Wireless Vibration and Temperature Monitoring

Vibration monitoring and predictive maintenance made easy with a full solution from Banner

- Detect problems early
- Prevent unexpected downtime
- Plan maintenance efficiently
Vibration Monitoring for Predictive Maintenance

**Why Monitor Vibration?**
- Reduce downtime – eliminate unexpected failures
- Detect problems early – avoid additional damage to machines
- Efficiently manage replacement parts
- Track machine faults and warranty

**How Does It Work?**
- Banner vibration sensors measure several vibration characteristics and wirelessly sends the data to the DXM controller
- The DXM controller collects the data and can be programmed to automatically establish baselines and set warning and alarm thresholds
- The Vibration Solutions Kit (see page 6) is completely pre-programmed and displays data locally on the HMI or can send data to the network or the cloud
- Banner’s wireless vibration monitoring system easily integrates with legacy machines

**Machine Learning**
- Banner’s machine learning algorithm automatically establishes a machines baseline using the first 300 data samples
- It then sets warning and alarm thresholds for both acute and chronic conditions for each machine

**What to Monitor**
- **Vibration Characteristics:**
  - RMS velocity = general machine health
  - High frequency RMS acceleration = early bearing wear
- **Common Equipment:**
  - Motors
  - Pumps
  - Exhaust fans
  - HVAC
  - Compressors
  - Gear boxes
  - Spindles
  - Any rotating equipment
End-to-End Vibration Monitoring Solution

IIoT Condition Monitoring

All of the critical components of condition monitoring are provided by Banner Engineering and designed to work seamlessly together. Solution Guides are available that make it easy to setup a complete system in days, not weeks or months. Banner Connected Data Solutions (CDS) provides a codeless environment and easily interfaces with the DXM controller to receive vibration data from Banner vibration sensors via wireless nodes. The DXM controller, using a machine learning algorithm, establishes vibration baselines and automatically sets warning and alarm thresholds.
Easy Installation of Wireless Remote Monitoring

QM30VT1
- 1-wire serial interface
- One vibration sensor to one node with 1-wire serial interface

QM30VT2
- Functions as a modbus slave device via RS-485
- Can be connected via a wireless or wired modbus network
- Aluminum and stainless steel housings available

Q45VA
- All-in-one vibration and temperature sensor/node
- Uses a 1-wire serial interface
- Easy-to-deploy

Select One Wireless Node

Select Modbus Radio

OR
Simple Monitoring
Q45VTP
- Easy-to-use without software
- Two AA lithium batteries
- DIP switch configurable for vibration characteristics and sample intervals

Monitor Many Sensors Over Long Distances
Performance Series Nodes
- Expandable up to 47 Nodes
- Cover large areas with 900 MHz, 1 Watt power
- D-cell lithium battery or 10 to 30 V dc
- Models available that also monitor current

Modbus Slave
MultiHop Modbus Slave with RS-485
- Connect to any modbus network
- Expandable up to 100 slave radios
- Use repeaters to extend range and circumvent obstacles
- Modbus host controller required
### QM30VT Series Sensor

QM30VT1
- Vibration & temperature sensor
- One sensor per node
- Uses a 1-wire serial interface
- Dual axis vibration sensing
- Sealed aluminum housing

QM30VT2
- Vibration & temperature sensor
- Functions as a Modbus slave device via RS-485
- Dual axis vibration sensing
- Sealed aluminum and stainless steel housings
- Can connect to a wireless or wired Modbus network

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QM30VT1</td>
<td>Vibration and temperature sensor with 1-wire serial interface; 2.09 m QD cable</td>
</tr>
<tr>
<td>QM30VT2</td>
<td>Vibration and temperature sensor that functions as a modbus slave device via RS-485; 2.09 m QD cable</td>
</tr>
<tr>
<td>QM30VT2-SS-9M</td>
<td>Vibration and temperature sensor with stainless steel housing that functions as a modbus slave device via RS-485; 9 m cable with flying leads</td>
</tr>
</tbody>
</table>

### Q45VA Sensor/Node

Vibration and temperature sensor and node in one compact package
- Uses a 1-wire serial interface
- Easy-to-order
- Easy-to-deploy
- DIP switch configurable for vibration characteristics and sample intervals
- Dual-axis vibration sensing

### Vibration Solutions Kit

- Monitor vibration and temp on up to 40 assets
- Pre-programmed DXM700 and HMI for easy setup – no programming required
- Simply bind nodes using the HMI screen, install sensors (sold separately), and start collecting data
- Machine learning algorithm automatically sets baselines and thresholds
- Visualize data and alarms on the HMI, or send it to the network or the cloud
- Use Virtual Network Computing (VNC) to emulate the HMI screen on computers and mobile devices

<table>
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<tr>
<th>Models</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>SOLUTIONSKIT2-VIBE</td>
<td>2.4 GHz; Enclosure, DXM700</td>
</tr>
<tr>
<td>SOLUTIONSKIT2-VIBE-Q</td>
<td>2.4 GHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor</td>
</tr>
<tr>
<td>SOLUTIONSKIT2-VIBEMETRIC</td>
<td>2.4 GHz; Enclosure, DXM700 (metric)</td>
</tr>
<tr>
<td>SOLUTIONSKIT9-VIBE</td>
<td>900 MHz; Enclosure, DXM700</td>
</tr>
<tr>
<td>SOLUTIONSKIT9-VIBE-Q</td>
<td>900 MHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor</td>
</tr>
<tr>
<td>SOLUTIONSKIT9-VIBEMETRIC</td>
<td>900 MHz; Enclosure, DXM700 (metric)</td>
</tr>
</tbody>
</table>
Connected Data Solutions (CDS)

Banner CDS is a cloud-based software platform that allows users to access, store, protect, and export critical data collected by Banner’s wired and wireless sensors.

- **Customizable and codeless dashboards**
- **Device geo information with health status**
- **Conglomerate/Business management tools**
- **Custom graphing with alert baselines**
- **Condition-based alerts and notifications (e-mail, SMS)**
- **Long term data storage and offloading via FTP**
### Nodes

**For use with VT1 Sensors**

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX809Q45VTP</td>
<td>Q45 Vibration and Temperature Node with 1-wire serial interface</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX809Q45VTP</td>
<td>1-wire Serial Performance Node with integrated battery</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX809X1S-P6</td>
<td>1-wire Serial Performance Node 10 to 30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX809X1S-P6</td>
<td>1-wire Serial Performance Node with integrated battery</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX809X1W-P6L</td>
<td>Condition Monitoring Node Input; VT1 Vibration sensor and Current Transformer</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX809X1W-P6L</td>
<td>1-wire Serial Modbus MultiHop Slave with integrated battery</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-H6</td>
<td>MultiHop Modbus Radio with RS-485</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H6</td>
<td>MultiHop Modbus Radio with RS-485</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-H1E</td>
<td>MultiHop Modbus Radio with RS-485 and counter input — battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H1E</td>
<td>MultiHop Modbus Radio with RS-485 and counter input — battery</td>
<td>2.4 GHz</td>
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</tbody>
</table>

See website for other models.

### Data Radios

**For Use with VT2 Sensors**

<table>
<thead>
<tr>
<th>Models</th>
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<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H</td>
<td>MultiHop Modbus Radio with RS-485</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H</td>
<td>MultiHop Modbus Radio with RS-485</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-H1</td>
<td>MultiHop Modbus Radio with RS-485 and counter input</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H1</td>
<td>MultiHop Modbus Radio with RS-485 and counter input</td>
<td>2.4 GHz</td>
</tr>
</tbody>
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### Wireless Gateways/Controllers

**DXM700 Controller**

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>DXM700-B1R1</td>
<td>DXM700 Controller with DX80 Gateway Performance</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DXM700-B1R3</td>
<td>DXM700 Controller with MultiHop Data Radio</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DXM700-B1R2</td>
<td>DXM700 Controller with MultiHop Data Radio</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DXM700-B1R4</td>
<td>DXM700 Controller with MultiHop Data Radio</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

See website for other models.

### Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Length</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWA-BK-013</td>
<td>Magnet</td>
<td>0.31 m (1 ft)</td>
<td>DEE2R-51D</td>
</tr>
<tr>
<td>BWA-BK-012</td>
<td>Stainless Steel</td>
<td>0.91 m (3 ft)</td>
<td>DEE2R-53D</td>
</tr>
<tr>
<td>BWA-BK-014</td>
<td>Aluminum</td>
<td>2.44 m (8 ft)</td>
<td>DEE2R-58D</td>
</tr>
<tr>
<td>BWA-BK-009</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BWA-BK-010</td>
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