

*VIBRATION MONITORING  
FOR  
**FOOD & BEVERAGE**  
APPLICATIONS*



**WHEN RELIABILITY MATTERS  
CONNECT TO CONFIDENCE**

The fast-paced, high-volume, and tightly regulated plant environment of the food and beverage industry means that downtime is not an option. As a result, developing an efficient maintenance program is critical for food and beverage plant operations. In large-scale manufacturing plants, maintenance costs incurred from reactive maintenance and unexpected downtime can range from 15% to 40% of total production costs. That is why predictive maintenance is quickly replacing reactive maintenance as an imperative cost-saving measure.

CTC is proud to offer a comprehensive portfolio of vibration analysis products engineered to meet the specific needs of food and beverage applications for both **critical and non-critical machines**, including:

- ▶ Air handling units
- ▶ Conveyors
- ▶ Motors
- ▶ Pumps
- ▶ Compressors
- ▶ Centrifuges
- ▶ Mixers
- ▶ And many more

**Common faults of machinery** include:

- ▶ Unbalance
- ▶ Misalignment
- ▶ Looseness
- ▶ Belt resonance defects / worn belts
- ▶ Worn or damaged sheaves
- ▶ Bearing defects
- ▶ Rubbing
- ▶ Motor electrical, including rotor bar faults



**The first consideration is whether or not Process Monitoring or Dynamic Vibration Analysis is right for your condition monitoring program.**

**Process Monitoring requires 4-20mA Loop Power Sensors**, which will provide the overall vibration level of the machine so that it can be trended and alarmed using the plant's DCS, PLC, or SCADA system. Process monitoring will require permanently-mounted loop power sensors that output a 4-20 mA signal proportional to velocity or acceleration. Process monitoring will provide an allover understanding of machine health, but cannot provide the same level of detailed diagnostic data as Dynamic Vibration Analysis. Process monitoring is a cost-effective way to get an understanding of machine health.

**Dynamic Vibration Analysis allows for trended data and machine health diagnostics.** However, Dynamic Vibration Sensors can be paired with CTC's Signal Conditioners to create a hybrid approach for both Process Monitoring and Dynamic Analysis. A signal conditioner converts the signal from a dynamic sensor into a 4-20 mA output, so it can be trended and alarmed using the plant DCS, PLC, or SCADA system, and may also be used for more in-depth predictive maintenance.

Regardless of whether or not a signal conditioner is the right choice for your program, CTC has a variety of vibration analysis hardware for your machine condition monitoring program.



### Loop Power Sensor Offerings for Process Monitoring:

4-20 mA monitoring will provide a cost effective online process monitoring solution. Our standard LP200 and LP300 Series can be permanently mounted for a 4-20 mA output proportional to vibration in velocity or acceleration respectively.

#### LP200 SERIES



*4-20 mA Output Proportional to Vibration in Velocity*

#### LP300 SERIES



*4-20 mA Output Proportional to Vibration in Acceleration*

CTC's Loop Power Sensors can be paired with our PMX enclosures to display overall vibration levels with additional capabilities to alarm and shutdown.



### Relay and Display Equipment for Use with Loop Power Sensors:



CTC's **PMX Series Enclosure** is a fiberglass process control enclosure for 1 to 4 single output loop power sensors, with display and relay. These enclosures are designed for loop power sensor input, and the relays can trigger alarm or shutdown, with optional red or tricolor stack light and horn alarm.

## 100 mV/g Accelerometers for Dynamic Vibration Monitoring:

100 mV/g accelerometers are considered general purpose and typically meet the needs of food and beverage operations. In limited access areas, like near belt guards, side exit connector accelerometers are typically suggested. CTC's Dynamic Vibration IEPE Ultrasound Sensors also provide an excellent solution for general purpose monitoring with the ability for high frequency fault detection.

CTC offers a wide variety of General Purpose Accelerometers in top and side exit configurations, including:

### AC102 & AC104



*Multipurpose  
Accelerometer,  
2 Pin Connector,  
100 mV/g,  
±10%  
±80 g, Dynamic Range*

### AC292 & AC294



*Premium Compact  
Accelerometer,  
2 Pin Connector,  
100 mV/g,  
±5%  
±80 g, Dynamic Range*

### UEB332 & UEA332



*Dynamic Vibration IEPE  
Ultrasound Sensor,  
1/4-28 Mounting,  
2 Pin mini-MIL Connector,  
100 mV/g,  
±10%  
±80 g, Peak*

## Cables and Connectors:

Due to the caustic washdowns commonly used in food and beverage plants to maintain sterile operations, the cable connecting the accelerometer to the switch box needs to be robust, chemically resistant, moisture resistant, as well as reliable in a caustic environment, such as CTC's Premium V Series Viton® Boots or A2N Nylon Connectors.







*Our **Viton® Boot Series (V Series) Connectors** are a premium offering for the best chemical resistance and an IP69 rating for moisture concerns.*



*Our **A Series Connectors** are a general purpose offering that work in a variety of environments. The A Series comes with a stainless steel locking ring and variety of material options, including Polycarbonate, PPS, and Nylon.*

## Junction Boxes:

Junction Boxes can be used for local measurements or the transmission of data to online vibration monitoring systems. Junction Boxes can also be used for cable reduction purposes or for switched outputs during manual route data collection of the vibration signals. Depending on the environment in which your junction box is mounted, CTC offers the majority of our offerings in either fiberglass or stainless steel options.

	<b>MINI-MAXX BOXES</b> <i>Mini enclosed BNC connection boxes</i>	<b>MAXX BOXES</b> <i>Enclosed BNC connection boxes</i>	<b>SB BOXES</b> <i>Legacy switch box series</i>	<b>JB BOXES</b> <i>Premium switch box series</i>
				
<b>Provides connection for remotely installed sensors to portable data collectors</b>	✓	✓	✓	✓
<b>Optional cord grip or conduit inputs provide quick &amp; secure cable entry to closure</b>	✓	✓	✓	✓
<b>Withstands harsh factory &amp; outdoor environments</b>	✓ NEMA 4X / IP66 rated	✓ NEMA 4X / IP66 rated	✓ NEMA 4X / IP66 rated	✓ NEMA 4X / IP66 rated
<b>Covered BNCs</b>	✓	✓	✓	✓
<b>Quick release terminal blocks</b>		✓	✓	✓
<b>Fiberglass &amp; stainless steel options available</b>		✓	✓	✓
<b>Sloped top &amp; modular box options available</b>		✓	✓	✓
<b>Optional continuous outputs</b>			✓	✓
<b>Minimum channel count</b>	1	1	4	4
<b>Max channel count</b>	4	12	48	48
<b>Fold-forward panel for easy wiring</b>				✓
<b>IEPE bias indicator light</b>				✓
<b>Cost rating (1-4)</b>	1 lowest cost option for harsh factory environments	2 low cost option for higher channel counts in harsh environments	3 high-end offering for ease of data collection & ability for online expansion	4 premium offering with the most benefits & features in one NEMA 4X enclosure