

*VIBRATION MONITORING  
FOR THE  
**Cement**  
INDUSTRY*



**WHEN RELIABILITY MATTERS  
CONNECT TO CONFIDENCE**

CTC recognizes that the equipment used within a cement plant is subject to heavy use, dirty environments, and often high temperatures. These factors can result in increased wear and tear on rotating components, creating the threat of premature failure. Condition monitoring programs can be used to monitor the vibration of the bearings throughout the plant and improve reliability of the overall process.

### **Common Applications**

Important equipment, including crushers, mills, precipitators, kilns, and silos, rely heavily on motors, pumps, and fans, which have rotating components that can be monitored.

### **What We Offer**

CTC offers a variety of accelerometers, mounting hardware, cables, and connectors for cement industry applications. CTC products can be used to craft the perfect vibration monitoring solution for important rotating machinery to ensure operational uptime, increase the efficacy of predictive maintenance, and maintain reliability & safety standards.

### **Process Monitoring**

4-20 mA loop power sensors will provide the overall vibration level of the machine so that it can be trended and alarmed using the plant DCS, PLC, or SCADA system. Process monitoring will require permanently mounted loop power sensors like LP202, LP204, LP302 or LP304 series that output a 4-20 mA signal proportional to velocity or acceleration.



**LP202**  
4-20 mA Output  
Proportional to  
Vibration in Velocity,  
Top Exit 2 Pin  
Connector



**LP204**  
4-20 mA Output  
Proportional to  
Vibration in Velocity,  
Side Exit 2 Pin  
Connector



**LP302**  
4-20 mA Output  
Proportional  
to Vibration in  
Acceleration, Top Exit  
2 Pin Connector



**LP304**  
4-20 mA Output  
Proportional  
to Vibration in  
Acceleration, Side Exit  
2 Pin Connector

### **Dynamic Vibration Analysis**

The use of CTC accelerometers or Piezo velocity sensors can provide detailed information on the frequency and amplitude of vibrations generated by the machine. Dynamic vibration analysis can be in the form of portable or permanent measurements.

Portable vibration analysis requires a data collector, accelerometer, mounting magnet, and data collector cable with a break-away safety feature. Online (permanent) vibration monitoring requires permanently mounted accelerometers, durable cabling, and an appropriate connector. Suggested products for online monitoring include AC192, AC194, UEB332, or TREA330 permanently-mounted accelerometers.



**AC192**

Compact Multipurpose Accelerometer, Top Exit 2 Pin Connector, 100 mV/g,  $\pm 10\%$



**AC194**

Compact Multipurpose Accelerometer, Side Exit 2 Pin Connector, 100 mV/g,  $\pm 10\%$



**UEB332**

Dynamic Vibration IEPE Ultrasound Sensor, 1/4-28 Mounting, Top Exit 2 Pin Mini-MIL Connector, 100 mV/g,  $\pm 10\%$



**TREA330**

Premium Miniature Industrial Triaxial Accelerometer, Side Exit 4 Pin Mini-MIL Connector, Follows Cartesian Phase Coordinate System, 100 mV/g,  $\pm 5\%$

**Suggested Accessories for Process Monitoring & Dynamic Vibration Analysis**

Durable cabling such as CB111, CB206, CB606, or CB602 combined with the V2N (for CB111 only) or A2N connectors over-molded on the cables can be used with loop power sensors or standard CTC accelerometers to provide reliable connectivity back to the vibration monitoring system. CTC's nylon connectors are the ideal choice for use with multi-purpose accelerometers and Dual Output Sensors. Our nylon connectors have strong chemical resistance for the caustic environments to protect the efficacy of your data. For high moisture concerns, select V Series Viton® seal-tight boots for an IP69-rated seal.



**V2N**

2 Socket MIL-Style, Seal-Tight Viton® Boot Connector with Nylon Insert, Permanent Mount, 250 °F (121 °C) Max Temp



**A2N**

2 Socket MIL-Style, Nylon Molded Connector, Permanent Mount, 250 °F (121 °C) Max Temp

## Combined Approach

A combination of process monitoring and dynamic vibration analysis will create a full coverage approach to provide operations and vibration analysts the necessary tools to maintain daily production quotas. A combined approach will require accelerometers to measure the dynamic vibration, or piezo velocity sensors for low frequency vibration (velocity < 10 Hz), and a four-wire transmitter (SC300 series) to convert the dynamic signal to 4-20 mA output for trending and alarming on the DCS, PLC, or SCADA systems. In this application, if the control room notes a change in the amplitude of the vibration via the 4-20 mA signal, the analyst can use the dynamic output of the transmitter to identify the frequency fault and determine what is wrong with the machine.

## Dual Output Offerings

CTC also offers dual output sensors, which combine temperature and vibration measurements into a single sensor for the permanent and reliable assessment of the overall condition of the machine. CTC Dual Output Sensors like the TA202, TA204, TA231, TA284, TA233, and TA234 can provide dynamic vibration and temperature inputs to the SC300 series signal conditioner. The signal conditioner will then transmit the overall vibration and temperature as 4-20 mA signals to the DCS, PLC, or SCADA systems.



**TA202**

Dual Output Sensor,  
Temperature & Acceleration,  
Top Exit 3 Pin Connector,  
100 mV/g, 10 mV/°C, ±10%



**TA204**

Dual Output Sensor,  
Temperature & Acceleration,  
Side Exit 3 Pin Connector,  
100 mV/g, 10 mV/°C, ±10%



**TA231**

Dual Output Sensor,  
Temperature & Acceleration,  
Top Exit 3 Pin Connector,  
10 mV/g, 10 mV/°C, ±10%



**TA233**

Dual Output Sensor,  
Temperature & Acceleration,  
Top Exit 3 Pin Connector,  
500 mV/g, 10 mV/°C, ±10%



**TA234**

Dual Output Sensor,  
Temperature & Acceleration,  
Side Exit 3 Pin Connector,  
500 mV/g, 10 mV/°C, ±10%



**TA284**

Dual Output Sensor,  
Temperature & Acceleration,  
M8x1.25 Captive Bolt, Side  
Exit 3 Pin Connector,  
100 mV/g, 10 mV/°C, ±10%



## **Recommended Enclosures**

### **SCE Series: Dynamic Output for Analysis**

- 1-8 channel signal conditioner enclosure
- Provides 4-20 mA signals & dynamic powered output
- Link to PLC /DCS Systems
- Available in Fiberglass or Stainless Steel
- For use with accelerometers, dual output, piezo velocity sensors & proximity probes



### **PMX1000**

- 1-2 channel process control enclosure with display and relay or display only
- Relays trigger alarm or shutdown
- 4-20 mA output



### **SCD100 Series**

- 4 channel compact vibration monitoring system
- Dynamic external links
- Sunlight viewable display
- SPDT (Form C) 2 relays each
- For use with accelerometers, piezo velocity sensors & proximity probes



### **JB Series**

- Convenient fold-forward interface panel for easy wiring
- Available in 4 - 48 channel configurations
- -58 to 180 °F (-50 to 82 °C) temperature range
- IEPE bias indicator included on panel
- Rated for NEMA 4X (IP66)



### **MX Series**

- Convert output of permanently installed accelerometer or piezo velocity sensor to BNC output
- Available connections for up to 12 channels
- -58 to 180 °F (-50 to 82 °C) temperature range
- Rated for NEMA 4X (IP66)



At CTC, we have two comprehensive product lines to meet your industrial vibration monitoring needs. Our products reflect the inputs of our customers and distributors from around the world, and are designed and tested to meet the real world demands of plant environments. We believe our products are the highest quality on the market, which is why each product line is backed by our best-in-class warranties.



The CTC product line features vibration analysis hardware for heavy industry.

All CTC products are backed by our unconditional, lifetime warranty. If any CTC product should ever fail, we will repair or replace it at no charge.



The PRO line offers the industry's most reliable proximity probe sets.

All PRO products are backed by a lifetime warranty on materials and workmanship. PRO will repair or replace any of our products as long as the product was not subjected to misuse, neglect, natural disasters, improper installation, or modification.

All stock products may be returned for a 25% restocking fee if returned in new and unused condition within 90 days of shipment. Built-to-order and private-label products qualify for a 50% refund if returned in new and unused condition within 90 days of shipment. Custom products are quoted and built specifically to the requirements of the customer, which may include completely custom product design or private-labeled versions of standard products for OEM customers. Custom products are non-cancellable, non-returnable, and non-refundable.

