

*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, $\pm 10\%$ Sensitivity Tolerance



AC194

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



UEB332

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



TREA330

Premium Miniature Industrial Triaxial Accelerometer, Side Exit 4 Pin Mini-MIL Connector, 100 mV/g, $\pm 5\%$ Sensitivity Tolerance

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% Sensitivity Tolerance



TA204

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



TA231

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



TA233

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



TA234

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



TA284

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

Recommended Enclosures



SCE Series: Dynamic Output for Analysis

- » Input Options: 1 - 4 or 1 - 8 CTC Signal Conditioners
- » Provides 4-20 mA Signals Along with Dynamic Outputs
- » Fiberglass and Stainless Steel Options Available
- » NEMA 4X (IP66) Rated
- » 15 to 140 °F (-10 to 60 °C) Temperature Range
- » Includes DC Power Supply with 100-240 VAC Input



PMX Series: Relay and Display Enclosure

- » Input Options: 1 - 4 Single Output Loop Power Sensors
- » Trigger Alarms and *Shut Down Machinery
*(*available only when used without stack light)*
- » Sunlight Viewable Display of Vibration Levels, IPS, g's, Mils, or Customized Scale
- » Optional Single or Tri-Color Stack Light and Horn Alarm Available
- » Fiberglass Enclosure
- » NEMA 4X (IP65) Rated
- » 32 to 140 °F (0 to 60 °C) Temperature Range



SCD100 Series: Relay and Display Enclosure

- » Input Options: 1 - 4 CTC Signal Conditioners
- » Trigger Alarms and *Shut Down Machinery
*(*available only when used without stack light)*
- » Sunlight Viewable Display of Vibration Levels, IPS, g's, Mils, or Customized Scale
- » Optional Single or Tri-Color Stack Light and Horn Alarm Available
- » Fiberglass Enclosure
- » NEMA 4X (IP65) Rated
- » 32 to 140 °F (0 to 60 °C) Temperature Range



JB Series: Premium iBox Switch Boxes

- » Input Options: 4 - 12 or 24 -48 Single Output, Dual Output, or Triaxial Output Sensors
- » Convenient Fold-Forward Interface Panel for Easy Wiring
- » IEPE Sensor Condition Indication Lights on Front Panel
- » Fiberglass, Stainless Steel, or Slope Top Stainless Steel Options Available
- » Internally Earth Grounded for Noise Reduction
- » NEMA 4X (IP66) Rated
- » -58 to 180 °F (-50 to 82 °C) Temperature Range



MX Series: Enclosed BNC Connection Boxes

- » Input Options: 1 - 4 or 1 - 12 Single Output Sensors and 1 - 2 Dual Output Sensors
- » Convert Output of Permanently-Mounted Accelerometer or Piezo Velocity Sensors to BNC Output
- » Terminal Strip Behind BNC Panel for Easy Wiring
- » Fiberglass, Polycarbonate, or Powder Coated Aluminum Options Available
- » Internally Earth Grounded for Noise Reduction
- » NEMA 4X (IP66) Rated
- » -58 to 180 °F (-50 to 82 °C) Temperature Range