

The Solutions Kit provides visual status of up to 40 Banner 1-wire serial or All-in-One Vibration Sensor Nodes (assets) that are bound to the included DXM Wireless Controller. This provides a simple “check engine light” of the monitored asset. The Condition Monitoring VT/CT Node (CM1L) can also take advantage of current measurements in combination with the vibration and temperature measurements.

The Solutions Kit uses the [Banner Vibration Monitoring & Predictive Maintenance Solution Guide](#) software to program the DXM Wireless Controller.

The Sensor Nodes take a data sample every 5 minutes and the software uses the raw data to detect whether an asset is running, creates a baseline of the four vibration characteristics (RMS Velocity (10-1000Hz) and RMS High Frequency Acceleration(1000-4000Hz) on Z and X axis), and generates warning and alarm thresholds for those characteristics. Only data from an operational asset is used to create the baselines or thresholds and only that data is used to trigger warnings or alarms. Data from assets that are not operational appear on the graphs but is not used in the analysis.

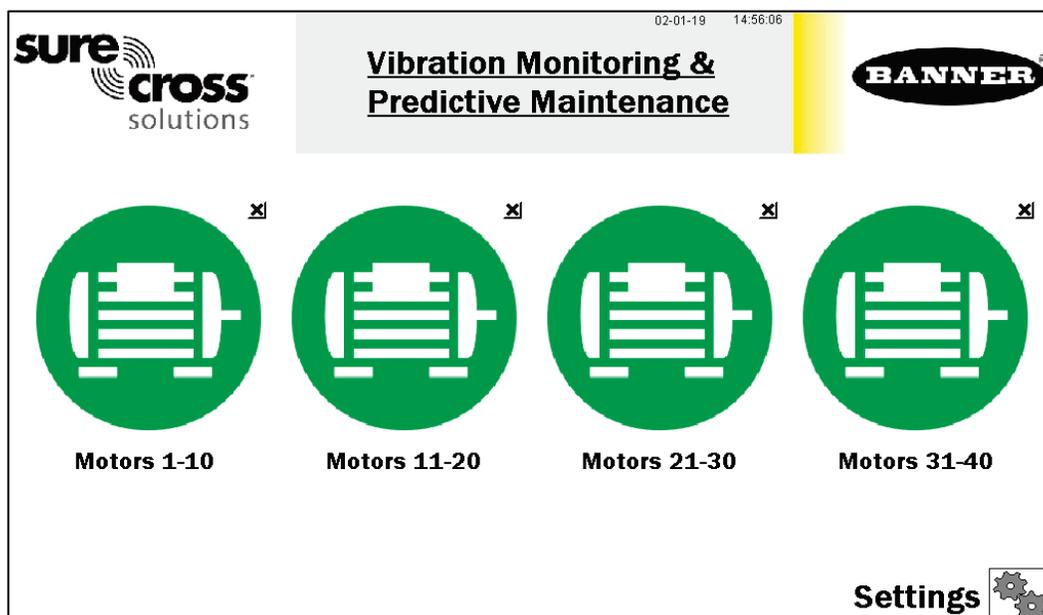
RMS Velocity identifies problems such as: imbalance, misalignment, looseness, and other low frequency machine issues. **RMS high frequency acceleration** is used to indicate early bearing wear issues.

The items included with the Vibration Monitoring and Predictive Maintenance Solutions Kit are:

- 10” Banner Touch Screen HMI with Ethernet connection
- [DXM700-B1R1 Wireless Controller](#)
- 5-port Ethernet switch
- [24 VDC, 1.3A power supply](#)
- 6A C6 miniature circuit breaker
- [14”x12” Polycarbonate enclosure](#), DIN rails, and terminal blocks

HMI Home Screen

- Four “check engine” type icons that represent groups of 10 assets. Each icon is a color-coded indication of the status of vibration warnings or alarms, temperature warnings or alarms, or wireless Node connection status within that group. The icon acts as a touch button that brings up the 10 individual icons that represent that assets’ status and acts as a touch button to view that assets’ screen where detailed data viewing options are available. (see page 2).

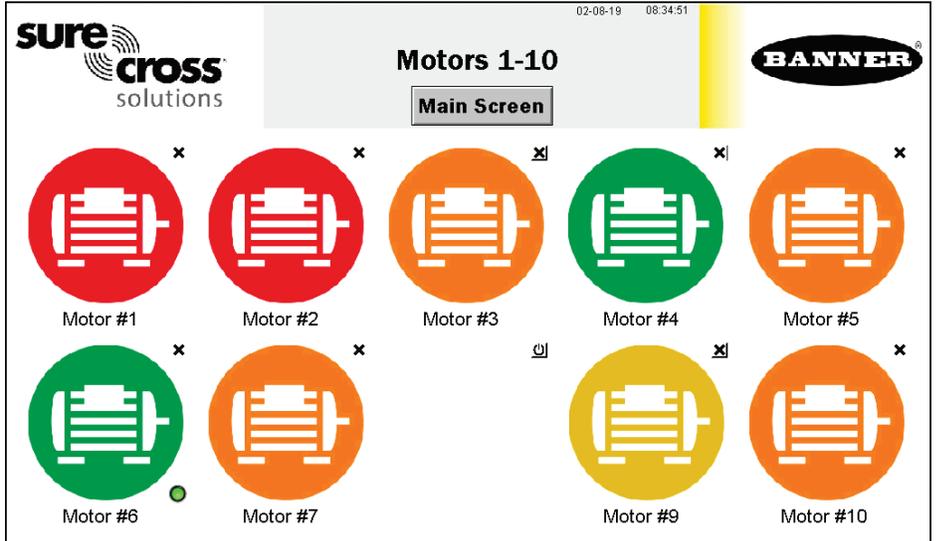


- Touch the “X” button in the upper right hand corner of each icon to hide that group of assets and prevent Node status alerts for any Nodes within that group. Use the button that appears after pressing the “X” button to unhide that group for future expansion.
- The **Settings** button opens access to Node binding, Node site survey, asset baselining, log file downloads, and other settings. (see page 4)
- Touch each asset group label to re-label the icon.

Vibration Node Group Screens

Each asset/Node group on the main page has a screen of 10 individual icons, one for each sensor/Node pair. These icons represent the status of the motor with colored icons shown below.

- Touch any icon to bring up the individual sensor Node’s screen that includes graphs, raw data, and alert descriptions. (see page 3)
- Touch the “X” button in the upper right hand corner of each icon to hide that asset and prevent Node status alerts from that Node from appearing on the main HMI screen. Use the button that appears after pressing the “X”



button to unhide that group for future expansion. For example, Asset #8 is hidden in the sample screen.

- Touch each asset label to re-label the icon. That label remains in non-volatile memory and appears on the Node’s status screen, binding screen, site survey screen, and baselining screens.
- A small green lamp in the bottom right corner of a Node’s icon indicates when that Node is baselining. Only temperature warnings and alarms appear during the baselining phase. After baselining is complete, the threshold levels are established and vibration alerts may begin to appear.

Icon Legend



No Alerts



Warning



Alarm

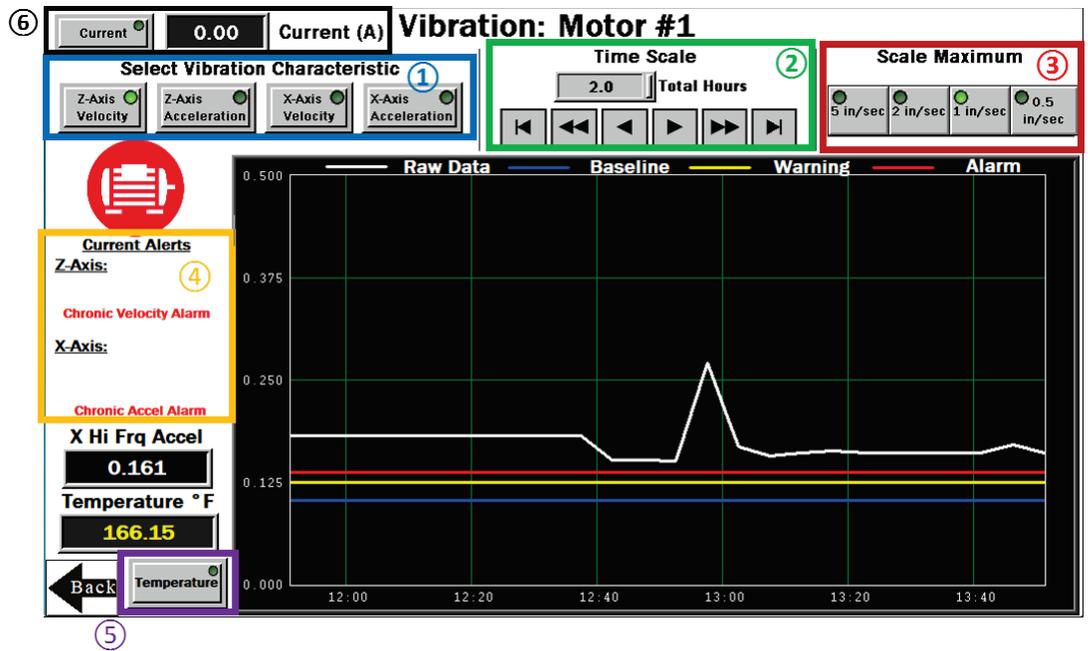


Node Out of Sync

Individual Node (Asset) Status Screen

Selecting a Node icon opens that Node's status screen.

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. Velocity is displayed in in/s (mm/s for Vibemetric versions) and Acceleration is displayed in gs. **Note:** Velocity



values of 6.5535 and/or acceleration values of 5.355 indicate a sensor error. The system ignores these data points to avoid affecting the saved baseline or trended data. The system will not baseline when the raw data values appear as those values. Contact Banner support for troubleshooting.

② - Select the time scale of the graph from 1 to 168 total hours. Use the arrow keys to scroll right or left to see different periods of the collected data. The maximum viewable data on the HMI is 168 hours or 7 days. The graphing data loggers have a fixed number of data points and using the DEMO MODE button on the Settings page, which samples at 2 seconds and reduces the number of data points available for viewing until those data points have rolled off the end of the timeline.

③ - Select the data Scale Maximum. For Acceleration, the range is 0.25g to 5g (g-force). For Velocity, the range is 0.5 inches/ second to 5 inches/second.

④ - The Current Alerts section shows any 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 five samples in a row (or the user setting on the **Settings** screen) and Chronic alerts are when a 100 point moving average crosses the thresholds. Only data from an operational asset is used to calculate averages and alerts.

⑤ - Select **Temperature** 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 readout color is white if it's nominal, yellow if it's in a warning state, and red if it's in an alarm state. The warning and alarm temperature settings are 158°F and 176°F respectively. A raw temperature value of 327.67 indicates a sensor error. Contact Banner support for troubleshooting.

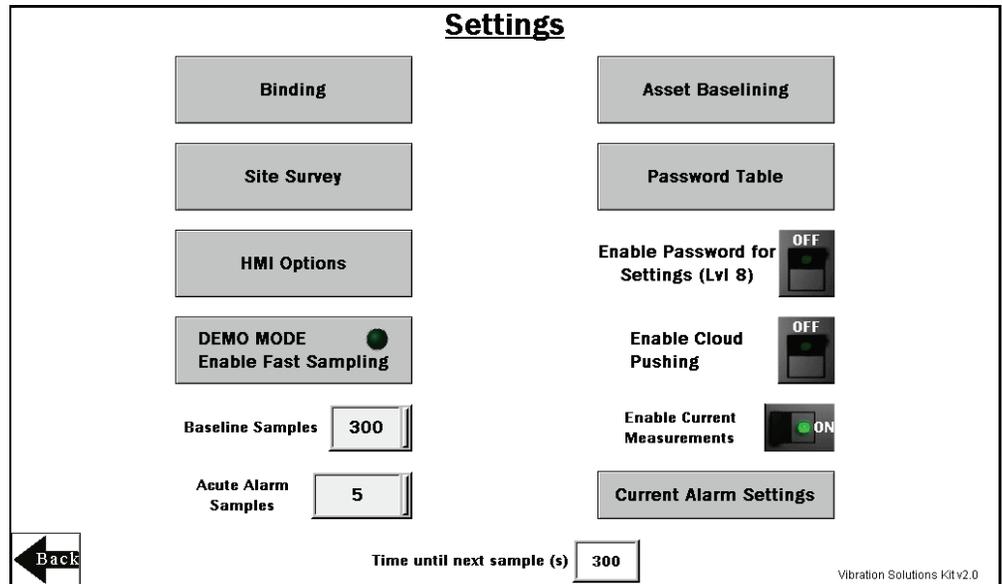
⑥ - Select **Current** to view the current graph over the selected time period. Directly to the right of the button is the raw current reading in Amps of the selected Node. The readout color is white if it's normal, yellow if it's in a warning state, and red if it's in an alarm state. Requires the use of the Banner CM1L Condition Monitoring VT/CT node. This option only appears if **Enable Current Measurements** is turned on within the Settings screen. Warning and alarm settings are set on the **Current Alarm Settings** screen within the Settings page.

Settings Screen

Binding – Opens a screen to allow binding of each sensor Node to the Solutions Kit. (see page 5)

Site Survey – Opens a screen to perform a site survey on any sensor Node bound to the Solutions Kit network. (see page 6)

Asset Baselining – Nodes bound into the system automatically begin baselining. This button opens a screen to enable creation of new baselines and thresholds of each sensor Node individually, displays the remaining samples in the current baseline, and allows manual threshold limits to be set for both vibration and temperature on each sensor Node. (see page 7)



HMI Options - Provides the ability to copy/manage HMI log files, HMI configuration for advanced options, functional HMI options, and an Icon Legend as well as a Graph Legend.

Enable Password for Settings (Lvl 8) – Turn ON/OFF the switch to enable/disable a password to access the settings menu. The default password for User Level 8 is “88888888”. This can be modified by clicking the **Password Table** button above and changing the password for level 8 to any number password up to 9 numbers long.

Enable Cloud Pushing – Turn ON/OFF the switch to enable to the DXM to begin pushing data to a cloud webserver at 5 minute intervals. This requires additional set up and modification of the XML file in the DXM to point to the correct web server with the correct site ID. Cloud pushing also requires connecting the DXM to a local network via Ethernet or a separately sold cellular modem.

Baseline Samples – The Solutions Kit takes a baseline of the first 300 running samples of an asset. This can be adjusted up or down by clicking on this numeric entry box to any desired sample. Samples are taken at a fixed 5 minute interval.

Acute Alarm Samples – The default number of samples above the warning or alarm threshold before an alert is triggered is five consecutive samples. Use the numeric entry box to adjust the default value up or down.

Time until next sample (s) – Displays the time (in seconds) until the Solutions Kit samples data from all bound sensor Nodes and updates graphs and other visual indicators.

DEMO MODE – Use only for demonstration purposes when fast sampling is required. Demo mode enables the Teach mode on all the bound sensor Nodes, putting them into a 2 second sample rate and changing the HMI graphs to log at a 2 second sample rate for 15 minutes (status indicated by the green light within the button). We also recommend you reduce the Baseline Samples to less than 30 for demonstration purposes. Using Demo Mode drains the battery faster and creates a larger log file that fills up memory quicker, so only use this mode when to demonstration the kit, not during standard operation.

Enable Current Measurements – Turn ON this rocker switch when using the Banner VT/CT CM1L Condition Monitoring Node to enable current measurements and graphs on individual asset screens. This setting also enables the **Current Alarm Settings** button below the rocker switch to set the scale, warning, and alarm settings for the current measurements on each Node.

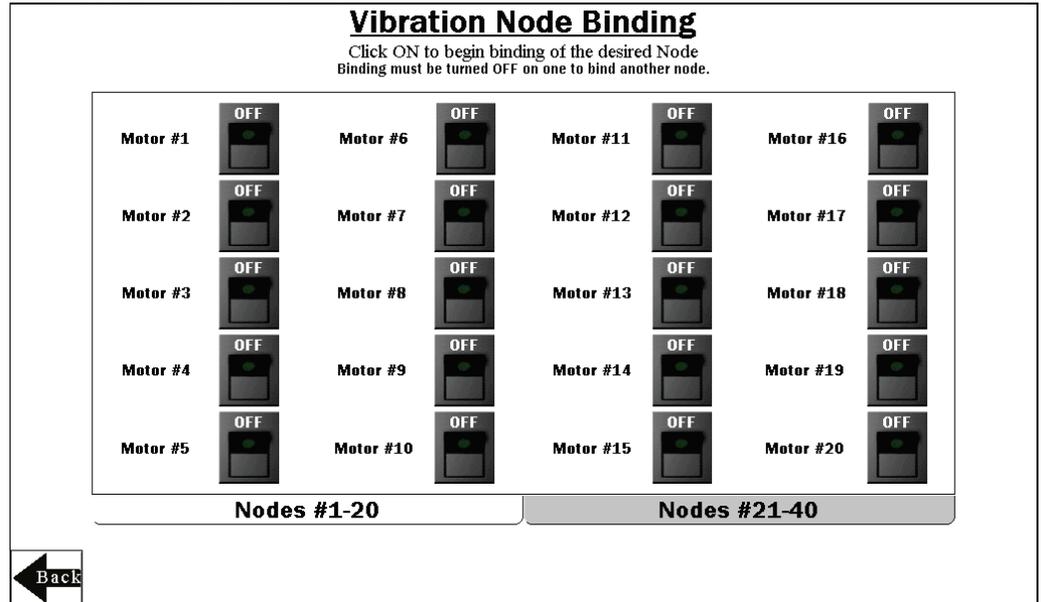
Vibration Node (Asset) Binding Screen

Banner Wireless Q45 or P6(L) Nodes combined with Banner's QM42VT Vibration and Temperature Sensors or the Q45VA All-in-One Vibration Sensor Node must be bound to the DXM Wireless Controller to begin communicating.

Following the instruction below, the Q45/P6 Nodes are assigned a Node address and begin communicating with the DXM Wirelessly. Nodes and sensors are purchased separately and after they are combined, must be bound individually. A new Q45/P6 Node and sensor can be added to the network at any time by using the binding procedure.

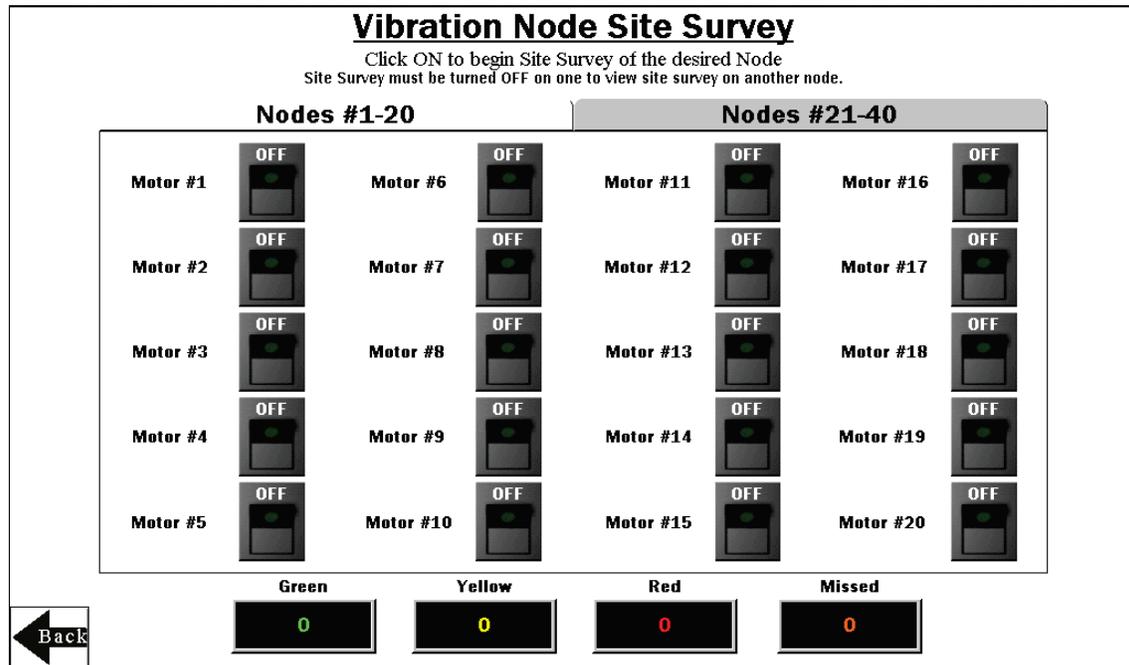
Bind the Nodes

1. On the HMI screen, touch the ON/OFF rocker switch for the desired Node to turn on binding.
2. On the Node, triple-click the binding button under the Q45 lid or triple-click button 2 (right) on a P6 or P6L to enter binding mode. For the P6, follow the Node's datasheet to setting the rotary dials before entering binding mode. After the Node is bound, the LEDs stay solid momentarily, then flash four times. The Node automatically exits binding mode.
3. On the HMI screen, touch the same ON/OFF rocker switch to turn the switch to off to take the DXM out of binding mode. After the DXM is out of binding mode, the indicator LED on the Node flickers green when the node is in sync with the DXM.
4. Repeat steps 1 through 3 for as many Nodes as are needed for the network. Use the **Nodes #1-20** and **Nodes #21-40** tabs to access binding switches for up to 40 sensor Nodes. NOTE: Entering binding mode causes all Nodes to go out of sync until the DXM exits binding mode. The Nodes will sync to the DXM within a few seconds.



Vibration Node (Asset) Site Survey Screen

Perform a site survey on each Q45/P6 Node after they are installed to analyze the wireless communication between the Nodes and DXM.



Conduct a Site Survey

1. On the HMI, touch the ON/OFF rocker switch for the desired Node to turn on Site Survey mode for that Node. If the Node is communicating with the DXM, the results display at the bottom of the HMI screen. The results add up to a total of 100. It takes several seconds for the first 100 packets to display complete results.
2. Follow the interpreting section of the [Conducting a Site Survey and Interpreting the Results](#) technical note on bannerengineering.com.
3. After the site survey is complete, touch the ON/OFF rocker switch to turn Site Survey mode off.
4. Repeat for each additional Node. Use the tabs **Nodes #1-20** and **Nodes #21-40** to access site survey switches for the up to 40 sensor Nodes. NOTE: Entering site survey mode causes all the Nodes to go out of sync with the DXM until the DXM exits Site Survey mode. The Nodes will resume communicating with the DXM within a few seconds.

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 running.

The software generates a baseline and thresholds based on the first 300 data samples or about 24 hours of asset running time (unless modified on the Settings page).

When an asset is replaced, repaired, or has heavy maintenance done, create a new baseline. If the sensor is moved after the initial baseline is calculate, generate a new baseline.

1. Turn on baselining for the appropriate Nodes if a new baseline needs to be generated. The initial baseline is generated any time a new Node is bound to the DXM and begins sending data without the need to trigger these switches. The number of baseline samples remaining displays next to the ON/OFF switch. The baseline switch remains on during baselining and resets to off after the baseline is complete.
2. Use the tabs **Nodes #1-10**, **Nodes #11-20**, **Nodes #21-30**, and **Nodes #31-40** to access baselining switches for the up to 40 sensor Nodes.
3. Use the corresponding **Manual Warning & Alarm Adjustments** button for each Node to open an individual windowed screen where current baseline threshold settings are visible.
4. Touch the numeric entry box in any of the **New Settings** rows to manually enter a new value for any or all the warning or alarm thresholds, including temperature.
5. Set vibration settings back to zero to use the original baseline setting. Temperature is not a baselined value so although it displays a baseline value, the value is for reference if the new setting is changed. Manually set the temperature back to the baseline setting by entering 158°F (70°C) for warning or 176°F (80°C) for alarm.

Vibration: Baselining Assets

Click ON to begin re-baselining the desired Asset
Baseline Switch will remain ON during baselining and will reset to OFF once baseline is complete

Motor #1	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments	Motor #6	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments
Motor #2	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments	Motor #7	<input checked="" type="checkbox"/> ON ¹⁵⁰	Manual Warning & Alarm Adjustments
Motor #3	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments	Motor #8	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments
Motor #4	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments	Motor #9	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments
Motor #5	<input checked="" type="checkbox"/> ON ²⁵	Manual Warning & Alarm Adjustments	Motor #10	<input type="checkbox"/> OFF	Manual Warning & Alarm Adjustments

N1 Warning & Alarm Adjust

Warning & Alarm Adjustments

Motor #1

	Z Velocity Warning	Z Hi Accel Warning	X Velocity Warning	X Hi Accel Warning	High Temp Warning
New Setting	0.0000	0.000	0.0000	0.000	0
Baseline Setting	0.0000	0.000	0.0000	0.000	158
	Z Velocity Alarm	Z Hi Accel Alarm	X Velocity Alarm	X Hi Accel Alarm	High Temp Alarm
New Setting	0.0000	0.000	0.0000	0.000	0
Baseline Setting	0.0000	0.000	0.0000	0.000	176

**Vibration "New Settings" at Zero will use Baseline Setting

Current Alarm Settings Screen

After enabling the Current measurements rocker switch, users are able to adjust the CT scale, current warning, and alarm measurements. The CT scale from the DIP switch settings of the Condition Monitoring VT/CT Node are read and populated into the scale field.

1. **CT Scale** – Default setting will be based on the DIP switch setting of the Condition Monitoring Node. If the user replaces the 20A or 150A CT provided with the Condition Monitoring Node, adjust the scale manually.
2. **Current Warning** – Set the warning level for the current data to trigger yellow motor icons when in a warning state.
3. **Current Alarm** – Set the alarm level for the current data to trigger red motor icons when in an alarm state.
4. Use the tabs “Nodes #1-10”, “Nodes #11-20”, “Nodes #21-30”, and “Nodes #31-40” to access the scale, warning, and alarm settings for the up to 40 Sensor Nodes.

CT Scale & Current Alarm Settings

Click on the numeric entry box to set the scale, warning and alarm thresholds.
Threshold settings are not required. CT Scale is required to properly calculate the current. Set 50/60 Hz via dipswitches in Node.

	CT Scale	Current Warning	Current Alarm		CT Scale	Current Warning	Current Alarm
Motor #1	20	10.00	15.00	Motor #6	20	200.00	250.00
Motor #2	20	8.00	12.00	Motor #7	150	200.00	250.00
Motor #3	150	75.00	90.00	Motor #8	20	200.00	250.00
Motor #4	150	200.00	250.00	Motor #9	150	200.00	250.00
Motor #5	150	200.00	250.00	Motor #10	20	200.00	250.00

Assets #1-10 Assets #11-20 Assets #21-30 Assets #31-40

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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 – Enters HMI Panel Setup. Use for setting Time, Date, and Advanced Options. Entering this screen will clear any logged data from the graphs but will not clear any data saved to files.

Stop Operation Safely – Stops HMI operation safely without data corruption before you power off the HMI.

The HMI provides data logging of all the raw data, baselines and thresholds. This data is saved to a file every 10 minutes and a new file is generated every day and stored in monthly folders. The HMI has storage for about 75 days of log files. Below are some options for managing and retrieving those files.

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

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

Auto Delete Files Older than 'X' Days –The HMI auto deletes files older than the selected number of days. Default is 30 days with a maximum of 60 days.

Restart HMI Application – Restarts the HMI application, which clears all graphed data but retains any saved logs.

HMI System Setup

Stop Operation Safely

Copy Log Files to USB Drive

Manually Delete Files Older than 'X' days

Auto delete files older than 'X' days 30

Restart HMI Application

Re-Initialize HMI Non Volatile on Restart OFF

Icon Legend

No Alerts

Warning

Alarm

Node Out of Sync

Graph Legend

Raw Data

Baseline

Warning

Alarm

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Re-Initialize HMI Non Volatile on Restart – Flip the switch to ON before restarting the HMI to reinitialize default settings and labels.

Advanced Options

Install 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 DXM Wireless Controller uses PNP outputs with a maximum of 100 mA per output so an interposing relay may need to be added to accommodate higher amperage lights.

To install:

1. Cut a hole in the box and mount the light accordingly.
2. Wire DC ground to the light or an interposing relay from the bottom row of the gray 2-row terminal blocks inside the Solutions Kit on the DIN rail adjacent to the DXM controller.
3. Wire the input of the light or interposing relay to the DXM as follows:
 - a. O1 – Pin 5 – indicates any node/asset in Alarm condition
 - b. O2 – Pin 6 – indicates any node/asset in Warning condition
 - c. O3 – Pin 7 – indicates any node/asset in either Warning or Alarm condition
 - d. O4 – Pin 8 – indicates no Warning or Alarms conditions exist

Connect the DXM and HMI to a Wide Area Network (WAN)

By default, the HMI and DXM Wireless Controller are configured to communicate using static IP addresses. To connect to a WAN, the two devices need to be configured 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 configured by any computer on the network and allows the DXM to be configured to push data to a cloud webserver for remote monitoring.

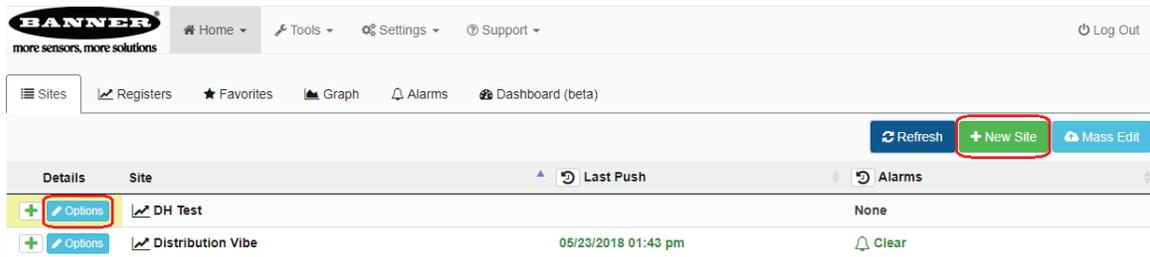


1. Open the solution box and connect an ethernet cable from the WAN to the ethernet switch inside the solution box.
2. On the DXM: With power applied to the DXM, use the arrow keys to select **System Config** and hit **Enter**.
3. Use the arrow keys to select **Ethernet**.
4. If you are using a static IP address, select the IP address shown and click **Enter**. Then use the arrow and Enter keys to set the new static IP address. If you are using DHCP, click **Enter** on **DHCP** and use the arrow keys to select **DHCP ON** and hit **Enter**. A device reboot is requested if any changes are made to these settings.
5. If you are using DHCP, navigate to the **System Info-> Ethernet** and write down the IP address to enter into the HMI. Subnet mask can be adjusted here as well if needed.
6. On the HMI: From the main screen go to the **HMI Options** screen and then choose **HMI System Setup**.
7. In the Panel Setup screen select **General**.
8. On the pop-up screen that appears, set up DHCP in one of two ways:
 - a. Type in the IP address and network information for a static IP address by selecting the appropriate fields; or
 - b. Toggle from false to true in the field next to **Get an IP address automatically**, then press **OK**.
9. Push **Link 1** and press on the IP address field. Enter in the IP address of the DXM from earlier and press **OK**.
10. To finish press **Run**.

Push Information to the Cloud

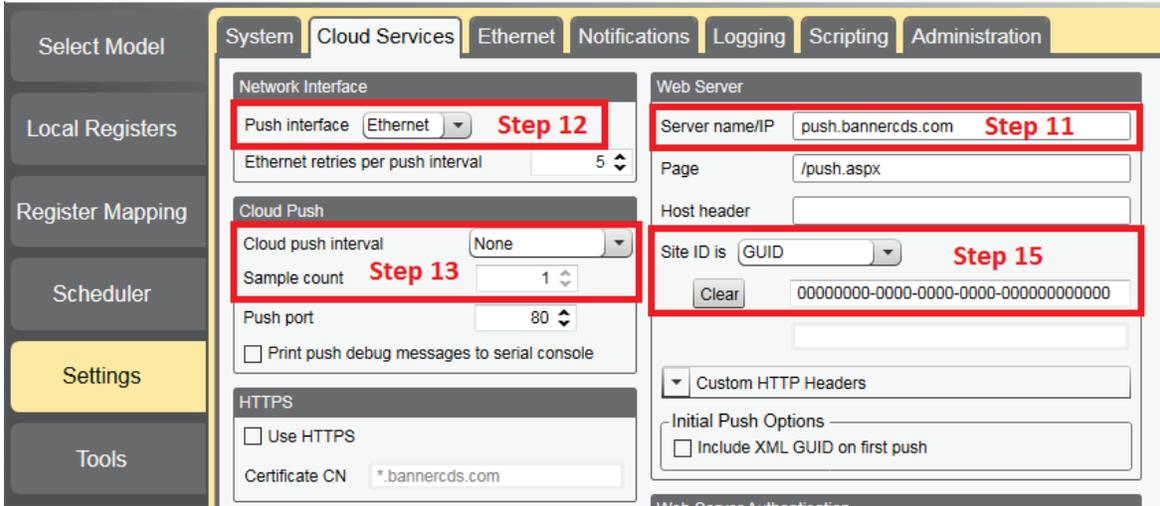
The DXM Wireless Controller can connect to the Web via Ethernet or an internal cell module. The controller pushes data from the DXM to the cloud to be stored and displayed on a website. To enable this capability, modify the DXM's XML configuration file.

The Banner website for storing and monitoring the system's data is <https://bannercds.com/>. Banner Connected Data Services will automatically generate dashboard icons and graphs for the Solutions Kit that can be placed in the Dashboard tab. Email alerts can be set up on the Alarms tab as well.



1. On the Website: Visit the Banner Connected Data Solutions by Sensorix website (<https://bannercds.com/>) and log into an existing account or register a new account. Click **+ New Site** and name the site.
2. Highlight and copy the Site ID then click **Save**.
3. On the computer: Download the [DXM Configuration Software v4](#) from the Banner Engineering website and install.
4. On the DXM: Apply power to the DXM.
5. Connect the DXM Controller to the computer with a USB cable or skip if the DXM is connected to the same network as the computer.
6. On the computer: Launch the DXM Configuration Software.
7. Select DXM Model as **DXM700** and connect the DXM to the tool by clicking **Device-> Connection Settings** in the menu bar.
8. 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 and multiple appear, attempt to connect to each one of them until successful. If connected to the same network as the DXM, select **TCP/IP** and enter the DXM IP address and click **Connect**.
9. After the DXM is connected to the software, get the current XML file by clicking **Device->Get XML configuration from DXM**. Name and save the file to the computer.
10. Within the tool, click the **Settings** tab on the left and then the **Cloud Services** tab on the top.
11. Set the **Server name/IP** to push.sensorix.net.
12. Select the appropriate **Push interface** to either Cellular or Ethernet. (To set up Ethernet, use the Network Tab under settings. To set up cellular, refer to the [Activating a Cellular Modem](#) tech note)
13. Leave the **Cloud push interval** and **Sample count** set as they were. The DXM script controls this to push every 5 minutes.
14. Registers are preselected to push to the cloud. Some registers can be removed if you are not using all 40 Nodes. Additional registers can be added by going to the **Local Registers** tab on the left. The preselected READ registers are 1-200 for the raw Node data, 201-240 for vibration failure mask info, 281-320 for Node connection status, and 5181-5660 for baseline/threshold data. The preselected READ/WRITE registers are 321-360, which are the re-baselining registers. READ/WRITE is used so the Baseline registers can be updated from the website from a 0 to a 1 to trigger a new baseline remotely. To modify registers either:
 - a. Click on each register and edit the Cloud Permissions at the bottom of the screen; or
 - b. Choose the Modify Multiple Registers tab at the bottom of the screen of the Local Register tab to edit the Cloud Permissions for a block of registers
15. Under Web Server heading, keep the **Site ID is** drop-down selection as **GUID** and paste the copied ID from the webpage into the Site ID field.
16. Save the XML file (**File > Save**).
17. Upload the file to the DXM (**Device > Send XML Configuration to the DXM**).
18. On the Website: Click **Options** on the row of the newly created site. Click the checkbox next to **XML Config** and select the XML file that was just saved and uploaded to the DXM.

19. Click **Save** to complete the connection to the website.



VNC Viewing on Laptop and Mobile Device

The Solutions Kit HMI can be viewed and controlled through a VNC application on either a mobile phone, tablet, or laptop connected to the same network as the Solutions Kit. Follow the steps in the following Tech Note to set up VNC remote viewing and control. [Tech Note: View Solutions Kit Data on a Mobile Device or PC \(b 4492805\)](#)

This creates continuity between the site created on the website with the DXM. If the DXM has network connection, it will upload data on its next cloud push interval. Refer to the [Banner CDS Web Services 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, contact your local Banner distributor and follow the instructions in the [Tech Note: Connecting DXM Wireless Controller to Banner Web Services Demo Site](#) for modified instructions on how to send data to the Demo site.

For additional advanced options using the DXM, such as sending email or SMS/text alerts, 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 and should NOT be installed on the DXM being used with the HMI. Use the DXM Configuration Software and perform a **Device -> Get XML configuration from DXM** to make modifications to the file pre-loaded to the DXM in the Solutions Kit.

For additional information on the DXM Wireless Controller, Q45U Wireless 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 60 Hz

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 Phillips drive screws provided (torque limit = 30 in. lbs.). The enclosure can be mounted vertically (ie. on a wall) or horizontally (ie. table top).

Certifications



(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.

Banner Engineering Corp. Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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