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 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
Pumps
Exhaust fans
HVAC

Compressors
Gear boxes
Spindles
Any rotating equipment
End-to-End Vibration Monitoring Solution

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

Select One Wireless Node

QM42VT1
- 1-wire serial interface
- One vibration sensor to one node with 1-wire serial interface

QM42VT2
- Functions as a modbus slave device via RS-485
- Can be connected via a wireless or wired modbus network

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

**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**
P6 Performance Node
- Expandable up to 47 Nodes
- Cover large areas with 900 MHz, 1 Watt power
- LCD screen displays register values
- D-cell lithium battery or 10 to 30 V dc

**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**

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**Solutions Kit**

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**PLC**

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**DXM100**

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**Local Wireless Network**

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**Cloud**
QM42VT Series Sensor

QM42VT1
- Vibration & temperature sensor
- One sensor per node
- Uses a 1-wire serial interface
- Dual axis vibration sensing
- Robust zinc alloy housing

QM42VT2
- Vibration & temperature sensor
- Functions as a Modbus slave device via RS-485
- Dual axis vibration sensing
- Robust zinc alloy housing
- Can connect to a wireless or wired Modbus network

QM42VT1QP
- Vibration and temperature sensor with 1-wire serial interface; 150 mm QD cable

QM42VT2QP
- Vibration and temperature sensor that functions as a modbus slave device via RS-485; 150 mm QD cable

Q45VA Sensor/Node

- Vibration 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

SOLUTIONSKIT2-VIBE
- 2.4 GHz; Enclosure, DXM100

SOLUTIONSKIT2-VIBE-Q
- 2.4 GHz; Enclosure, DXM100, one DX80N9Q45VT Node and one QM42VT1 Sensor

SOLUTIONSKIT2-VIBEMETRIC
- 2.4 GHz; Enclosure, DXM100 (metric)

SOLUTIONSKIT9-VIBE
- 900 MHz; Enclosure, DXM100

SOLUTIONSKIT9-VIBE-Q
- 900 MHz; Enclosure, DXM100, one DX80N9Q45VT Node and one QM42VT1 Sensor

SOLUTIONSKIT9-VIBEMETRIC
- 900 MHz; Enclosure, DXM100 (metric)
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 and Data Radios

### Nodes with 1-Wire Serial Interface

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45VTP</td>
<td>Q45 Vibration and Temperature Node</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</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N9X6S-P6</td>
<td>1-wire Serial Performance Node</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80N9X1W-P6L</td>
<td>1-wire Serial Performance Node</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N9X6S-P6</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>

### MultiHop Modbus Radios

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H</td>
<td>MultiHop Modbus Radio</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-H1E</td>
<td>MultiHop Modbus Radio with I/O — battery</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80DR2M-H1E</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80DR9M-HB1</td>
<td>MultiHop Modbus Radio with I/O — Board model</td>
<td>900 MHz</td>
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<tr>
<td>DX80DR2M-HB1</td>
<td></td>
<td>2.4 GHz</td>
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</tbody>
</table>

See website for other models

## Wireless Controllers and Gateways

### DXM100 Controller

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>DXM100-B1R1</td>
<td>DXM100 Controller with DX80 Gateway preconfigured as a protocol converter</td>
<td>900 MHz</td>
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<tr>
<td>DXM100-B1R3</td>
<td></td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DXM100-B1R2</td>
<td>DXM100 Controller with MultiHop Data Radio</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DXM100-B1R4</td>
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<td>2.4 GHz</td>
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</tbody>
</table>

See website for other models

### PM Gateways (10-30 V dc)

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80G9M6S-PM2</td>
<td>4 Discrete in, 4 Discrete out</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80G2M6S-PM2</td>
<td>2 Analog in, 2 Analog out</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>DX80G9M6S-PM8</td>
<td>6 Discrete in, 6 Discrete out</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80G2M6S-PM8</td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

See website for other models

## Accessories

- BWA-BK-001 (magnet)
- BWA-BK-005
- BWA-BK-008 (magnet)
- BWA-BK-009
- BWA-BK-010 (magnet)

[See website for other models]