# Sure Cross® DXM1200-B1 Wireless Controller

## Datasheet

The DXM1200-B1 Wireless Controller is an industrial wireless controller that facilitates Industrial Internet of Things (IIoT) applications. As a communications gateway, it interfaces local serial ports, local I/O ports, and local ISM radio devices to the Internet using a cellular connection or wired Ethernet network connection.

- High Performance Wireless Communication—Uses Sure Cross® DX80 Wireless Gateway or MultiHop radio with 900 MHz or 2.4 GHz ISM bands available for long range communication using an internal antenna
- Flexible and Customizable—Expanded internal logic controller with action rules and ScriptBasic programming capable of developing simple or complex solutions to process, log, and control data to/from multiple wireless radios and sensors
- Easy Installation in all Environments—IP67 housing makes installation in any location simpler by eliminating the need for a control cabinet
- Improved Speed and Memory—Upgraded internal processor to use 2850 32-bit integer registers, 2000 floating-point registers, and 1050 non-volatile 32-bit integer registers; expanded ScriptBasic programming capability for faster script processing and ability to build more complex solutions with scripts

- External Communications—Optional cellular modem with internal antenna for internet connectivity
- Industry Compatibility—Automation protocols include Modbus/TCP, Modbus RTU, and EtherNet/IP™ for communications between PLCs, HMIs, or other local hosts
- Cloud Connectivity—Visualize data and set alarms by sending data from the DXM1200 to the cloud either through BannerCDS.com or third-party cloud sites
- Customizable Alerts—Secure email for alarms and alerts
- Data logged to a removable SD card or sent via email
- Interactive programmable user interface with LCD and LED indicators
- Industry standard RS-485, Ethernet, and USB communication ports

Important: Please download the complete DXM1200-B1 Wireless Controller technical documentation, available in multiple languages, from www.bannerengineering.com for details on the proper use, applications, Warnings, and installation instructions of this device.

Important: Por favor descargue desde www.bannerengineering.com toda la documentación técnica de los DXM1200-B1 Wireless Controller, disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.

Important: Veuillez télécharger la documentation technique complète des DXM1200-B1 Wireless Controller sur notre site www.bannerengineering.com pour les détails sur leur utilisation correcte, les applications, les notes de sécurité et les instructions de montage.

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.

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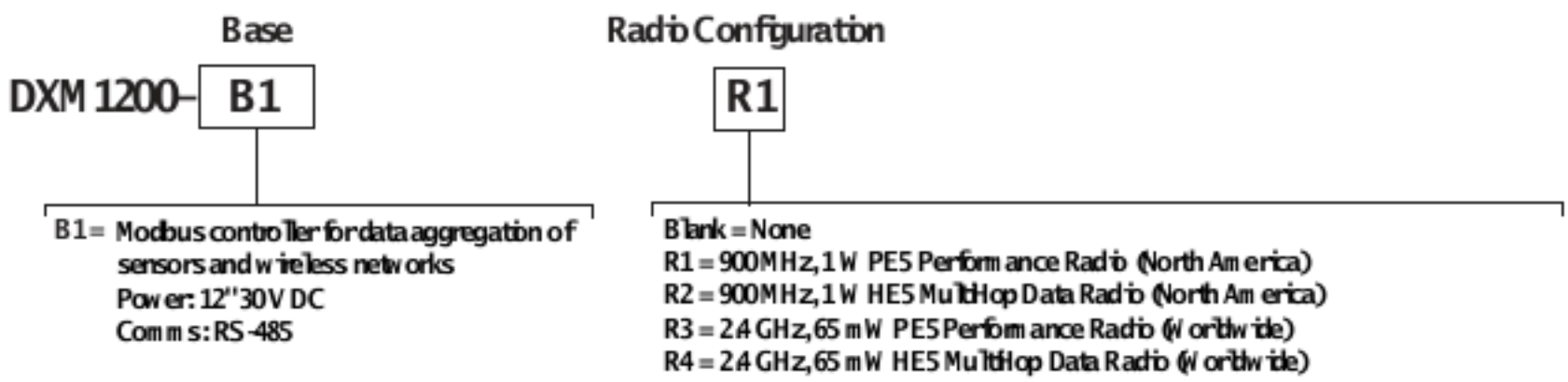
Important:

- 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




Some example models include, but are not limited to, the following:

| Models | Description |
|---|---|
| DXM1200-B1R1 | DXM1200-B1 Wireless Controller with DX80 ISM 900 MHz radio |
| DXM1200-B1R2 | DXM1200-B1 Wireless Controller with DX80 ISM 900 MHz MultiHop radio |
| DXM1200-B1R3 | DXM1200-B1 Wireless Controller with DX80 ISM 2.4 GHz radio |
| DXM1200-B1R4 | DXM1200-B1 Wireless Controller with DX80 ISM 2.4 GHz MultiHop radio |

Cellular Communications—Controllers accept Banner Cellular Modems only. Adding a cellular modem to the DXM1200-B1 requires the placement of an internal cellular antenna. Cellular modems are ordered separately as accessories under the following part numbers:

- LTE CAT1 Verizon (United States only): SXI-LTE-001
- GSM/3G (HSPA) (International only): SXI-GSM-001
- LTE CAT-M1 AT&T (North America only): SXI-CATM1ATT-001
- LTE CAT-M1 Verizon (North America only): SXI-CATM1VZW-001

For more information, refer to the technical note Activating a Cellular Modem (p/n 205026).

## DXM1200 Documentation

For more information about the DXM1200-B1 family of products, please see additional documentation and videos on the Banner website: www.bannerengineering.com.

- DXM Wireless Controller Sell Sheet, p/n 194063
- DXM1200-B1 Wireless Controller Datasheet, p/n 196719
- DXM1200-Bx Wireless Controller Instruction Manual, p/n 216539
- DXM ScriptBasic Instruction Manual, p/n 191745
- DXM Controller Configuration Quick Start, p/n 191247
- DXM Configuration Software v4 (p/n b_4496867)
- DXM Configuration Software Instruction Manual, p/n 209933
- DXM EDS Configuration file for Allen-Bradley PLCs
- Activating a Cellular Modem (p/n b_4419353)
- Additional technical notes and videos

Technical notes, configuration examples, and ScriptBasic program examples are available at www.bannerengineering.com.

## DXM1200-Bx System Overview

Banner's DXM Logic Controller integrates Banner's wireless radio and cellular connectivity to provide a platform for the Industrial Internet of Things (IIoT).

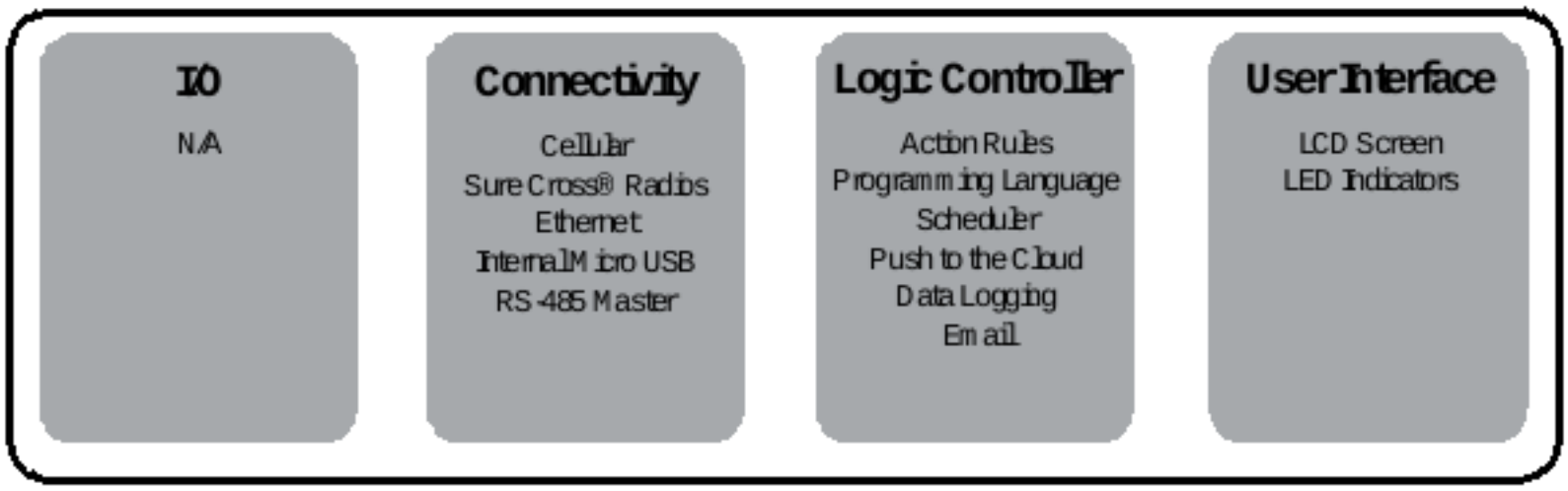



Figure 1. DXM1200-B1 system overview

| Modbus Registers for Internal Local Registers (Modbus Slave ID 199) | | |
|---|---|---|
| Local Registers | Type | Description |
| 1–845 | 32-bit integer | Local data registers |
| 846–849 | 32-bit integer | Reset, Constant, Timer |
| 851–900 | 32-bit non-volatile integer | Data flash, non-volatile |
| 901–1000 | | Reserved for internal use |
| 1001–5000 | Floating point | Floating point registers, local data registers |
| 5001–7000 | 32-bit integer | Local data registers |
| 7001–8000 | 32-bit non-volatile integer | Data flash, non-volatile |
| > 10000 | | Read only virtual registers, system-level data |

Connectivity—The DXM1200-B1's wired and wireless connectivity options make it easy to share data between local and remote equipment. The cellular modem option eliminates the need for IT infrastructures to connect remote equipment for sensing and control to IIoT cloud services. The integrated Sure Cross® wireless radio enables Modbus connectivity to remote sensors, indicators, and control equipment. Connect directly to any PLC and/or SCADA system for easy integration into existing control or monitoring systems.

Wired Connectivity

- Ethernet: Modbus/TCP (master/slave) or Ethernet/IP
- Field Bus: Modbus RS-485 Master

Wireless Connectivity

- Sure Cross Wireless Radio: DX80 900 MHz, DX80 2.4 GHz, MultiHop 900 MHz, or MultiHop 2.4 GHz
- Cellular modem: LTE (United States only) or GSM (Outside the United States), CATM1-ATT (North America Only) or CATM1-VZW (US Only)

Logic Controller—Program the DXM1200-B1's logic controller using action rules and/or ScriptBasic language, which can execute concurrently. The control functions allow freedom when creating custom sensing and control sequences. The logic controller supports the Modbus protocol standards for data management, ensuring seamless integration with existing automation systems. File and LCD password protection is an option.

Register Mapping

- Cyclical Read rules from wireless devices or local wired Modbus devices that include optional scaling, error conditions, and the ability to activate a read rule
- Cyclical or Change of State Write rules to wireless devices or local wired Modbus devices with scaling
- Modbus/TCP Master Read or Write rules for external devices on the network

Action Rules

- Thresholds (IF/THEN/ELSE) with timers, minimum on/off time, and logging options
- Math/Logic Rules (arithmetic and bitwise operators)
- Control Logic (logical operators and SR/T/D/JK flip flops
- Trending (multiple averaging filters
- Tracking (counts, on/off times)
- Email notifications
- Push data on conditions

Scheduler

- Time/calendar-based events
- Holiday skips
- One-time events
- Dynamic scheduler updating
- Astronomical clock

Optional Text Programming Language

- ScriptBasic to create variables, arrays, functions, loops, IF/THEN/ELSE, logical and arithmetic operators, API commands, register access, string functions and operators, time commands

Data Logging

- Cyclic data/event logging
- Email log files

User Interface— A simple user interface consists of an LCD screen and four LED indicators.

User programmable LCD

- Bind Sure Cross radios
- Conduct a site survey to evaluate the radio signal integrity of radios within the network
- View register and output information
- View system status and configuration

API Interface

- Host Initiated control
- Web service integration

User Defined LED indicators

- Indicates the status of the DXM1200-B1, processes, or equipment

## Applications Overview

The DXM1200-B1 is ideal for smart factory and facilities applications, including:

- Productivity solutions, such as
  - Call for parts, service, or maintenance
  - Pick-to-light
  - OEE Tower light monitoring
- Predictive maintenance and continuous monitoring using
  - Vibration and temperature monitoring
  - Tank level monitoring
  - Non-contact condition monitoring
- Environmental monitoring and control, such as
  - Temperature and humidity monitoring

The DXM1200-B1 can provide visual indication using indicator lights, send email alerts, collect data, and interface with automation systems.

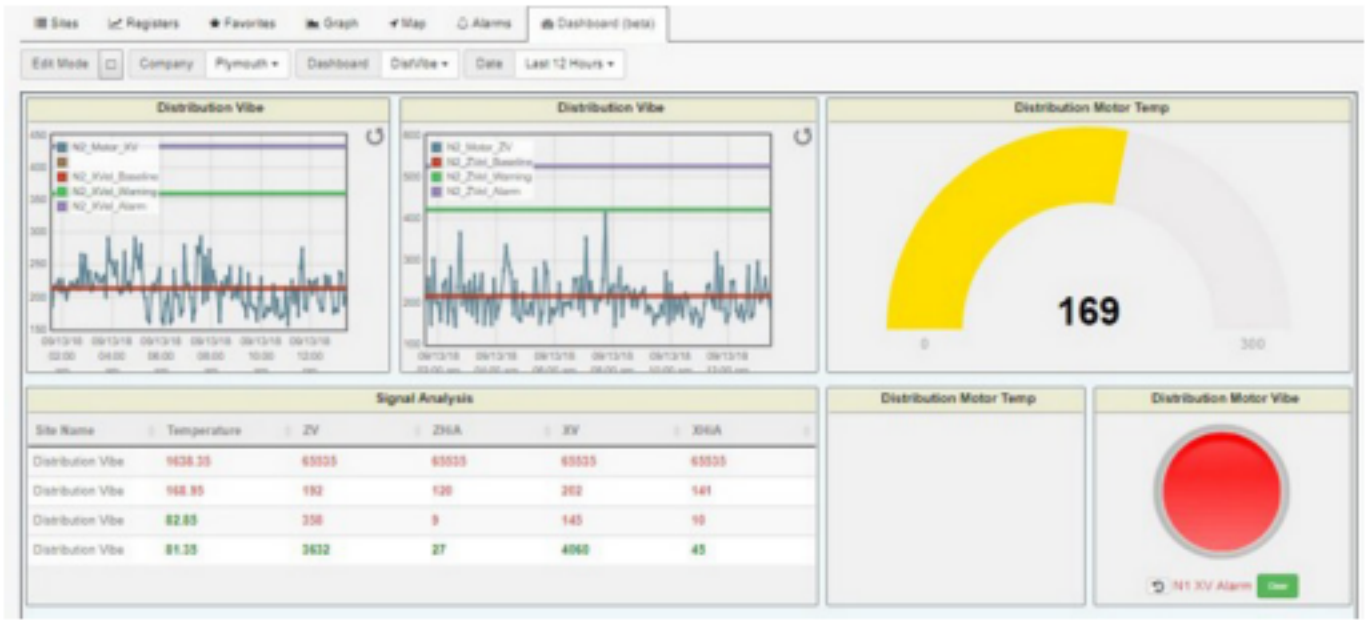
## Banner Connected Data Solutions (CDS)

With a few easy steps, the DXM controller can be connected and sharing data with Banner's Connected Data Solutions. This is a web-based software platform that allows users to access, store, protect, visualize, and export critical data collected by Banner's DXM controllers.

This software complements our wireless product portfolio and provides customers with complete end-to-end IIoT solutions to solve the most pressing problems of the Industrial market. Visit the Connected Data Solutions site for account access and technical support at https://bannercds.com/.

### Get Solutions Up and Running Quickly

Solution Templates are available to help implement IIoT solutions with ease-no coding or expertise required. In addition, all elements of a wireless solution from Banner-from sensor to cloud-are purpose-built to work together for easy configuration and use.




Popular solution templates include guides for the following applications:

- Vibration Monitoring and Predictive Maintenance
- Overall Equipment Effectiveness
- Tank Level Monitoring
- Temperature and Humidity Monitoring
- And more…

## Make Better Data-Driven Decisions

The CDS platform is more than a dashboard. The software can provide actionable insights that allow you to solve real challenges on the factory floor by using analytics and visualization tools that range from graphs, gauges, status indicators, and number displays to alarm icons, maps, and tables.

Easily organize and manage the health of various assets and processes via customizable layouts that can be constructed for workstation screens or kiosk displays. In addition, the ability to store or export data, and analyze trends over time helps you and the organization make better, data-driven decisions long-term.

## Access the Data You Want and Get the Alerts You Need

Remotely access data anytime and anywhere.

On-demand visibility and real-time alerts allow you to remotely monitor and diagnose systems quickly, saving time and cost. Simple data structure allows users to organize assets and facilities in a manner that best serves the needs of the business.

## Maximize Uptime and Increase fen

Predictive maintenance is a key capability of Banner's IIoT solutions.

The software platform helps you use device data to predict machine maintenance requirements, which reduces unplanned downtime, increases mean time between failure (MTBF), and reduces maintenance costs.

## petons

## MultiHop Radio with Internal Antenna petons

Radio Range[1]
900 MHz, 1 Watt (Internal antenna): Up to 3.2 km (2 miles) with line of sight
2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight

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)

900 MHz Compliance (1 Watt)
FCC ID UE3RM1809: FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809
IFT: RCPBARM13-2283

2.4 GHz Compliance (MultiHop)
FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247
Radio Equipment Directive (RED) 2014/53/EU
IC: 7044A-DX8024

Radio Packet Size (MultiHop)
900 MHz: 175 bytes (85 Modbus registers)
2.4 GHz: 75 bytes (37 Modbus registers)

[1] Range depends on the environment and decreases significantly without line of sight. Always verify your wireless network's range by performing a Site Survey.

## RS-485 Communication petons

Communication Hardware (MultiHop RS-485)
Interface: 2-wire half-duplex RS-485
Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Software
Data format: 8 data bits, no parity, 1 stop bit

## Power and I/O petons

Supply Voltage
12 to 30 V DC (use only with a suitable Class 2 power supply (UL) or a Limited Power Source (LPS) (CE) power supply)

Power Consumption
60 mA average at 24 V

Communication Protocols
Modbus RTU Master, Modbus/TCP, and EtherNet/IP

Construction
Polycarbonate

Connection
Integral 5-pin M12/Euro-style male quick disconnect

Logging
8 GB maximum; removable Micro SD card format

Certifications

(CE approval only applies to 2.4 GHz models)

(NOM approval only applies to 900 MHz models)

Security Protocols
TLS, SSL, HTTPS

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.
Supply wiring leads < 24 AWG shall not be spliced.
For additional product support, go to www.bannerengineering.com.

| Supply Wiring (AWG) | Required Overcurrent Protection (Amps) |
|---|---|
| 20 | 5.0 |
| 22 | 3.0 |
| 24 | 2.0 |
| 26 | 1.0 |
| 28 | 0.8 |
| 30 | 0.5 |

## Environmental petons

Operating Conditions[2]
–20 °C to +60 °C (–4 °F to +140 °F)
95% maximum relative humidity (non-condensing)
Radiated Immunity: 3 V/m (EN 61000-4-3)

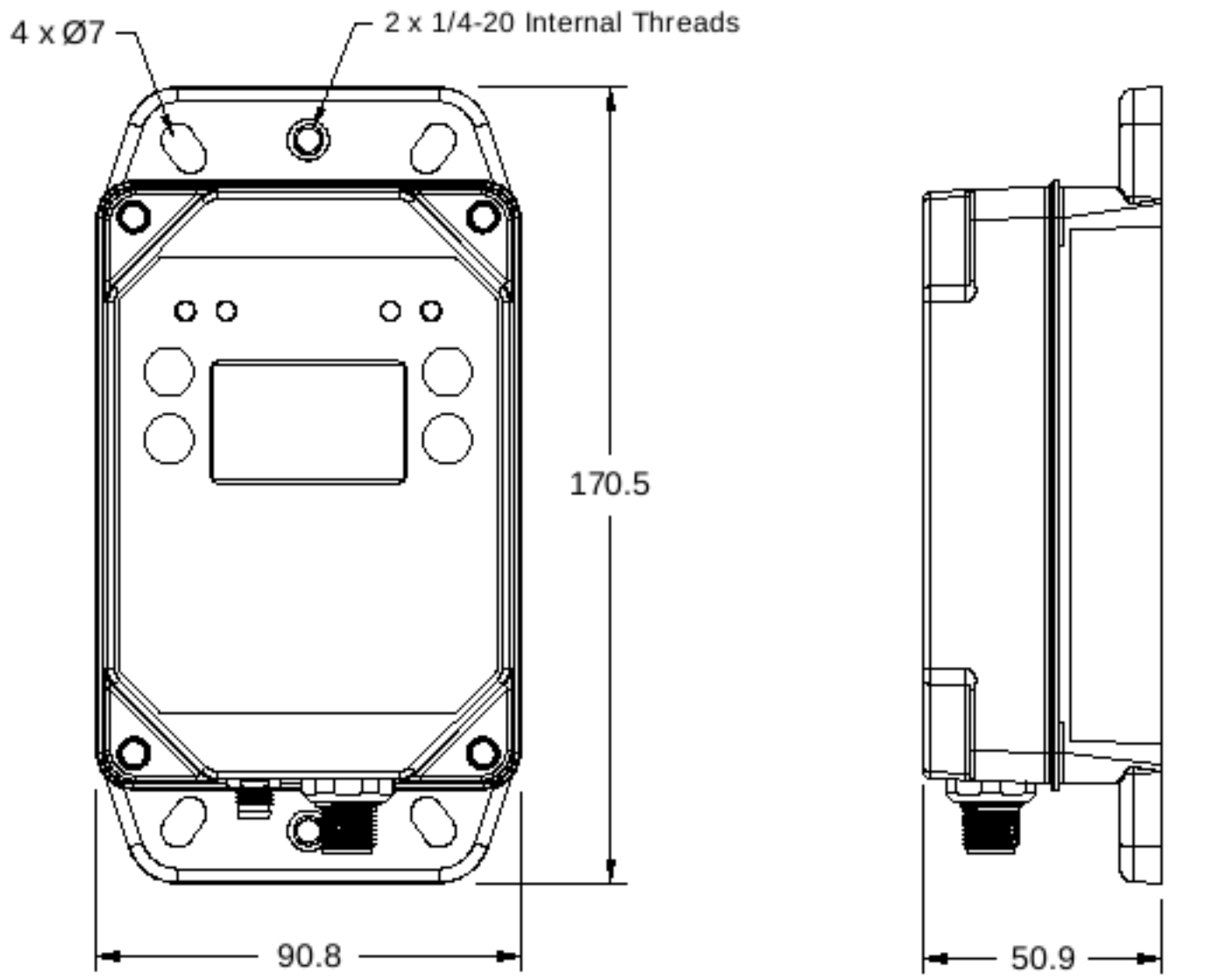
Shock and Vibration
All models meet IEC 60068-2-6 and IEC 60068-2-27 testing criteria
Shock: 30G 11 ms duration, half sine wave per IEC 60068-2-27
Vibration: 10 Hz to 55 Hz, 0.5 mm peak-to-peak amplitude per IEC 60068-2-6

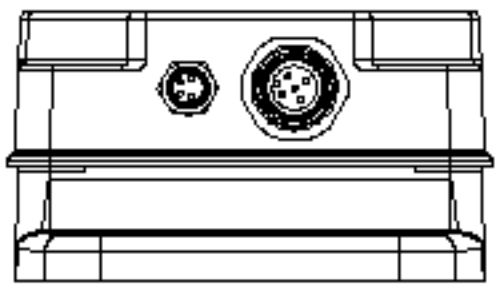
Environmental Rating
IEC IP67

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

## Dimensions

All measurements are listed in millimeters, unless noted otherwise.



## Accessories

For a complete list of all the accessories for the Sure Cross wireless product line, please download the Banner Industrial Wireless Accessories list (p/n b_3147091).

Cordsets

- MQDC1-506—5-pin M12/Euro-style, straight, single ended, 6 ft
- MQDC1-530—5-pin M12/Euro-style, straight, single ended, 30 ft
- MQDC1-506RA—5-pin M12/Euro-style, right-angle, single ended, 6 ft
- MQDC1-530RA—5-pin M12/Euro-style, right-angle, single ended, 30 ft
- IVUC-E-406—RJ45 Ethernet to 4-pin threaded M8/Pico-style, straight, 6 ft
- IVUC-E-415—RJ45 Ethernet to 4-pin threaded M8/Pico-style, straight, 15 ft

Cellular Kits

- SXI-LTE-001—LTE CAT1 Verizon (United States only)
- SXI-GSM-001—GSM/3G (HSPA) (International only)
- SXI-CATM1ATT-001—LTE CAT-M1 AT&T (North America only)
- SXI-CATM1VZW-001—LTE CAT-M1 Verizon (North America only)

Power Supplies

- PSD-24-4—DC Power Supply, Desktop style, 3.9 A, 24 V dc, Class 2, 4-pin M12/Euro-style quick disconnect (QD)
- PSDINP-24-06—DC power supply, 0.63 Amps, 24 V DC, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated
- PSDINP-24-13 —DC power supply, 1.3 Amps, 24 V DC, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated
- PSDINP-24-25 — DC power supply, 2.5 Amps, 24 V DC, with DIN Rail Mount, Class I Division 2 (Groups A, B, C, D) Rated
- PSW-24-1—DC power supply with wall plug, 100-240 V AC 50/60 Hz input, 24 V DC 1 A output, UL Listed Class 2

Mounting

- SMBWSQ120—Rear-mount protective metal enclosure, prevents buildup of water or ice from interfering with performance
- SMBQ240SS1 —Sensor mounting plate and pivoting bracket, provides ± 20° of tilt in one axis for enhanced alignment

## 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 dBm. Antennas not included in this list or having a gain greater that 9 dBm 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.

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

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Banner es una marca registrada de Banner Engineering Corp. y podrán ser utilizadas de manera indistinta para referirse al fabricante. "Este equipo ha sido diseñado para operar con las antenas tipo Omnidireccional para una ganancia máxima de antena de 6 dBd y Yagi para una ganancia máxima de antena 10 dBd que en seguida se enlistan. También se incluyen aquellas con aprobación ATEX tipo Omnidireccional siempre que no excedan una ganancia máxima de antena de 6dBd. El uso con este equipo de antenas no incluidas en esta lista o que tengan una ganancia mayor que 6 dBd en tipo omnidireccional y 10 dBd en tipo Yagi, quedan prohibidas. La impedancia requerida de la antena es de 50 ohms."

| Antenas SMA | Modelo |
|---|---|
| Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho | BWA-9O2-C |
| Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho | BWA-9O5-C |

| Antenas Tipo-N | Modelo |
|---|---|
| Antena, Omni 902-928 MHz, 6 dBd, fibra de vidrio, 1800mm, N Hembra | BWA-9O6-A |
| Antena, Yagi, 900 MHz, 10 dBd, N Hembra | BWA-9Y10-A |

## Mexican Importer

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