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 machine’s 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
- Compressors
- Pumps
- Gear boxes
- Exhaust fans
- Spindles
- HVAC
- 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 Services (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

Select One
Wireless Node

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 Modbus Radio
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

Modbus TCP/IP or Ethernet IP
Cloud
Solutions Kit
PLC
Local Wireless Network
DXM100
Cloud
PLC
Local Wireless Network
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

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**QM30VT1**

- 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

**QM30VT2**

- 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

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**QM30VT2-SS-9M**

- Vibration and temperature sensor with stainless steel housing that functions as a modbus slave device via RS-485; 9 m cable with flying leads

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**Q45VA Sensor/Node**

- 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

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**Vibration Solutions Kit**

Models

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

Models

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
</table>
| **DX80N9Q45VA**
All-in-one Vibration and Temperature sensor – 900 MHz |
| **DX80N2Q45VA**
All-in-one Vibration and Temperature sensor – 2.4 GHz |

Models

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
</table>
| **SOLUTIONSKIT2-VIBE**
2.4 GHz; Enclosure, DXM700 |
| **SOLUTIONSKIT2-VIBE-Q**
2.4 GHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor |
| **SOLUTIONSKIT2-VIBEMETRIC**
2.4 GHz; Enclosure, DXM700 (metric) |
| **SOLUTIONSKIT9-VIBE**
900 MHz; Enclosure, DXM700 |
| **SOLUTIONSKIT9-VIBE-Q**
900 MHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor |
| **SOLUTIONSKIT9-VIBEMETRIC**
900 MHz; Enclosure, DXM700 (metric) |
Connected Data Services (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>DX80N0Q45VTP</td>
<td>Q45 Vibration and Temperature Node with 1-wire serial interface</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2Q45VTP</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1S-P6</td>
<td>1-wire Serial Performance Node with integrated battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1S-P6</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X6S-P6</td>
<td>1-wire Serial Performance Node 10 to 30 V dc</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X6S-P6</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1W-P6L</td>
<td>1-wire Serial Performance Node with integrated battery, no LCD or rotary dials</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2X1W-P6L</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1W-CM1L</td>
<td>Condition Monitoring Node Input: VT1 Vibration sensor and Current Transformer</td>
<td>900 MHz</td>
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<tr>
<td>DX80N2X1W-CM1L</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-H6</td>
<td>1-wire Serial Modbus MultiHop Slave with integrated battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H6</td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

See website for other models

Data Radios

For Use with VT2 Sensors

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H</td>
<td>MultiHop Modbus Radio with RS-485</td>
<td>900 MHz</td>
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<tr>
<td>DX80DR2M-H</td>
<td></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></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></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

See website for other models

Wireless Gateways/Controllers

DXM700 Controller

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

See website for other models

Connected Data Services (CDS) Software Packages

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Length</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>806252</td>
<td>Starter Package</td>
<td>0.31 m (1 ft)</td>
<td>DEE2R-51D</td>
</tr>
<tr>
<td>806253</td>
<td>Standard Package</td>
<td>0.91 m (3 ft)</td>
<td>DEE2R-53D</td>
</tr>
<tr>
<td>806254</td>
<td>Premium Package</td>
<td>2.44 m (8 ft)</td>
<td>DEE2R-58D</td>
</tr>
</tbody>
</table>

Accessories

- BWA-BK-013 Magnet
- BWA-BK-012 Stainless Steel
- BWA-BK-014 Aluminum
- BWA-BK-009
- BWA-BK-010 Magnet

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