SMART VIBRATION SENSORS
Most industrial machinery exhibit a measurable warning sign that a fault, such as a worn bearing, cracked gear, loss of lubrication, or an unbalance condition is developing. Continuous vibration monitoring of critical machinery is widely regarded as an effective means of detecting such faults before a failure occurs. IMI smart vibration sensors combine traditional vibration sensors, specialized circuitry, advanced microprocessor technology, and targeted algorithms to provide useful, accurate, and timely information regarding a machine’s health.

IMI smart vibration sensors are USB programmable (using an optional USB Programmer) and have 2-pin polarity independent connections. The transmitters are 2-wire, loop-powered and are completely compatible with most existing plant monitoring systems such as PLC, DCS, or other plant information systems that accept a 4-20 mA input. CSA / ATEX / IECEx approvals for use in hazardous areas are available for some models.
HIGHLIGHTS

- Fully USB programmable
- Selectable measurement parameters
- Polarity independent
- Hazardous area approvals
- Hermetically sealed
- Increases monitoring reliability

APPLICATIONS

- Motors, pumps and compressors
- Reciprocating machinery
- Cooling towers, fans and gearboxes
- Mixers
- Fin fans
- Wind turbines
Reciprocating compressors can develop devastating faults in a short period of time. Mechanical looseness caused by a cracked rod nut, loose bolt, or excessive clearance can deteriorate quickly resulting in catastrophic failure of the compressor. In extreme cases, this can happen in a matter of minutes.

The patented Reciprocating Machinery Protector (RMP) detects true peak acceleration, counts impacts above specific thresholds, and processes the data based on compressor speed to quantify the machine’s health in terms of an Exclusive Reciprocating Fault Index (RFI).

It outputs a 4-20 mA signal that is proportional to the RFI. Using an optional Model 070A89 or Model 070A103 USB Programmer and free software, analysis parameters can be changed to optimize the results. This data can be logged and trended to provide historical information. One RMP is recommended per cylinder and should be mounted perpendicular to the motion of the piston on the crosshead or distance piece.

### RMP PROGRAMMER SCREEN

### ADDITIONAL MODELS

- **(EX)649A01, WITH 2-PIN MIL CONNECTOR**
- **(EX)649A71, WITH TERMINAL BLOCK AND CONDUIT ELBOW**

### SERIES 649Ax1 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>4-20 mA</td>
</tr>
<tr>
<td>Machinery Speed</td>
<td>240 to 10,000 RPM</td>
</tr>
<tr>
<td>Sampling Time</td>
<td>0.1 to 4.0 sec</td>
</tr>
<tr>
<td>Threshold Range</td>
<td>2 to 50 g</td>
</tr>
<tr>
<td>Weighting Factor Range</td>
<td>0.2 to 16 mA</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +212 °F (-40 to +100 °C)</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>15 to 30 VDC</td>
</tr>
</tbody>
</table>
Field-programmable with use of PC for precise setting of vibration threshold and other parameters.

Customizable time delays prevent false trips from errant vibration spikes during start-up and operation.

Measurement range in velocity provides more effective monitoring for equipment with low running speeds.

Magnetically-Adjustable Vibration Threshold (MAVT™) feature allows for field modification of vibration threshold without in-depth knowledge about equipment’s actual vibration levels.

Small footprint and accelerometer-style housing facilitate mounting in tight installation applications.

The Smart Vibration Switch is USB programmable with two-wire operation, universal power and a single stud mount. The product has an embedded precision accelerometer, a solid state relay and adjustable time delays to provide accurate, repeatable results. Smart Switches monitor vibration in velocity and are in a robust stainless steel housing that is hermetically-sealed for use in the harshest environments.

**SERIES 686 SMART VIBRATION SWITCH SPECIFICATION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay (Programmable)</td>
<td>Normally Open or Normally Closed, Latching or Non-Latching</td>
</tr>
<tr>
<td>Power</td>
<td>24 to 240 V DC/AC, 50-60 Hz</td>
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<tr>
<td>Alarm Threshold Level (Programmable)</td>
<td>0.25 to 5.0 in/sec pk (6.35 to 127.00 mm/sec pk)</td>
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<tr>
<td>Operational Delay (Programmable)</td>
<td>1 to 60 sec</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +185 °F (-40 to +85 °C)</td>
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</tbody>
</table>
BEARING FAULT DETECTOR PLUS
MODEL 649A03

- Provides early warning of rolling element bearing faults
- Has five output signal options
- Works on constant and variable speed machines
- Normalizes output using compensated peak
- Effective on large, slow speed roll bearings

The Bearing Condition Transmitter is a smart, microprocessor-based sensor that is specifically designed to provide early warning of typical rolling element bearing faults such as: cracked races, spalling, brinelling, looseness, and even loss of lubrication. It has five modes of detection that are user selectable for optimum performance: RMS acceleration, true peak acceleration, compensated peak (using bearing diameter and speed to normalize output), Crest Factor, and Crest Factor Plus for improved detection on variable speed machinery.
The Model 649A04 is a fully USB programmable, integrated vibration sensor and transmitter. It is housed in a hermetically sealed industrial sensor housing and mounts with a standard 1/4-28 stud. It can be programmed to output a 4-20 mA signal proportional to peak acceleration, velocity, or peak-peak displacement in either English or SI units. The sensor also has three selectable low pass filters and two high pass filters.
MTS Sensors, a division of MTS Systems Corporation (NASDAQ: MTSC), vastly expanded its range of products and solutions after MTS acquired PCB Piezotronics, Inc. in July, 2016. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corp.; IMI Sensors and Larson Davis are divisions of PCB Piezotronics, Inc.; Accumetrics, Inc. and The Modal Shop, Inc. are subsidiaries of PCB Piezotronics, Inc.