

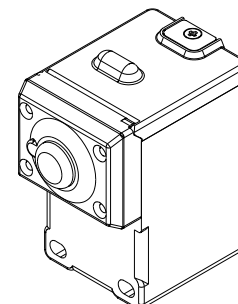
Q45RDNL Wireless Remote Discrete Non-Contact Switch Node



Features

Sure Cross® Wireless Q45 Sensors combine the best of Banner's flexible sensor family with its reliable, field-proven, Sure Cross wireless architecture to solve new classes of applications limited only by the user's imagination. Containing a variety of sensor models, a radio, and an internal battery supply, this product line is truly plug-and-play.

The Q45RDNL is a compact, industrial, battery-powered device that uses a locally installed magnet to sense the position of mechanical mechanisms. The Q45 wirelessly transmits the position to a wireless controller/gateway using a discrete input state. Configure the Q45 using internal DIP switches or the DX80 Performance Configuration Software.



Benefits

- Powerful device to deliver factory automation and IIoT solutions for many applications including but not limited to:
 - Door position sensing
 - Security - verify gate or door closure
 - Safety shower operation monitoring
 - Damper/valve/actuator position
 - Articulating equipment position (outriggers, booms, chocks, cylinders etc.)
- Easy-to-use rugged device that can be easily mounted to equipment
- Senses the position of doors, levers, or other moving mechanicals object by proximity to the Q45
- Use with a DXM Wireless Controller to track position, count cycles, or times in different positions
- Local LED indication can be linked to proximity sensing or to other wireless inputs within the network
- Battery powered for "peel and stick" functionality with 2-year battery life capability
- **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 enables 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 500 mW 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
- 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 a lost radio signal

Models

| Model | Frequency | Inputs and Outputs |
|------------------|------------------|---|
| DX80N9Q45RDNL-NH | 900 MHz ISM Band | Inputs: One remote discrete non-contact switch Outputs: One four-color LED indicator light |
| DX80N2Q45RDNL-NH | 2.4 GHz ISM Band | |

Storage Mode

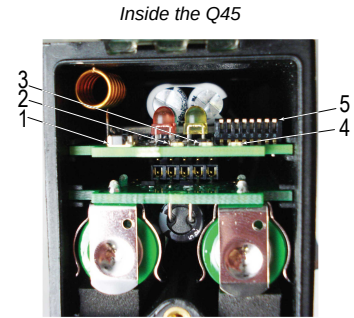
While in **storage mode**, the device's radio does not operate to conserve the battery. To put any device into storage mode, press and hold the binding button for five seconds. The device is in storage mode when the LEDs stop blinking. To wake the device, press and hold the binding button (inside the housing on the radio board) for five seconds.



Configuration Instructions

Buttons and LEDs

1. Binding button
2. Red LED (flashing) indicates a radio link error with the Gateway.
3. Green LED (flashing) indicates a good radio link with the Gateway.
4. Amber LED indicates when input 1 is active.
5. DIP switches



DIP Switches

After making any changes to any DIP switch position, reboot the Wireless Q45 Sensor by triple-clicking the button, waiting a second, then double-clicking the button. By default, the DIP switches are in the OFF position. To turn a DIP switch on, push the switch toward the battery pack. DIP switches are numbered from left to right.

| Device Settings | DIP Switches | | | | | | | |
|--|--------------|------|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 900 MHz transmit power level: 500 mW (27 dBm) | OFF* | | | | | | | |
| 900 MHz transmit power level: 250 mW (24 dBm), DX80 compatibility mode | ON | | | | | | | |
| Modbus or software configured (overrides DIP Switches 3-8) | | OFF* | | | | | | |
| DIP switch configured | | ON | | | | | | |
| Standard input | | | OFF* | | | | | |
| Inverted input | | | ON | | | | | |
| Light mode: flashing | | | | OFF* | | | | |
| Light mode: solid | | | | ON | | | | |
| Red light mapped to input | | | | | OFF* | OFF* | OFF* | |
| Yellow light mapped to input | | | | | OFF | OFF | ON | |
| Green light mapped to input | | | | | OFF | ON | OFF | |
| Blue light mapped to input | | | | | OFF | ON | ON | |
| No lights mapped to input | | | | | ON | OFF | OFF | |
| Reserved | | | | | ON | OFF | ON | |
| Reserved | | | | | ON | ON | OFF | |
| Reserved | | | | | ON | ON | ON | |
| Reserved | | | | | | | | OFF* |

* default configuration

Transmit Power Levels

The 900 MHz radios have a high output option that will transmit at 500 mW (27 dBm). The low output option transmits at 250 mW (24 dBm). The 250 mW mode reduces the radio's range but improves the battery life in short-range applications. 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).

Modbus/Software or DIP Switch Configured

In Modbus/Software Configured mode, use the DX80 Performance Configuration Software or a Modbus command to change the device parameters. DIP switch positions 3 through 8 are ignored. In DIP Switch Configured mode, use the DIP switches to configure the parameters listed in the table.

Apply Power to the Q45 AA-Cell Models

Follow these instructions to install or replace the lithium "AA" cell batteries.

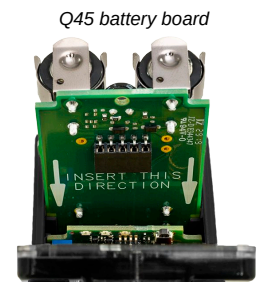
CAUTION:



- **As with all batteries, these are fire, explosion, and severe burn hazards. There is a risk of explosion if the battery is replaced incorrectly.**
- Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.
- Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
- Properly dispose of used batteries according to local regulations by taking them to a hazardous waste collection site, an e-waste disposal center, or another facility qualified to accept lithium batteries.

1. Loosen the clamp plate with a small Phillips screwdriver and lift the cover.
2. Slide the battery board out of the Q45 housing.
3. If applicable, remove the discharged batteries.
4. Install the new batteries.

Use Banner's **BWA-BATT-006** replacement batteries or equivalent 3.6 V AA lithium batteries, such as Xeno's XL-60F.
5. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
6. Slide the board containing the new batteries back into the Q45 housing.
7. Close the cover and gently tighten the clamp plate with the small Phillips screwdriver.



Bind to the Gateway and Assign the Node Address

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

1. On the Gateway: Enter binding mode.
 - For housed DX80 Gateways, triple-click button 2 on the Gateway. Both LEDs flash red.
 - For Gateway board modules, triple-click the button. The green and red LED flashes.
2. Assign the Q45 a Node address using the Gateway's rotary dials. Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your Q45 to Node 10, set the Gateway's left dial to 1 and the right dial to 0. Valid Node addresses are 01 through 47.
3. On the Q45: Loosen the clamp plate on the top of the Q45 and lift the cover.
4. Enter binding mode on the Q45 by triple-clicking the Q45's button.

The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q45 is bound, the LEDs stay solid momentarily, then they flash together four times. The Q45 exits binding mode.
5. Label the sensor with the Q45's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q45s as are needed for your network.
7. On the Gateway: After binding all Q45s, exit binding mode.
 - For housed DX80 Gateways, double-click button 2.
 - For board-level DX80 Gateways, double-click the button.

For Gateways with single-line LCDs: After binding your Q45 to the Gateway, make note of the binding code displayed under the Gateway's *DVCFG menu, XADR submenu on the LCD. Knowing the binding code prevents having to re-bind all Q45s if your Gateway is ever replaced.

Bind to a DXM and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices. Separate the radios by two meters when running the binding procedure. Put only one DXM into binding mode at a time to prevent the Q45 from binding to the wrong Gateway.

1. On the DXM: Use the arrow keys to select the **ISM Radio** menu on the LCD and click **ENTER**.
2. Highlight the **Binding** menu and click **ENTER**.
3. Use the arrow keys to select the Node address to bind the Q45 to.
4. On the Q45: Loosen the top clamp plate and lift the cover.
5. Enter binding mode by triple-clicking the binding button.

The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Node binds, the LEDs stay solid momentarily, then they flash together four times. The Node exits binding mode.
6. Label the sensor with the Node address number for future reference.
7. On the DXM: Click **BACK** to exit binding for that specific Node address.
8. Repeat steps 3 through 7 and change the Node address for as many Q45s as are needed for your network.
9. On the DXM: After you have finished forming your network, click **BACK** until you reach the main menu.

Modbus Registers

| I/O # | Modbus Holding Register | | I/O Type | I/O Range | | Holding Register Representation | |
|-------|-------------------------|-------------------|-------------------------------|------------|------------|---------------------------------|-------------|
| | Gateway | Any Node | | Min. Value | Max. Value | Min. (Dec.) | Max. (Dec.) |
| 1 | 1 | 1 + (Node# × 16) | Non-Contact Switch State | 0 | 1 | 0 | 1 |
| | | ... | | | | | |
| 7 | 7 | 7 + (Node# × 16) | Reserved | | | | |
| 8 | 8 | 8 + (Node# × 16) | Device Message | | | | |
| 9 | 9 | 9 + (Node# × 16) | Discrete OUT 1 (red light) | 0 | 1 | 0 | 1 |
| 10 | 10 | 10 + (Node# × 16) | Discrete OUT 2 (yellow light) | 0 | 1 | 0 | 1 |
| 11 | 11 | 11 + (Node# × 16) | Discrete OUT 3 (green light) | 0 | 1 | 0 | 1 |
| 12 | 12 | 12 + (Node# × 16) | Discrete OUT 4 (blue light) | 0 | 1 | 0 | 1 |
| | | ... | | | | | |
| 15 | 15 | 15 + (Node# × 16) | Control Message | | | | |
| 16 | 16 | 16 + (Node# × 16) | Reserved | | | | |

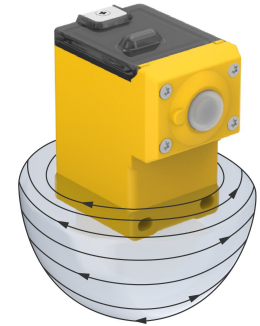
Magnetic Non-Contact Switch Sensing Area

The Q45RDNL has a normally open reed switch embedded into its base. Discrete switch closure is the result of a magnetic force in proximity to the lower portion of the Q45 housing surface.

The sensing area extends up to 1 inch from the face, rear, and bottom of the device and up to 1 inch to the sides from the center of the base with the supplied Neodymium (axially magnetized) rare earth magnet. The supplied magnet, p/n 204457, is a 0.5 inch × 0.25 inch Neodymium rare earth magnet with a pull force of 10.9 lbs.

Mounting the Q45RDNL depends on the specific application, but either the magnet or the Q45RNL can be mounted to a movable or fixed surface.

Any customer-supplied magnet configuration can be used. The sensing distance will vary based on the supplied magnet's size, type, and pull force.



Specifications

Radio Specifications for Performance Internal Antenna

Radio Transmit Power (900 MHz, 500 mW radios)

Conducted: 27 dBm (500 mW)
 EIRP with the supplied antenna: < 36 dBm

Radio Transmit Power (2.4 GHz radios)

Conducted: < 18 dBm (65 mW)
 EIRP with the supplied antenna: < 20 dBm (100 mW)

Antenna Minimum Separation Distance

900 MHz radios transmitting at ≥ 500 mW: 4.57 m (15 ft) with the supplied antenna
 2.4 GHz radios transmitting at 65 mW: 0.3 m (1 ft) with the supplied antenna

Radio Range

A 2 dB antenna ships with this device. Transmit power and range are subject to many factors, including antenna gain, installation methods, characteristics of the application, and environmental conditions.

Please refer to the following documents for installation instructions and high-gain antenna options.

- Installing Your Sure Cross® Radios ([151514](#))
- Conducting a Site Survey ([133602](#))
- Sure Cross® Antenna Basics ([132113](#))

Link Timeout (Performance)

Gateway: Configurable via User Configuration Software
 Node: Defined by Gateway

Spread Spectrum Technology

FHSS (Frequency Hopping Spread Spectrum)

900 MHz Compliance (SX7023EXT Radio Module)

Radio module is indicated by the product label marking
 Contains FCC ID: UE3SX7023EXT
 Contains IC: 7044A-SX7023EXT

2.4 GHz Compliance (SX243 Radio Module)

Radio module is indicated by the product label marking
 Contains FCC ID: UE3SX243
 Radio Equipment Directive (RED) 2014/53/EU
 Contains IC: 7044A-SX243

FCC Part 15 Class A for Intentional Radiators

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. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Q45RDNL Specifications

Typical Battery Life

Up to 2 years

A typical battery life assumes an average of 20 seconds between sensor changes of state and the default 62.5 millisecond sample rate. Battery life is reduced to 1 year with an average of 2 seconds between changes of state.

Battery life with light continuously flashing: 2 months

Battery life with light continuously solid: 1.5 weeks

Construction

Molded reinforced thermoplastic polyester housing, orange-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Designed to withstand 1200 psi washdown.

Default Sensing Interval

62.5 milliseconds

Report Rate

On Change of State

Indicators

Red and green LEDs (radio function); amber LED indicates when input 1 is active

Button Input

Sample Rate: 62.5 milliseconds

Report Rate: On Change of State

ON Condition: Button pressed

OFF Condition: Button not pressed

Certifications

CE/UKCA approval only applies to 2.4 GHz models



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03737-22-04042

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Environmental Specifications for the Q45

Operating Conditions

-40 °C to +70 °C (-40 °F to +158 °F); 90% at +50 °C
maximum relative humidity (non-condensing)

Radiated Immunity: 10 V/m (EN 61000-4-3)

Environmental Rating

NEMA 6P

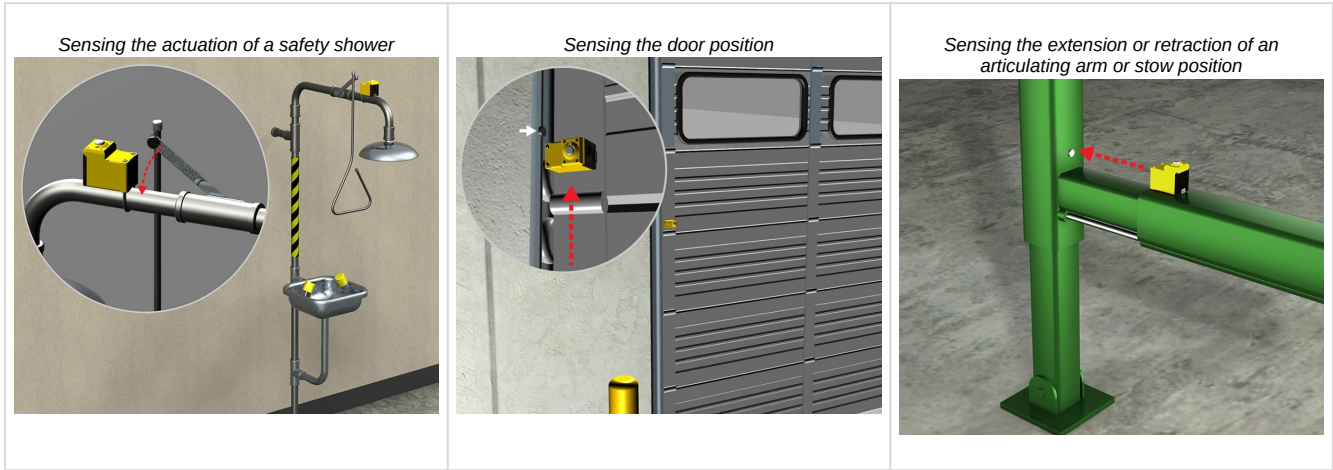
IP67

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

Q45RDNL Applications


Mount the Wireless Q45RDNL Sensor Node using the two (2) provided screws, the recommended bracket, or industrial-grade, double-sided tape on the back or the sides of the device.

Mount the supplied magnet with epoxy or double-sided tape. Customer-supplied specialized magnets can also be used. When the magnet is in range of the reed switch, the magnetic field closes the switching circuit.



Accessories

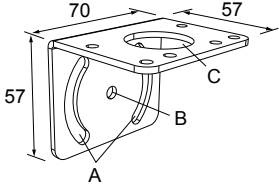
Replacement Batteries (AA Cells)

| | |
|---|---|
| <p>BWA-BATT-006</p> <ul style="list-style-type: none"> • 3.6 V Lithium AA cell • Two batteries |  |
|---|---|

Mounting Brackets

- Q45 Wireless sensors can be mounted with double-sided tape or with bracket options below
- -NH models are supplied with two (2) mounting screws and nuts

Use with the -NH models:

| | |
|---|---|
| <p>SMB30MM</p> <ul style="list-style-type: none"> • 12-gauge stainless steel bracket with curved mounting slots for versatile orientation • Clearance for M6 (¼ in) hardware • Mounting hole for 30 mm sensor <p>Hole center spacing: A = 51, A to B = 25.4 Hole size: A = 42.6 × 7, B = ∅ 6.4, C = ∅ 30.1</p> |  |
|---|---|

Warnings (Internal Antenna Models)

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.** Consult with Banner Engineering Corp. if the destination country is not on this list.

IMPORTANT: Please download the complete Wireless Q45RDNL Node 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 Wireless Q45RDNL Node, 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 Wireless Q45RDNL Node 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:

- **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.

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.

Notas Adicionales

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Mexican Importer

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