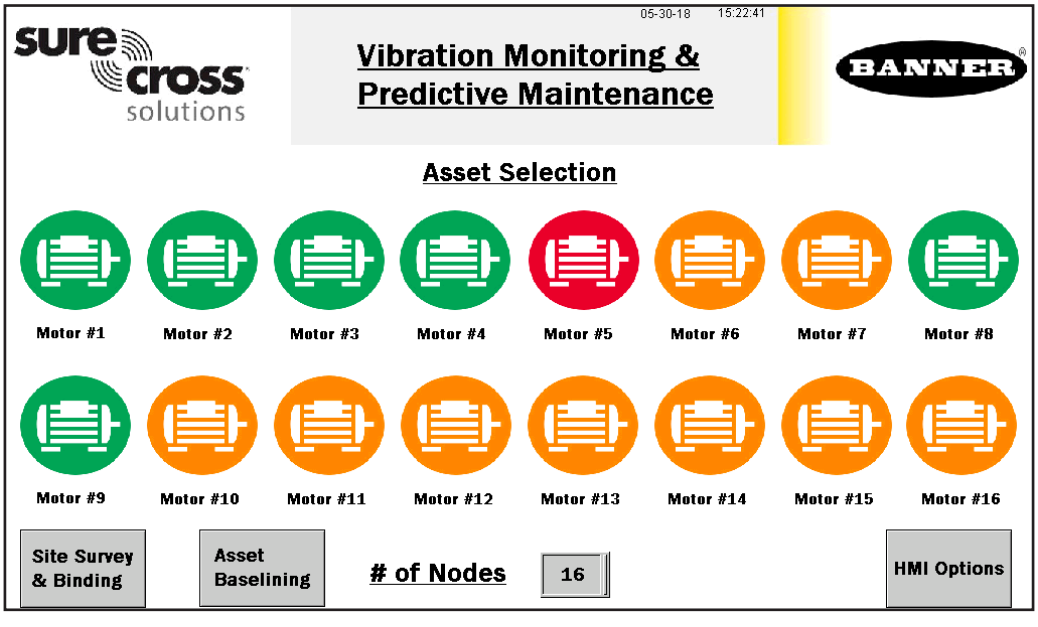
Quick Start Guide
Vibration/Predictive Maintenance Solution Kit

The Solutions Kit provides visual status of up to 16 Banner QM42VT1 Sensor Nodes (assets) that are bound to the included DXM Wireless Controller. This provides a simple “Check Engine Light” of the asset being monitored.

The Solution Kit uses a modified version of the Banner Vibration Monitoring and Predictive Maintenance Solutions Guide configuration files to program the Wireless Controller. The Q45 Nodes take a data sample every 5 minutes and the software uses the raw data to detect if an asset is running, create a baseline of the four vibration characteristics (RMS Velocity and High Frequency Acceleration on Z and X axis), and generate warning and alarm thresholds for those characteristics.

Included with the Vibration Monitoring and Predictive Maintenance Solutions Kit are:

- 10” Banner Touch Screen HMI with Ethernet connection (THM101CE)
- DXM100-B1R1 Wireless Controller
- 5-port Ethernet switch
- 24 VDC, 1.3A power supply
- 6 A C6 miniature circuit breaker
- 14 inch × 12 inch polycarbonate enclosure, DIN rails, and terminal blocks



Plug the Solutions Kit into a 100–240 V ac power source to begin operating. If the HMI doesn’t power on immediately, open the enclosure and flip the circuit breaker on the left side of the DIN rail to the on position.

HMI Home Screen

- Each individual Node icon is a color-coded indication of the vibration warning or alarm status; it is also a touch button that will brings up that Node’s screen where detailed data-viewing options are available. (See page 4)
- Site Survey & Binding—Conducts a site survey or binds any Node. (See page 2)
- Asset Baselining—Brings up a screen to create new baselines for each Node. (See page 2)
- The # of Nodes can be changed from 1 to 16 to display how many Nodes are used.
- HMI Options—Provides an icon legend, along with options for HMI panel set up and access to log files. (See page 3)
- Touch the Node label to re-name every asset icon; the name applies to all associated screens for that Node.

Click here to download a PDF version of this Quick Start Guide or go to www.bannerengineering.com and search for document 206875.

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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Vibration Node (Asset) Site Survey and Binding Screen

Bind your Banner Wireless Q45 or P6 Nodes wired to the QM42VT Vibration and Temperature sensors to the DXM Wireless Controller to begin communicating.

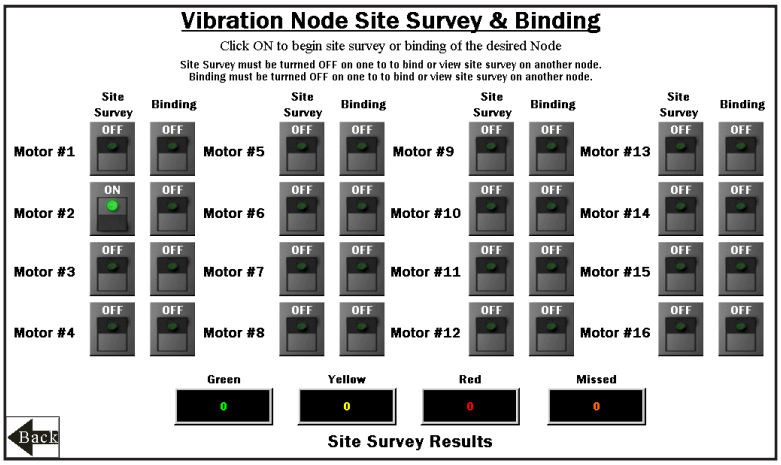
Follow these instructions to assign the Nodes a Node address and begin communicating with the DXM.

Nodes and vibration/temperature sensors are purchased separately; each Node must be bound individually. A new Q45/P6 Node and sensor can be added to the wireless network at any time by following the binding procedures.

Perform a Site Survey on each Q45/P6 Node after they are installed to ensure proper connection between the Nodes and DXM.

Bind a Node

1. On the HMI screen, touch the Binding switch for the desired Node to turn on binding.
2. On the Node, connect the vibration sensor to the Node.
3. Triple-click the binding button to enter binding mode. The binding button is under the Q45's lid or is button 2 on a P6. For the P6, follow the Node's datasheet for setting the rotary dials before binding.
4. After the Node is bound, the LEDs stay solid momentarily, then they flash together four times. The Node automatically exits binding mode.
5. On the HMI screen, touch the same Binding switch again to turn the switch off.
6. Repeat steps 1–5 for as many Nodes as are needed for the system.



Conduct a Site Survey

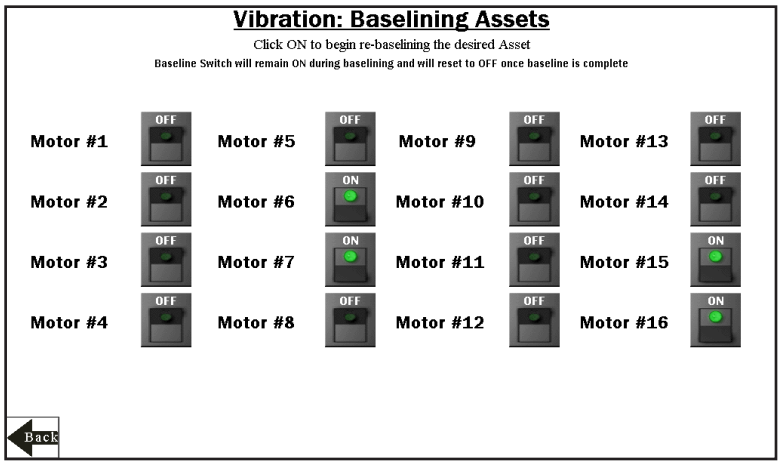
1. On the HMI, select Site Survey for the desired Node.
   If the Node selected is communicating with the DXM, the results displays at the bottom of the HMI screen.
2. For more information on Site Survey, refer to the Conducting a Site Survey and Interpreting the Results technical note on bannerengineering.com.
3. After the site survey is complete, select the switch to turn it to the off position.

Node (Asset) Baselining Screen

After the sensor node is installed and the system is powered on, the software automatically begins collecting data and determines if the asset is operating.

The software generates a baseline and thresholds based on the first 300 data samples (about 24 hours of asset running time). When an asset is replaced, repaired, moved, or has heavy maintenance done, use this screen to create a new baseline.

1. To generate a new baseline, turn on baselining for the appropriate Node. An initial baseline generates after a new Node is bound to the DXM and begins sending data without the need to trigger these switches.
2. The baseline switch remains on during baselining and resets to off after the baseline is completed.



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HMI Options Menu Screen

This screen provides some added HMI functionality along with an icon legend and a graph legend.

HMI System Setup
Enter HMI Panel Setup
Entering this screen will clear any logged data from the graphs but will not clear any data saved to files.

Restart HMI Application
This will simply restart the HMI application which will clear all graphed data but retain saved logs.

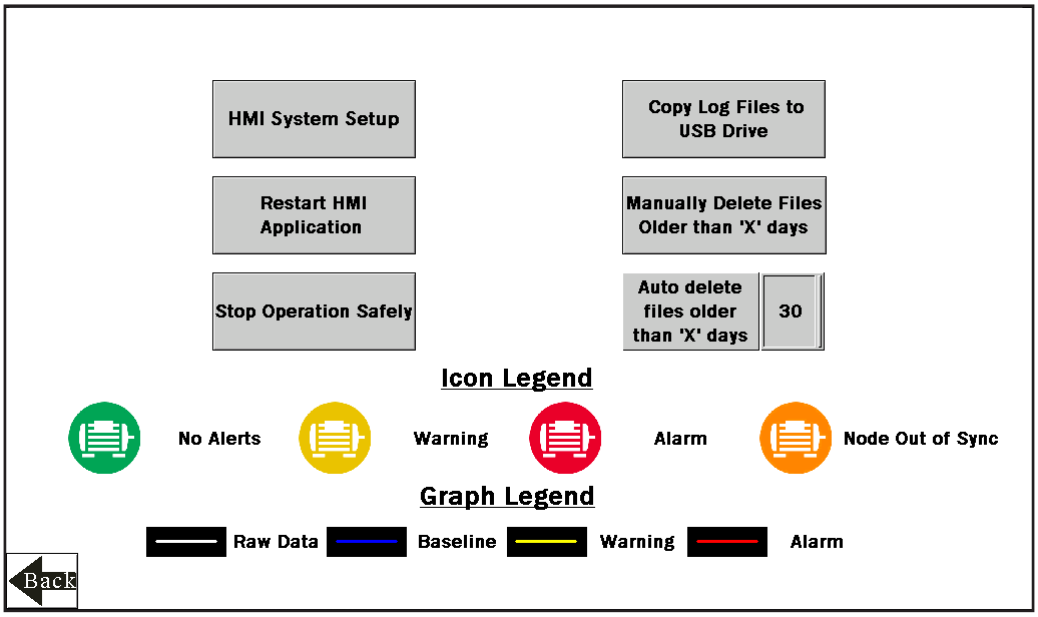
Stop Operation Safely
Stops HMI operation safely without data corruption prior to powering off the HMI.

The HMI provides data logging of all the raw data, baselines, and thresholds. This data is saved to a file every 30 minutes. A new file is generated every day and stored in monthly folders. The HMI has storage for about 75 days of log files. Some options for managing and retrieving those files are:

Copy Log Files to USB Drive
Plug in a USB drive to the back of the HMI and click here to select the log files or folders to copy.

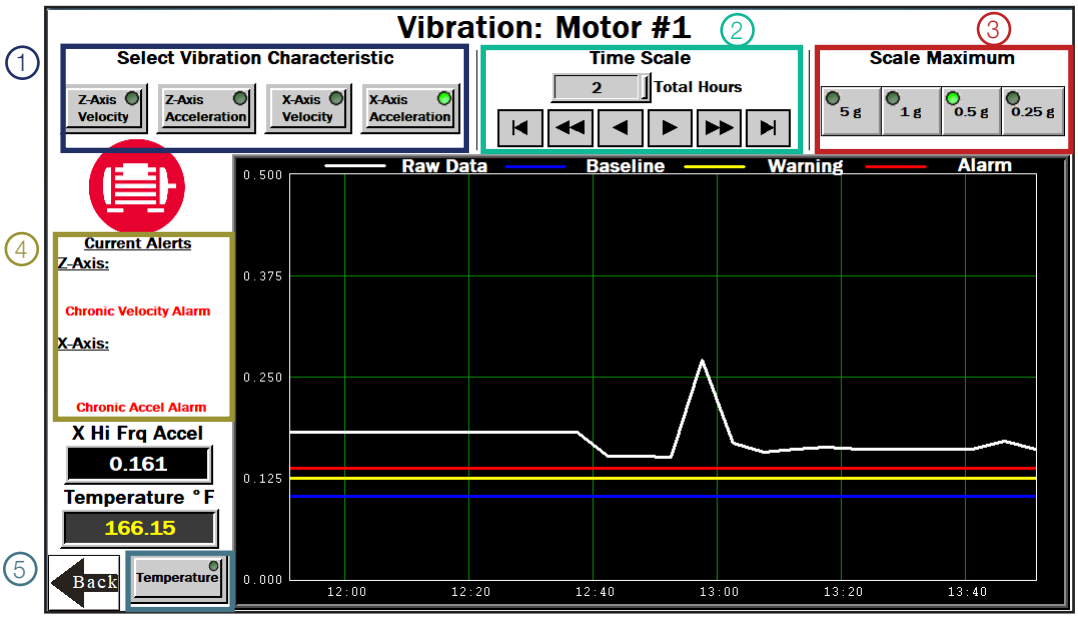
Manually Delete Files Older than 'X' Days
Delete files older than a specified number of days immediately. Use this option if the HMI is warning about an inability to save data or lack of storage space. Shortening the auto delete days may be necessary.

Auto Delete Files Older than 'X' Days
The HMI will auto delete files older than the selected number of days.



Individual Node (Asset) Status Screen

Selecting an individual Node icon opens an individual Node status screen along with many other key pieces of information as shown:



1. Select the Vibration Characteristic to graph raw data. Options include: Z-Axis Velocity, Z-Axis High Frequency Acceleration, X-Axis Velocity, and X-Axis High Frequency Acceleration. The bottom left of the screen shows a real-time readout of the selected characteristic.
2. Select the time scale of the graph from 1 to 168 total hours. The arrow keys scroll right or left to see different periods of the collected data. The 168 hours or 7 days is the maximum for viewable data on the HMI.
3. Select the data Scale Maximum. For Acceleration the range is 0.25g - 5g (g-force) and for Velocity the range is 0.5 in/s to 5 in/s.
4. The Current Alerts section shows warnings or alarms based on the Axis, Vibration Characteristic, and type (Chronic or Acute) that the system is detecting. Acute alerts are those crossing the threshold for 5 sample in a row and Chronic alerts are when a 100 point moving average crosses the thresholds. Only data from an asset determined to be running is used to calculate average and alerts.
5. Select this button to view the temperature graph over the selected time period. Directly above the button is the current temperature in degrees Fahrenheit of the selected Node. The color of the readout is white for nominal, yellow to indicate a warning state, and red to indicate an alarm state. The warning and alarm temperature settings are 158 °F and 176 °F respectively.

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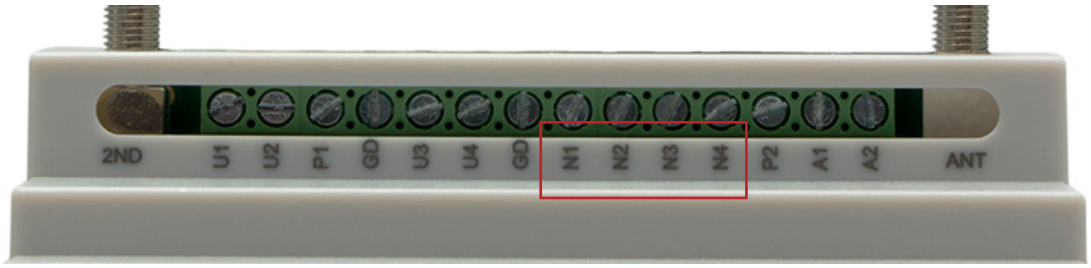
Advanced Options

Installing a Warning/Alarm Light Indicator

A tower light or indicator light (such as a K70, TL50, TL70, etc.) may be added to the solution box for added local indications of all clear, warnings or alarms. The light must use the NMOS output on the DXM Wireless Controller and the power supply terminals inside the box.

To install:

1. Cut a hole in the box and mount the light accordingly.
2. Wire 24 V dc to the light from the top row of the gray 2-row terminal blocks located next to the DXM Controller.
3. Wire the input of the light to the DXM as follows:
   a. N1 – Pin 25 – indicates any Node/asset in Alarm condition
   b. N2 – Pin 26 – indicates any Node/asset in Warning condition
   c. N3 – Pin 27 – indicates any Node/asset in either Warning or Alarm condition
   d. N4 – Pin 28 – indicates no Warning or Alarms conditions exist



Connecting the DXM and HMI to a wide area network (WAN)

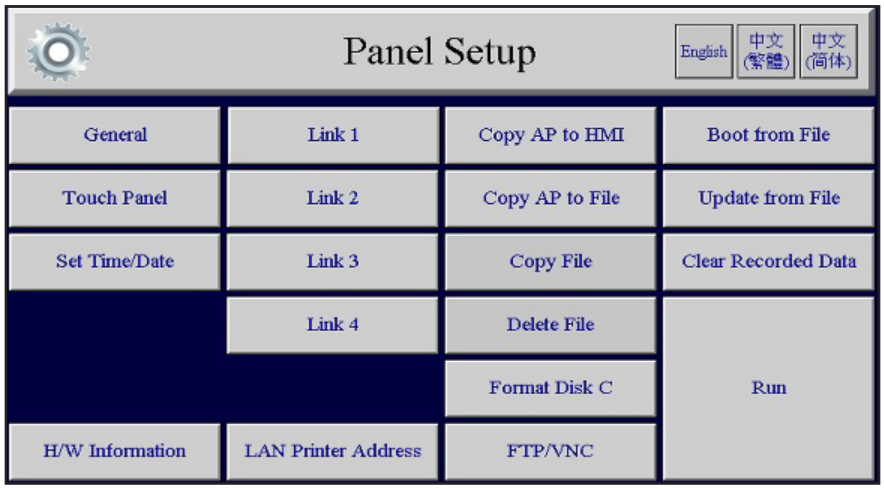
By default, the HMI and DXM Wireless Controller are configured to communicate via static IP addresses.

To connect to a WAN, the two devices need to be adjusted to either have new static IP address on the new network or to acquire their own IP address via DHCP. Connecting to a WAN allows the devices to be accessed for configuration by any computer on the network and allows the DXM to be set up to push data to a cloud webserver for remote monitoring on the web. Follow the instructions in **Push Information to the Cloud** to connect the DXM to the Banner Connected Data Solutions website.

1. Open the solution box and connect an ethernet cable from the WAN to the ethernet switch inside the solution box.
2. [DXM]: With power applied to the DXM, use the arrow keys to select **System Config** and click **Enter**.
3. [DXM]: Use the arrow keys to select Ethernet.
4. [DXM]: If you are using a static IP address:
   a. Select the IP address shown and click **Enter**.
   b. Use the arrow and **Enter** keys to set the new static IP address.

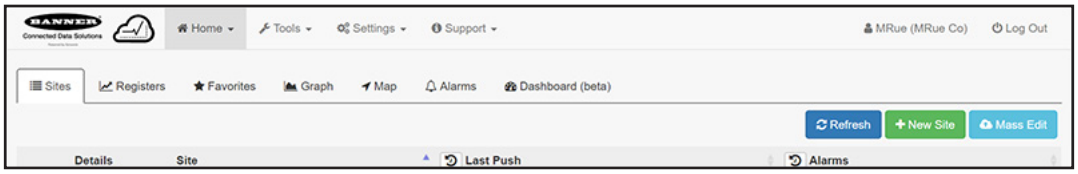
   If you are using DHCP:
   c. Click **Enter** on **DHCP**
   d. Use the arrow keys to select DHCP ON and click **Enter**.

   The DXM will request you reboot the device if any changes are made to these settings.
5. [DXM]: If using DHCP, navigate to the **System Info > Ethernet** menu and write down the IP address to enter into the HMI. Subnet mask can be adjusted here as well if needed.
6. [HMI]: From the main screen go to the **HMI Options** screen, then choose **HMI System Setup**.
7. [HMI]: In the Panel Setup screen select **General**.



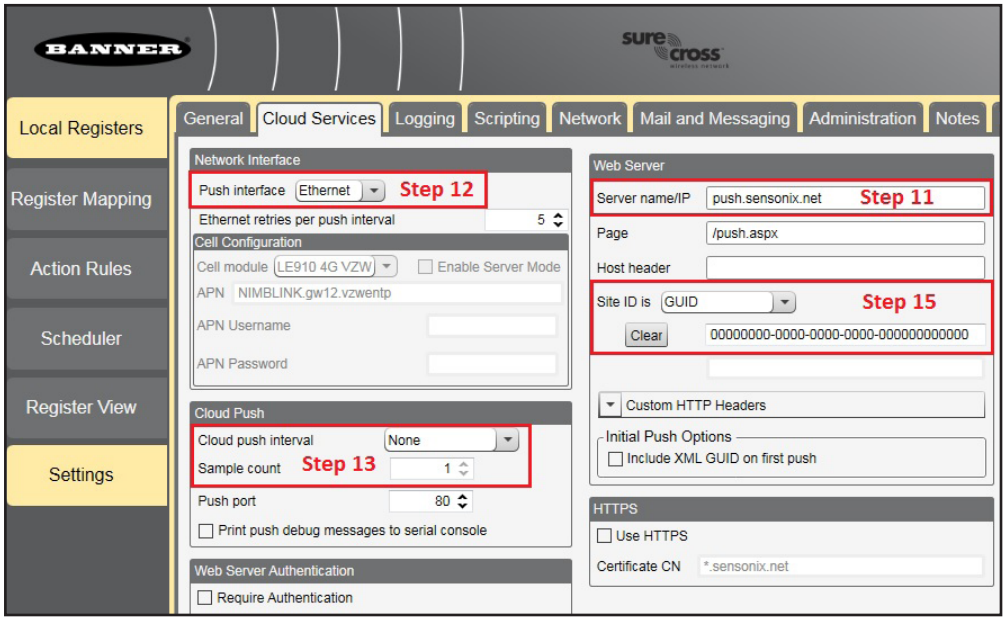
8. [HMI]: On the pop-up screen that appears, either type in the IP address and network information for a static IP address or, next to the **Get an IP address automatically** field, click on False to toggle it to True, then click **OK**. This sets up DHCP.
9. [HMI]: Click **Link 1** and click on the IP address field. Enter in the IP address of the DXM from earlier and click **OK**.
10. [HMI]: To finish, click **Run**.

Push Information to the Cloud



The DXM Wireless Controller can connect to the web via Ethernet or an internal cell module to push data from the DXM to the cloud for storage and display on a website. To enable this capability, modify the DXM's XML configuration file. The Banner website for storing and monitoring the system's data is https://data.sensonix.net/.

1. [WEB]: Visit the Banner Connected Data Solutions by Sensonix website (https://data.sensonix.net/) and log into an existing account or register a new account.
2. [WEB]: Click **+ New Site** and name the site.
3. [WEB]: Highlight and copy the Site ID, then click **Save**.
4. [DXM]: Download the DXM Configuration Tool v3 from the Banner Engineering website and install it on a computer.
5. [DXM]: Apply power to the DXM.
6. [DXM]: Connect the DXM Controller to the computer with a USB cable or skip this step if the DXM is on the same network as the computer.
7. [DXM]: Open the DXM Configuration Tool software and connect the software to the DXM clicking **Device > Connection Settings** in the menu bar.
8. [DXM]: If you are using the USB cable, select **Serial** then select the COM port that the USB cable is plugged into. Click **Connect**. If you are unsure which COM port to select and multiple appear, attempt to connect to each one of them until you are successful. If the computer is connected to the same network as the DXM, select **TCP/IP** and enter the DXM IP address and click **Connect**.
9. [DXM]: After you are connected, get the current XML file by clicking **Device > Get XML configuration from DXM**. Name and save the file to the computer.
10. [DXM]: Within the tool, go to the **Settings > Cloud Services** screen.
11. [DXM]: Set the **Server name/IP** to push.sensonix.net.



12. [DXM]: Select the appropriate **Push interface** to either Cellular or Ethernet. (To set up Ethernet, use the Settings > Network screen. To set up cellular, refer to the Activating a Cellular Modem technical note).
13. [DXM]: Leave the **Cloud push interval** and **Sample count** set as they were. The DXM script will control this to push every 5 minutes.
14. [DXM]: To select which registers push to the cloud, go to the Local Registers screen. The most likely registers to select are those 1–80 for the raw Node data, 101–116 for vibration failure mask info, 191–206 for Node connection status, and 501-692 for baseline/threshold data. Then either:
    a. Expand each register and select Cloud Permissions to Read; or
    b. Choose the Modify Multiple Registers tab to select Cloud Permissions Read for a block of registers

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15. [DXM]: Under the Web Server section, keep the **Site ID** drop-down selection as **GUID** and paste the copied ID into the Site ID field.
16. [DXM]: Save the XML file (**File > Save**).
17. [DXM]: Upload the file to the DXM (**Device > Send XML Configuration to the DXM**).
18. [WEB]: Return to the Banner Connected Data Solutions by Sensonix website. Click **Options** on the row of the newly created site, select **XML Config**, and select the XML file that was just saved and uploaded to the DXM.
19. [WEB]: Click **Save** to complete the connection to the website.

This creates continuity between the site created on the website with the DXM. If the DXM has network connection, it will push up data on its next cloud push interval. Refer to the Banner Connected Data Solutions Instruction Manual to review all the features available for monitoring, comparing data, and establishing warnings/alarms on the website.

To access a Demo version of the website, please contact your local Banner distributor and follow the instructions in the technical note Connecting DXM Wireless Controller to Banner Connected Data Solutions Demo Site for modified instructions on how to send data to the Demo site.

For additional advanced options using the DXM, refer to the Vibration & Predictive Maintenance Solution Guide on the Banner Engineering website. NOTE: The files used in the Solutions Kit are slightly different than those used with the Solutions Guide. Use the Solutions Kit files with the DXM being used with the HMI. To apply any of the advanced options mentioned in the Vibration and Predictive Maintenance Solutions Guide, first use the DXM Configuration Tool and perform a Device > Get XML configuration from DXM to download the Solutions Kit XML configuration file.

For additional information on the DXM Wireless Controller, Wireless Q45U Node, P6 Node, or QM42VT1 sensor, visit www.bannerengineering.com/wireless.

Specifications

Supply Voltage
AC: 100 to 240 V ac (-15%/+10%) at 50 or 60Hz

Power Consumption
9 W average; 30 W maximum

Operating Conditions
0 °C to +50 °C (32 °F to +122 °F) (HMI);
–40 °C to +85 °C (–40 °F to +185 °F) (DXM);
–20 °C to +80 °C (–4 °F to +176 °F) (DXM LCD)
Micro SD Card (if applicable): –25 °C to +85 °C (–13 °F to +185 °F)
90% maximum relative humidity (non-condensing)

900 MHz Compliance (1 Watt)
FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance
FCC ID UE300DX80-2400: This device complies with FCC Part 15, Subpart C, 15.247
ETSI EN 300 328: V1.8.1 (2012-04)
IC: 7044A-DX8024

Radio Range
900 MHz, 1 Watt: Up to 9.6 km (6 miles)
2.4 GHz, 65 mW: Up to 3.2 km (2 miles)

Antenna Minimum Separation Distance
900 MHz, 150 mW and 250 mW: 2 m (6 ft) 900 MHz, 1 Watt: 4.57 m (15 ft)
2.4 GHz, 65 mW: 0.3 m (1 ft)

Radio Transmit Power
900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)
2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Mounting
A mounting system that provides for various mounting options has been provided with this enclosure.
To connect the mounting brackets, turn the enclosure such that the backside is visible. Place the mounting brackets over the octagon bosses either horizontally, diagonally, or vertically, and fasten them with the ¼"-20 x 0.25" SS, countersunk Philips drive screws provided (torque limit = 30 in. lbs.). The enclosure can be mounted vertically (ie. on a wall) or horizontally (ie. table top).

Certifications
CE (applies only to model SOLUTIONSKIT2-VIBEMETRIC)

FCC Part 15 and CAN ICES-3 (B)/NMB-3(B)

This device complies with part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the manufacturer.

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