

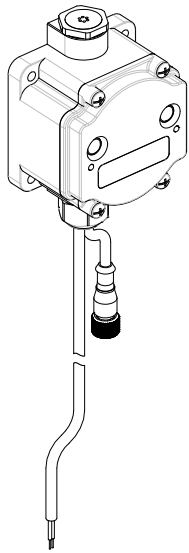
Sure Cross® Performance Condition Monitoring Node (Vibration and Current Sense)



Datasheet

The Sure Cross® wireless system is a radio frequency network with integrated I/O that operates in most environments to eliminate the need for wiring runs. The Sure Cross Performance Series Condition Monitoring Node (CM1) combines a pre-wired Euro-style connector for use with any Banner 1-wire serial VT1 vibration sensor (sold separately) and a pre-wired one-meter twisted pair cable for use with a current transformer¹ with the reliable, field-proven Sure Cross wireless architecture into one, easy-to-deploy package.

A custom transformer of the user's choice can also be used and the values can be scaled in the DXM Controller. This proven wireless solution makes condition monitoring simple by measuring vibration and current with a single device. All configuration is done through internal DIP switches or the DX80 User Configuration Software.



Benefits

- Deliver factory automation and IIoT solutions for a range of applications requiring vibration and current monitoring including:
 - Motor brushes
 - Motor windings
 - Motor load
 - Compressor failure
 - Energy use
 - Remote lighting use
 - On/off state
- **Eliminate control wires**—The Sure Cross wireless system is a radio frequency network with integrated I/O that removes the need for power and control wires
- **Reduce complexity**—Machine or process reconfiguration made easier; great for retrofit applications
- **Deploy easily**—Simplify installation on existing equipment to enable deployment in remote and hard-to-access locations where implementing a wired solution would be difficult, impractical, or not cost-effective
- Selectable transmit power levels of 250 mW or 1 Watt for 900 MHz models and 65 mW for 2.4 GHz models
- DIP switches for user configuration
- Frequency Hopping Spread Spectrum (FHSS) technology ensures reliable data delivery within the unlicensed Industrial, Scientific, and Medical (ISM) band
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- Diagnostics allow user defined output settings in the unlikely event of lost RF signal



WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.



Important:

- **Never operate a 1 Watt radio without connecting an antenna**
- Operating 1 Watt radios without an antenna connected will damage the radio circuitry.
- To avoid damaging the radio circuitry, never apply power to a Sure Cross® Performance or Sure Cross MultiHop (1 Watt) radio without an antenna connected.



Important:

- **Electrostatic discharge (ESD) sensitive device**
- ESD can damage the device. Damage from inappropriate handling is not covered by warranty.
- Use proper handling procedures to prevent ESD damage. Proper handling procedures include leaving devices in their anti-static packaging until ready for use; wearing anti-static wrist straps; and assembling units on a grounded, static-dissipative surface.

Models

Model	Frequency	Inputs and Outputs
DX80N9X1W-CM1L	900 MHz ISM Band	Pre-wired Euro Connector for use with any 1-wire serial vibration sensor (sold separately).
DX80N2X1W-CM1L	2.4 GHz ISM Band	Pre-wired one meter twisted pair cable reports true RMS Current (20 A and 150 A current transformers included with Node; model and frequency are DIP switch selectable)

Integrated battery models are also available without batteries. If you purchase a model without the battery, Banner Engineering recommends using the XENO XL-205F battery or equivalent. For Class I Division 1/Zone 0 and Class I Division 2/Zone 2 environments, only a XENO XL-205F battery is certified.

¹ The Node includes two split core current transformers: 20 A and 150 A



Configuration Instructions

Setting Up Your Wireless Network

To set up and install your wireless network, follow these steps.

Disconnect the power from your Sure Cross devices.

1. Configure the DIP switches of all devices.
2. If your device has I/O, connect the sensors to the Sure Cross devices. If your device does not have I/O, skip this step.
3. Refer to the wiring diagrams to apply power to all devices.
 - For housed models, the Gateway's LED 1 is solid green and the Node's LED 2 flashes red to indicate there is no radio link to the Gateway.
 - For board-level models, the Gateway's LED is solid green and the Node's LED flashes red to indicate there is no radio link to the Gateway.
4. Form the wireless network by binding the Nodes to the Gateway. If the binding instructions are not included in the datasheet, refer to the product manual for binding instructions.
5. Observe the LED behavior to verify the devices are communicating with each other.
 - For housed models, the Gateway's LED 1 is solid green and the Node's LED 1 flashes green to indicate it is communicating with the Gateway.
 - For board-level models, the Gateway's LED is solid green and the Node's LED flashes green to indicate it is communicating with the Gateway.
6. Configure any I/O points to use the sensors connected to the Sure Cross devices.
7. Conduct a site survey between the Gateway and Nodes. If the site survey instructions are not included in this datasheet, refer to the product manual for detailed site survey instructions.
8. Install your wireless sensor network components. If installation instructions are not included in this datasheet, refer to the product manual for detailed installation instructions.

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, refer to one of the following product manuals.

- Sure Cross® Quick Start Guide: [128185](#)
- Sure Cross® Wireless I/O Network Instruction Manual: [132607](#)
- Web Configurator Instruction Manual (used with "Pro" and DX83 models): [134421](#)
- Host Controller Systems Instruction Manual: [132114](#)

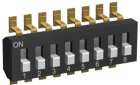
Configure the DIP Switches

Before changing DIP switch positions, disconnect the power. For devices with batteries integrated into the housing, remove the battery(ies) for at least one minute to reboot the device. You may also triple-click button 2, then double-click button 2 to reset the device without removing the battery. Any changes made to the DIP switches are not recognized until after power is cycled to the device.

For parameters not set via DIP switches, use the User Configuration Software to make configuration changes. For parameters set using the DIP switches, the DIP switch positions override any changes made using the User Configuration Software.

Access the Internal DIP Switches

Follow these steps to access the internal DIP switches.



1. Unscrew the four screws that mount the cover to the bottom housing.
2. Remove the cover from the housing without damaging the ribbon cable or the pins the cable plugs into.
3. Gently unplug the ribbon cable from the board mounted into the bottom housing. For integrated battery models (no ribbon cable), C housing models (ribbon cable is glued down), and Class I, Division 2 certified devices (ribbon cable is glued down), skip this step.
4. Remove the black cover plate from the bottom of the device's cover.
The DIP switches are located behind the rotary dials.
5. Make the necessary changes to the DIP switches.
6. Place the black cover plate back into position and gently push into place.
7. If necessary, plug the ribbon cable in after verifying that the blocked hole lines up with the missing pin.
8. Mount the cover back onto the housing.

DIP Switch Settings

Description	Switch #							
	1	2	3	4	5	6	7	8
Transmit power level: 1 Watt (30 dBm)	OFF*							
Transmit power level: 250 mW	ON							
Default I/O configuration		OFF*	OFF*	OFF*				
I/O configuration 1		OFF	OFF	ON				
I/O configuration 2		OFF	ON	OFF				
I/O configuration 3		OFF	ON	ON				
I/O configuration 4		ON	OFF	OFF				

Description	Switch #							
	1	2	3	4	5	6	7	8
I/O configuration 5		ON	OFF	ON				
Reserved		ON	ON	OFF				
User (software) configured (use the Sensor Configuration Software to pre-configure the vibration sensor)		ON	ON	ON				
Mains frequency (for CT) 60 Hz					OFF*			
Mains frequency (for CT) 50 Hz					ON			
Sample/report rate: User configured (5 minute rate for vibration sensor, 1 minute rate for ac current transformer is default)						OFF*		
Sample/report rate: 2.5 minute rate for vibration sensor, 30 second rate for ac current transformer						ON		
English units (velocity = in/sec)							OFF*	
Metric units (velocity = mm/s)							ON	
AC current transformer is 20 A model								OFF*
AC current transformer is 150 A model								ON

Transmit Power Level—The 900 MHz radios transmit at 1 Watt (30 dBm) or 250 mW (24 dBm). While the Performance radios operate in 1 Watt mode, they cannot communicate with the older 150 mW radios. To communicate with 150 mW radios, operate this radio in 250 mW mode. For 2.4 GHz models, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 65 mW EIRP (18 dBm), making the 2.4 GHz Performance models automatically compatible with older 2.4 GHz models.

User or DIP Switch Configured—User (Software) Configured mode, use the User Configuration Software or a Modbus command to change the device parameters. DIP switch position 6 is ignored. In DIP Switch Configured mode, use the DIP switches to configure the parameters listed in the table.

Sample/Report Rates—The sample interval, or rate, defines how often the Sure Cross device samples the input. For battery-powered applications, setting a slower rate extends the battery life. The report rate defines how often the Node communicates the I/O status to the Gateway. For FlexPower® applications, setting the report rate to a slower rate extends the battery life.

I/O Configurations Set by DIP Switches 2 through 4							
Input Register		Default I/O	I/O Configuration 1	I/O Configuration 2	I/O Configuration 3	I/O Configuration 4	I/O Configuration 5
1	Z-Axis	RMS Velocity (in/s)	RMS Velocity (in/s)	High-Frequency RMS Acceleration (g)	RMS Velocity (in/s)	Full Bandwidth RMS Acceleration (g)	RMS Velocity (in/s)
2		High-Frequency RMS Acceleration (g)	Peak Acceleration (g)	Peak Acceleration (g)	Peak Velocity Component Frequency (Hz)	Full Bandwidth Peak Acceleration (g)	Full Bandwidth RMS Acceleration (g)
3	-	Temperature (°F)	Temperature (°F)	Temperature (°F)	Temperature (°F)	Temperature (°F)	Temperature (°F)
4	-	RMS Current (A)	RMS Current (A)	RMS Current (A)	RMS Current (A)	RMS Current (A)	RMS Current (A)
5	X-Axis	RMS Velocity (in/s)	RMS Velocity (in/s)	High-Frequency RMS Acceleration (g)	RMS Velocity (in/s)	Full Bandwidth RMS Acceleration (g)	RMS Velocity (in/s)
6		High-Frequency RMS Acceleration (g)	Peak Acceleration (g)	Peak Acceleration (g)	Peak Velocity Component Frequency (Hz)	Full Bandwidth Peak Acceleration (g)	Full Bandwidth RMS Acceleration (g)

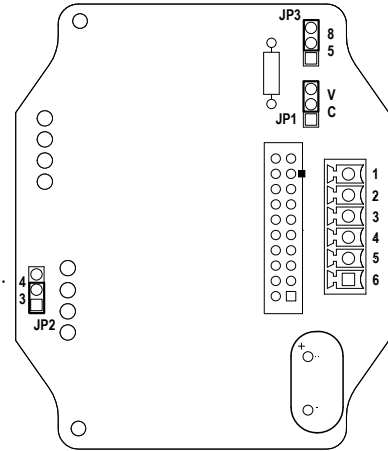
If DIP switch 7 is on, all in/s units change to mm/s, all degrees F change to degrees C. DIP switch 7 will only change units using the DIP switch I/O configurations, not with any user configuration.

Wire for Power and I/O

Follow these instructions to wire your device for power, ground, inputs, and outputs. The jumper settings determine which inputs and outputs are active.

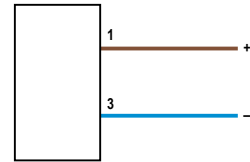
The CM1L Node ships from the factory pre-wired. Do not re-wire the Node.

Input Configuration	Jumper Setting	VT Euro Wire	CT Wire	Wiring Terminals	Description
Reserved	J3 set to 5			1	Reserved
1-wire serial input for VT1	J3 set to 8	gray		1	1-wire serial input for VT1
		white and blue		2	Ground
Switch power 1		brown		3	Power for VT1
Reserved	J1 (not used)			4	
			blue	5	Ground
CT Input	J2 set to 3		brown	6	CT Input
Reserved	J2 set to 4			6	Reserved



VT1 Wiring to Node **Current Transformer Wiring to Node**

5-pin M12/Euro-style Connector (Male)	Pin	Wire Color	Sensor Connection
	1	Brown	Power IN (+), 3.6 to 5.5 V dc
	2	White	1-Wire serial device select (sinking input to sensing device)
	3	Blue	Ground (-)
	4	Black	Not used/reserved
	5	Gray	1-Wire serial communications



Key	Wire Color	Description
1	brown	Input from CT (K)
3	blue	CT ground (L)

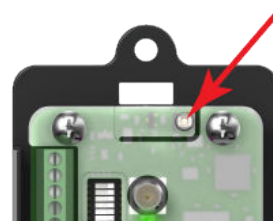
Bind Radios to Form Networks

Binding Nodes to a Gateway ensures the Nodes only exchange data with the Gateway they are bound to. For a more detailed definition of binding mode, refer to the *Advanced Setup* section of the *SureCross Wireless I/O Networks* instruction manual.

Apply power to the Gateway and Nodes.

1. Enter binding mode on the Gateway.
 - If you have a two-button Gateway, triple-click button 2
 - If you have a one-button Gateway, triple-click the button

Two-Button Gateway **One-Button Gateway**



The LEDs flash alternately when the Gateway is in binding mode. Any Node entering binding mode will bind to this Gateway.

2. Using the Gateway's rotary dials, select the Node address to assign to the Node. Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your Node to address 10, set the left dial to 1 and the right dial to 0. (Address 00 is reserved for the Gateway. Nodes assigned to 00 will not bind to a Gateway.)

3. Enter binding mode on the Node.
 - If you have a two-button Node, triple-click button 2.
 - If you have a one-button Node, triple-click the button.

The Node enters binding mode and locates the Gateway in binding mode.

For two LED models, the red LEDs flash alternately. After binding is complete, both LEDs are both solid red for a few seconds.

For one-LED models, the red and green LED flashes alternately while the Node searches for the Gateway. After binding is complete, the LED is red and green for four seconds (looks amber), then the red and green flash simultaneously (looks amber) four times.

The Node automatically exits binding mode, cycles its power, then enters RUN mode.

4. Repeat steps 2 and 3 for all Nodes that will communicate to this Gateway.
5. Exit binding mode on the Gateway.
 - If you have a two-button Gateway, single-click either button.
 - If you have a one-button Gateway, single-click the button.

Bind a DX80 Node to a DXM Gateway and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices. Separate radios by 2 meters when running the binding procedure. Put only one DXM Gateway into binding mode at a time to prevent binding to the wrong Gateway.

Binding Nodes to a Gateway ensures the Nodes only exchange data with the Gateway they are bound to. After a Gateway enters binding mode, the Gateway automatically generates and transmits a unique extended addressing (XADR), or binding, code to all Nodes within range that are also in binding mode. The extended addressing (binding) code defines the network, and all radios within a network must use the same code.

1. Enter binding mode on the DXM radio:
 - a) Use the arrow keys to select the **ISM Radio** menu on the LCD and press **ENTER**.
 - b) Highlight the **Binding** menu and press **ENTER**.
2. Assign the Node address to the Node.
 - For Nodes without rotary dials: Use the DXM arrow keys to select the Node address to assign to the DX80 Node about to enter binding mode. The DXM assigns this Node address to the next Node that enters binding mode. Only bind one Node at a time.
 - For Nodes with rotary dials: Use the Node's rotary dials to assign a valid decimal Node Address (between 01 and 47). The left rotary dial represents the tens digit (0 through 4) and the right dial represents the ones digit (0 through 9) of the Node Address.
3. Start binding mode on the DXM radio by pressing **ENTER** on the DXM radio.
4. Enter binding mode on the DX80 Node.
 - For housed radios, triple-click button 2.
 - For board-level radios, triple-click the button.
 - For Nodes without buttons, refer to the Node's datasheet for instructions on entering binding mode.

The left and right red LEDs flash alternately and the Node searches for a Gateway in binding mode. After the Node binds, the LEDs stay solid momentarily, then they flash together four times. The Node automatically exits binding mode.

5. Label the Node with the assigned address number for future reference.
6. Press **BACK** on the DXM to exit binding mode for that specific Node address.
7. Repeat steps 2 through 5, for as many DX80 Nodes as are needed for your network.
8. When you are finished binding, press **BACK** on the DXM until you return to the main menu.

LED Behavior for the Nodes

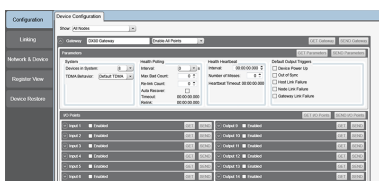
Nodes do not sample inputs until they are communicating with the Gateway. The radios and antennas must be a minimum distance apart to function properly. Recommended minimum distances are:

- 900 MHz 150 mW and 250 mW radios: 6 feet
- 900 MHz 1 Watt radios: 15 feet
- 2.4 GHz 65 mW radios: 1 foot

LED 1	LED 2	Node Status
Flashing green		Radio Link Ok
Flashing red	Flashing red	Device Error
	Flashing red, 1 per 3 sec	No Radio Link

Sure Cross® User Configuration Software

The User Configuration Software offers an easy way to link I/O points in your wireless network, view I/O register values, and set system communication parameters when a host system is not part of the wireless network. The software runs on any computer with the Windows Vista, Windows 7, Windows 8, or Windows 10 operating system.



Use a USB to RS-485 adapter cable to connect a standalone DX80 Gateway to the computer. For DXM Controllers with an internal DX80 radio, connect a computer to the DXM Controller using a USB or Ethernet connection. Download the most recent revisions of the configuration software from Banner Engineering's website: www.bannerengineering.com/wireless.

The USB to RS-485 adapter cable is not required for the DXM Controller. For standalone DX80 Gateway devices use:

- USB to RS-485 adapter cable model BWA-UCT-900 for 1 Watt radios
- USB to RS-485 adapter cable model BWA-HW-006 for all other radios

Installing Your Sure Cross® Radios

Please refer to one of the following instruction manuals for details about successfully installing your wireless network components.

- Performance Wireless I/O Network Instruction Manual: [132607](#)

Holding Registers

Modbus Registers		EIP Registers		I/O Type	I/O Range		Holding Register Representation (Dec)	
Gateway	Node	Node			Min.	Max.	Min.	Max.
1	1 + (Node# × 16)	0 + (Node# × 8)	Instance 100 / N7	Vibration Sensor Input Register 1				
2	2 + (Node# × 16)	1 + (Node# × 8)		Vibration Sensor Input Register 2				
3	3 + (Node# × 16)	2 + (Node# × 8)		Vibration Sensor Input Register 3				
4	4 + (Node# × 16)	3 + (Node# × 8)		Current Transformer Input Register				
5	5 + (Node# × 16)	4 + (Node# × 8)		Vibration Sensor Input Register 5				
6	6 + (Node# × 16)	5 + (Node# × 8)		Vibration Sensor Input Register 6				
7	7 + (Node# × 16)	6 + (Node# × 8)		Reserved				
8	8 + (Node# × 16)	7 + (Node# × 8)	Device Message					
9	9 + (Node# × 16)	0 + (Node# × 8)	Instance 112 / N14					
	...							
15	15 + (Node# × 16)	6 + (Node# × 8)		Control Message				
16	16 + (Node# × 16)	7 + (Node# × 8)		Reserved				

To interpret the holding register representation of the current transformer (CT) in amperes, divide the register value by 100.

To use a current transformer other than those provided, ensure the CT matches the 333 mV output characteristics of the CTs provided with the Condition Monitoring Node. If the custom CT exceeds the 150 A CT, set DIP switch 8 to ON and use a DXM Controller or PLC to multiply the typical 150 A output value in input 4 by the ratio of the custom CT to 150 A. For example: For a 300 A CT, divide input 4 register data by 100 as you would for the 150 A CT, then multiply that value by 2 to scale it to 300 A.

Storage and Sleep Modes

Storage Mode (applies to battery-powered models only)—While in **storage mode**, the radio does not operate. All Sure Cross® radios powered from an integrated battery ship from the factory in storage mode to conserve the battery. To wake the device, press and hold button 1 for 5 seconds. To put any *FlexPower*® or integrated battery Sure Cross radio into storage mode, press and hold button 1 for 5 seconds. The radio is in storage mode when the LEDs stop blinking, but in some models, the LCD remains on for an additional minute after the radio enters storage mode. After a device has entered storage mode, you must wait 1 minute before waking it.

Sleep Mode (applies to both battery and 10–30 V dc powered models)—During normal operation, the Sure Cross radio devices enter **sleep mode** after 15 minutes of operation. The radio continues to function, but the LCD goes blank. To wake the device, press any button.

Install or Replace the Battery (DX80 Models)



To install or replace the 3.6 V lithium "D" cell battery in any integrated housing model, follow these steps.



CAUTION: There is a risk of explosion if the battery is replaced incorrectly.

As with all batteries, these are a fire, explosion, and severe burn hazard. Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.

For non-hazardous locations, the replacement battery is model **BWA-BATT-011**. For non-hazardous or hazardous locations, the replacement battery is Xeno model XL-205F, Banner model **BWA-BATT-001**. For pricing and availability, contact Banner Engineering.

1. Remove the four screws mounting the face plate to the housing and remove the face plate.
2. Remove the discharged battery.
3. Install the new battery, verifying the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
4. After installing the battery, allow up to 60 seconds for the device to power up.
5. Properly dispose of used batteries according to local regulations by taking it to a hazardous waste collection site, an e-waste disposal center, or other facility qualified to accept lithium batteries.

Specifications

Performance Radio Specifications

Radio Range²

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, 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)

900 MHz Compliance (1 Watt)

FCC ID UE3RM1809: FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance

FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247
RED Directive 2014/53/EU
IC: 7044A-DX8024

Antenna Connection

Ext. Reverse Polarity SMA, 50 Ohms
Max Tightening Torque: 0.45 N-m (4 lbf-in)

Link Timeout

Gateway: Configurable via User Configuration Tool (UCT) software
Node: Defined by Gateway

Environmental Specifications

Operating Conditions

-40 °C to +85 °C (-40 °F to +185 °F)
95% maximum relative humidity (non-condensing)
Radiated Immunity: 10 V/m (EN 61000-4-3)

Shock and Vibration

IEC 68-2-6 and IEC 68-2-27
Shock: 30g, 11 millisecond half sine wave, 18 shocks
Vibration: 0.5 mm p-p, 10 to 60 Hz

Environmental Ratings

IEC IP67; NEMA 6
Refer to the Sure Cross® Wireless I/O Networks Instruction Manual (p/n [132607](#)) for installation and waterproofing instructions.

Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

CM1L Node Specifications

Supply Voltage

3.6 V dc low power option from an internal battery

Current Draw at 3.6 V dc

900 MHz, 1 Watt: Approximately 1 mA
900 MHz, 250 mW: Approximately 0.5 mA
2.4 GHz, 65 mW: Approximately 0.3 mA

CT20A and CT150A Current Transformer

Electrical:

Rated input: 5–20 A (CT20A) or 5–150 A (CT150A)
Rated Output: 0.333 V (AC)
Ratio: $\leq \pm 1.0\%$
Phase angle: $\leq \pm 60$ min
Dielectric Strength: 2.5 kV/1 mA/1 min
Insulation Resistance: DC500 V/100 MOhm min

Mechanical:

Case: PA / UL94-V0
Bobbin: PBT
Core: Silicon Steel
Operating Temp: -25 °C to +75 °C (-13 °F to +167 °F)
Operating humidity: $\leq 85\%$

Housing

Polycarbonate housing; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers
Weight: 0.30 kg (0.65 lbs)
Mounting: #10 or M5 (SS M5 hardware included)
Max. Tightening Torque: 0.56 N-m (5 lbf-in)

Interface

Two bi-color LED indicators; Two buttons;

Wiring Access

Pre-wired for vibration sensor
Pre-wired cable for current transducer

Certifications



(CE approval only applies to 2.4 GHz models)

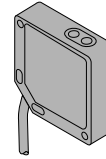
Accessories

Current Transformers (CT)	
CT20A <ul style="list-style-type: none"> Split-Core Current Transformer 5–20 A Input 0–50 mA/0.333 V Output 	CT150A <ul style="list-style-type: none"> Split-Core Current Transformer 5–150 A Input 0–100 mA/0.333 V Output

² Radio range is with the 2 dB antenna that ships with the product. High-gain antennas are available, but the range depends on the environment and line of sight. Always verify your wireless network's range by performing a Site Survey.

1-Wire Serial Sensors**QM42VT1**

- Vibration and temperature sensor with 1-wire serial interface
- Detects dual-axis vibration
- Zinc alloy housing
- 3 m cable with a 5-pin M12/Euro-style male quick disconnect (QD)
- Datasheet: [186209](#)

**QM42VT1QP**

- Vibration and temperature sensor with 1-wire serial interface
- Detects dual-axis vibration
- Zinc alloy housing
- 150 mm (6 in) PVC cable with a 5-pin M12/Euro-style male quick disconnect (QD)
- Datasheet: [186209](#)

Warnings

Install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty. Keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes; do not touch the Sure Cross® device or any equipment connected to the Sure Cross device during a thunderstorm.

Exporting Sure Cross® Radios. It is our intent to fully comply with all national and regional regulations regarding radio frequency emissions. **Customers who want to re-export this product to a country other than that to which it was sold must ensure the device is approved in the destination country.** The Sure Cross wireless products were certified for use in these countries using the antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies. This device has been designed to operate with the antennas listed on Banner Engineering's website and having a maximum gain of 9 dBi. Antennas not included in this list or having a gain greater than 9 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen such that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. Consult with Banner Engineering Corp. if the destination country is not on this list.

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.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: www.bannerengineering.com.

For patent information, see www.bannerengineering.com/patents.