

# 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 send 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

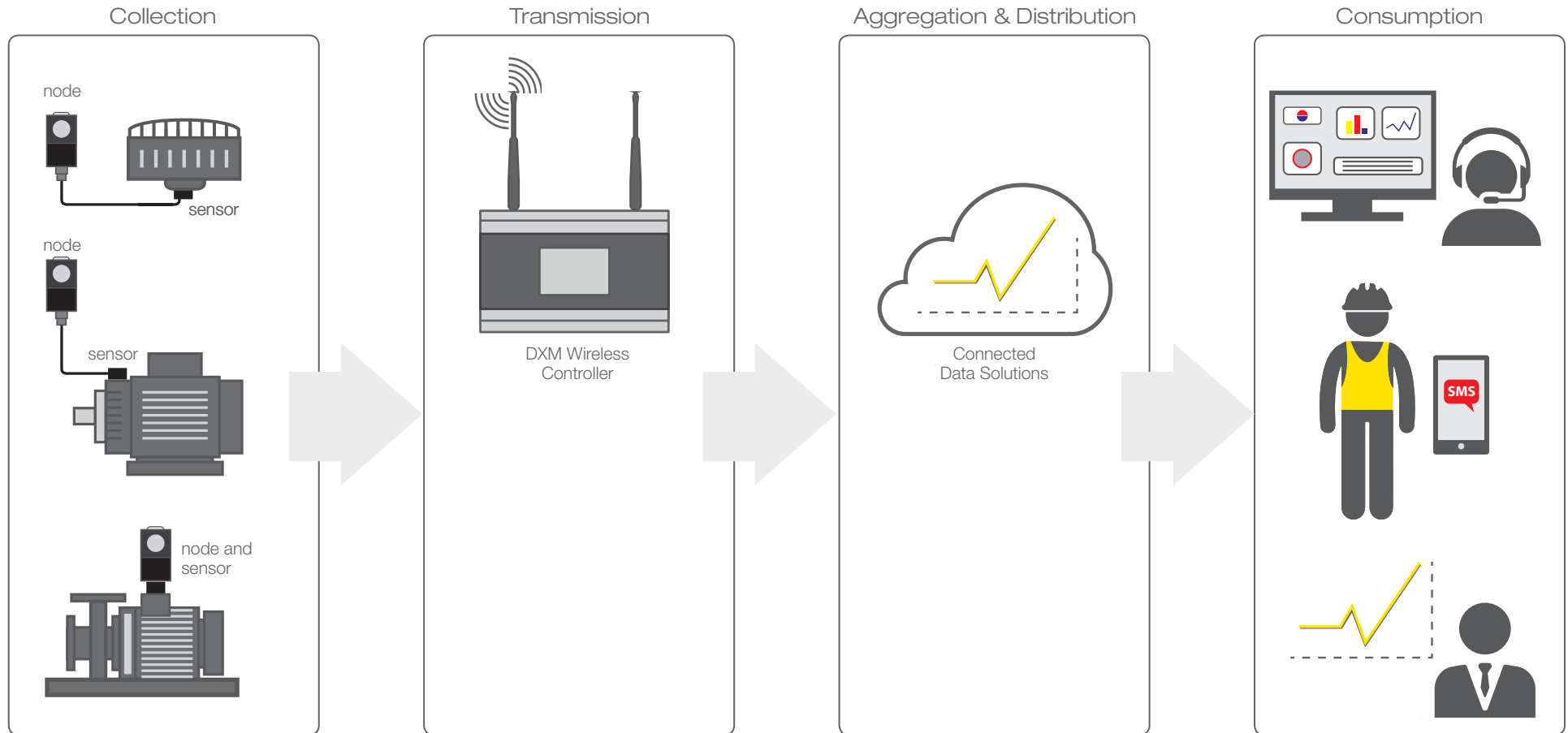
### Vibration Characteristics:

- 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 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



## Q45VA

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



OR

## QM30VT1

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



Select One  
Wireless Node

OR

## 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



Select  
Modbus  
Radio



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

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

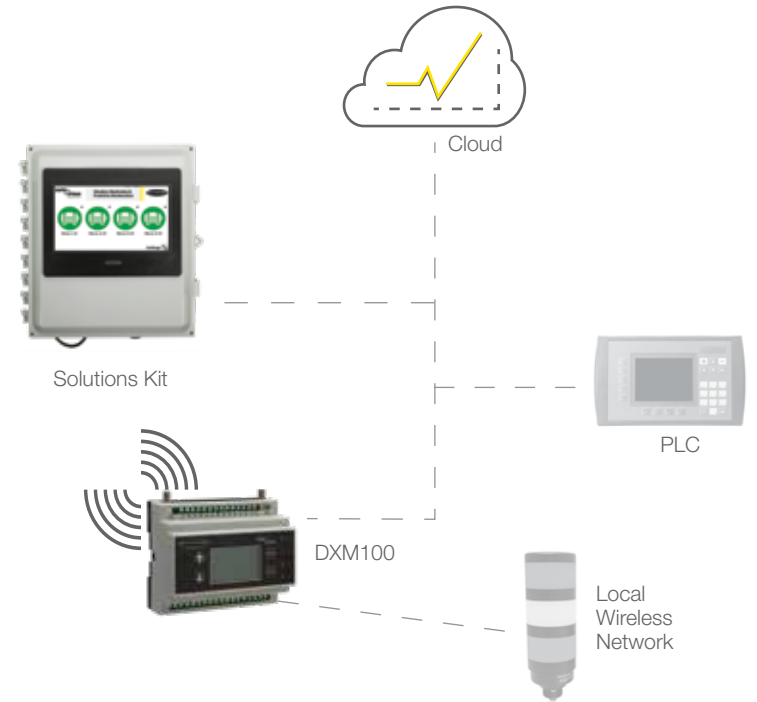
MultiHop Modbus Slave with RS-485

- Connect to any modbus network
- Expanable up to 100 slave radios
- Use repeaters to extend range and circumvent obstacles
- Modbus host controller required

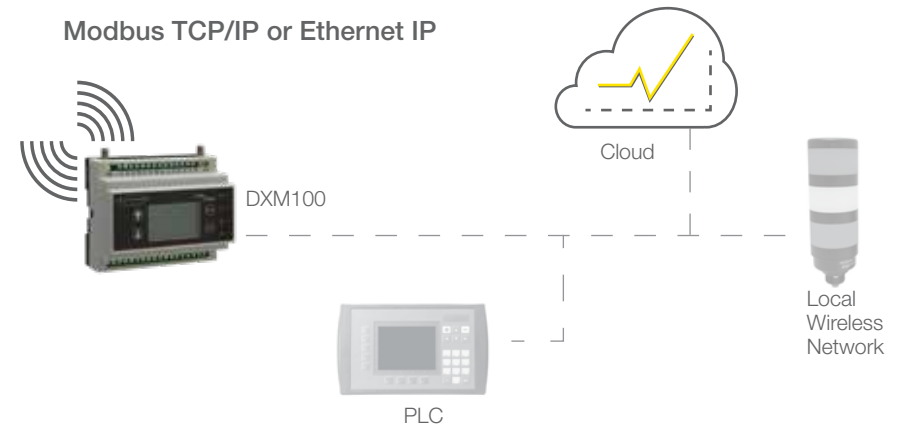
Select One

Select One

### Modbus TCP/IP or Ethernet IP



### Modbus TCP/IP or Ethernet IP





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

Models	Description
<b>QM30VT1</b>	Vibration and temperature sensor with 1-wire serial interface; 3 m QD cable
<b>QM30VT2</b>	Vibration and temperature sensor that functions as a modbus slave device via RS-485; 3 m QD cable
<b>QM30VT2-SS-9M</b>	Vibration and temperature sensor with stainless steel housing that functions as a modbus slave device via RS-485; 9 m cable with flying leads



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

Models	Description
<b>DX80N9Q45VA</b>	All-in-one Vibration and Temperature sensor – 900 MHz
<b>DX80N2Q45VA</b>	All-in-one Vibration and Temperature sensor – 2.4 GHz



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

Models	Description
<b>SOLUTIONSKIT2-VIBE</b>	2.4 GHz; Enclosure, DXM700
<b>SOLUTIONSKIT2-VIBE-Q</b>	2.4 GHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor
<b>SOLUTIONSKIT2-VIBEMETRIC</b>	2.4 GHz; Enclosure, DXM700 (metric)
<b>SOLUTIONSKIT9-VIBE</b>	900 MHz; Enclosure, DXM700
<b>SOLUTIONSKIT9-VIBE-Q</b>	900 MHz; Enclosure, DXM700, one DX80N9Q45VT Node and one QM30VT1 Sensor
<b>SOLUTIONSKIT9-VIBEMETRIC</b>	900 MHz; Enclosure, DXM700 (metric)

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.

Condition-based alerts and notifications (e-mail, SMS)

## Long term data storage and offloading via FTP





## Nodes

For use with VT1 Sensors

	<b>Models</b>	<b>Description</b>	<b>Frequency</b>
	DX80N9Q45VTP	Q45 Vibration and Temperature Node with 1-wire serial interface	900 MHz
	DX80N2Q45VTP		2.4 GHz
	DX80N9X1S-P6	1-wire Serial Performance Node with integrated battery	900 MHz
	DX80N2X1S-P6		2.4 GHz
	DX80N9X6S-P6	1-wire Serial Performance Node 10 to 30 V dc	900 MHz
	DX80N2X6S-P6		2.4 GHz
	DX80N9X1W-P6L	1-wire Serial Performance Node with integrated battery, internal antenna, no LCD or rotary dials	900 MHz
	DX80N2X1W-P6L		2.4 GHz
	DX80N9X1W-CM1L	Condition Monitoring Node Input: VT1 Vibration sensor and Current Transformer	900 MHz
	DX80N2X1W-CM1L		2.4 GHz
	DX80DR9M-H6	1-wire Serial Modbus MultiHop Slave with integrated battery	900 MHz
	DX80DR2M-H6		2.4 GHz

## Data Radios



For Use with VT2 Sensors

	<b>Models</b>	<b>Description</b>	<b>Frequency</b>
	DX80DR9M-H	MultiHop Modbus Radio with RS-485	900 MHz
	DX80DR2M-H		2.4 GHz
	DX80DR9M-H1	MultiHop Modbus Radio with RS-485 and counter input	900 MHz
	DX80DR2M-H1		2.4 GHz
	DX80DR9M-H1E	MultiHop Modbus Radio with RS-485 and counter input — battery	900 MHz
	DX80DR2M-H1E		2.4 GHz

See website for other models

## Wireless Gateways/Controllers

DXM700 Controller

	<b>Models</b>	<b>Description</b>	<b>Frequency</b>
	DXM700-B1R1	DXM700 Controller with DX80 Gateway Performance	900 MHz
	DXM700-B1R3		2.4 GHz
	DXM700-B1R2	DXM700 Controller with MultiHop Data Radio	900 MHz
	DXM700-B1R4		2.4 GHz

See website for other models



## Connected Data Solutions (CDS) Software Packages

Models	Description
<b>806252</b>	Starter Package
	1,000 Data Points per hour Total Storage: 2 million Data Points
<b>806253</b>	Standard Package
	4,000 Data Points per hour Total Storage: 20 million Data Points
<b>806254</b>	Premium Package
	12,000 Data Points per hour Total Storage: 100 million Data Points

## Accessories



**BWA-BK-013**  
Magnet



**BWA-BK-012**  
Stainless Steel



**BWA-BK-014**  
Aluminum



**BWA-BK-009**



**BWA-BK-010**  
Magnet



5-Pin M12/Euro-Style—  
Double-Ended

Length	Model
0.31 m (1 ft)	DEE2R-51D
0.91 m (3 ft)	DEE2R-53D
2.44 m (8 ft)	DEE2R-58D



PN 209132 rev. B

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