to enable pure low-frequency measurements and use high-frequency detection and analysis techniques all in one hermetically sealed accelerometer.

**AC133-1A**



*Standard Size, Top Exit  
Low Frequency Accelerometer,  
500 mV/g,  $\pm 10\%$*

**AC134-1A**



*Standard Size, Side Exit  
Low Frequency Accelerometer  
500 mV/g,  $\pm 10\%$*

**CB102-A2A**



*Red FEP Jacketed, Twisted, Shielded  
Pair Cable and Two-Socket MIL-Style  
Polycarbonate Molded Connector*

## MA Series Molded Accelerometers

CTC's MA Series molded sensors offer high-voltage isolation and are ideal for use in wind turbine monitoring applications in areas that are prone to lightning strikes. These molded sensors feature a durable stainless steel base and connector, with a polycarbonate-overmolded body. They offer 10 kV DC (7 kV AC) electrical isolation between the base and the electronics. CTC recommends using our grounded connectors, A2AG or A2NG, for added noise protection. Our MA Series comes in both 100 mV/g and 500 mV/g options.

**MA Series**



*Molded Accelerometers,  
100 mV/g & 500 mV/g*

**CB102-A2AG**



*Red FEP Jacketed, Twisted, Shielded  
Pair Cable and Two-Socket MIL-Style  
Polycarbonate Molded, Grounded Connector*

## Mounting Hardware

Due to the main bearing, gearbox, and generator being located between 50 and 150 meters in the air, accelerometers should be permanently stud mounted. CTC offers a variety of studs, as well as installation tool kits for the mounting surface to be spot faced, drilled, and tapped for threaded attachment of the accelerometer to the machine.

**MH117 Series**



*Accelerometer Installation Tool Kit*