Q45BL-NH Wireless Button with Light Node

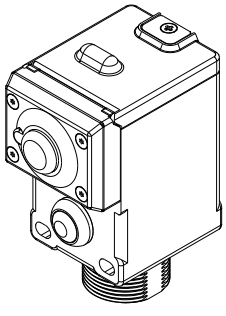
Features

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 Q45BL is a compact, industrial, battery-powered device that can be used to wirelessly transmit a single button input to a wireless controller/gateway for remote monitoring or control with local LED indication. All configuration is done through internal dip switches or the DX80 Performance Configuration Software.

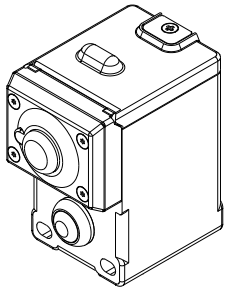
Benefits

- Powerful device to deliver factory automation and IIoT solutions for many applications including but not limited to:
  - Call for parts, service, or pallet pickup
  - Door/gate control
  - AGV control
  - Motor jog control
  - Forklift door control
- Easy-to-use rugged device that can be handheld or mounted to equipment
- Single, normally open push button for monitoring or control or remote devices
- Local LED indication can be linked to button presses or to other wireless inputs within the network
- Battery powered for "peel and stick" functionality with a two-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



Q45BL-RYGB Model

- 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



Q45BL-NH Models

Models

Model	Frequency	Port	Inputs and Outputs
DX80N9Q45BL-NH	900 MHz ISM Band	None	Inputs: One button Outputs: One four-color LED indicator light
DX80N9Q45BL-RYGB	900 MHz ISM Band	1/2-inch NPT on bottom	

The following models are no longer available for order, but are still covered by the information in this document.

Model	Frequency	Port	Inputs and Outputs
DX80N2Q45BL-NH	2.4 GHz ISM Band	None	Inputs: One button Outputs: One four-color LED indicator light

Quick Start Guide

Continue reading the datasheet for more detailed instructions.

1. Set the DIP switches. See "DIP Switches" on page 2.
2. Install the battery. See "Apply Power to the Q45 AA-Cell Models" on page 3.
   The radio powers on automatically.
3. Bind the Q45 to its Gateway (DXM Controller or DX80 Performance Gateway) and assign a node ID to the Q45. See "Bind to the Gateway and Assign the Node Address" on page 3.

Original Instructions
03-Feb-25

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206597
p/n: 206597 Rev. H

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

4. Mount the Q45.
5. Collect the data with the DXM Controller or Gateway from Input 1 (push button status).
6. Control the color status by turning on outputs 1 through 4 for the red, yellow, green, and blue LEDs respectively. See "Modbus Holding Registers" on page 4.

Storage Mode

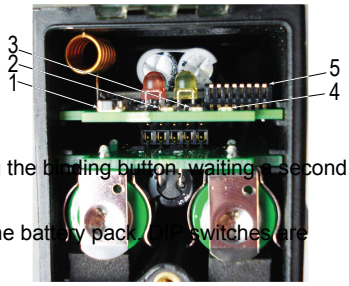
While in **storage mode**, the device's radio does not operate to conserve the battery. To put any device into storage mode, press and hold the binding button for five seconds. The device is in storage mode when the LEDs stop blinking. To wake the device, press and hold the binding button (inside the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

Configuration Instructions

Binding Button and LED Indicators

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

Inside the Q45



DIP Switches

After making any changes to any DIP switch position, reboot the Wireless Q45 Sensor by triple-clicking the binding button, waiting a second, then double-clicking the binding 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.

DIP switches

Description	DIP Switches							
	1	2	3	4	5	6	7	8
Transmit power: 500 mW (default)	OFF *							
Transmit power: 250 mW (compatible with 150 mW radios)	ON							
Reserved (default)		OFF *	OFF *	OFF *				
Button mode: toggle (default)					OFF *	OFF *		
Button mode: momentary					OFF	ON		
Button mode: latch					ON	OFF		
Reserved					ON	ON		
Reserved (keep in OFF position) (default)							OFF *	
Light mode: flash (recommended to conserve the battery) (default)[1]								OFF *
Light mode: solid								ON

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).

Toggle—The input register toggles between a value of 0 (off) and 1 (on) with successive button presses or touches. Write a decimal value of 5377 to I/O 15 to clear the toggle to 0 or write a value of 5505 to alternate the current state of the toggle (0 to 1 or 1 to 0).

Momentary—The input register holds the value of the current state of the button. When the button is actively pressed or touched, the input register shows a value of 1. When the button is not pressed or touched, the input register shows a value of 0.

Latch—After an input is activated (register set to 1) with a button press or using Modbus messages, the input remains at 1 until cleared or alternated by writing a value of 5377 or 5505 respectively. Latching prevents a successive button press from setting the input back to 0.

For more details on Latch/Toggle controls, see the *Latch/Toggle Control for Push Button and Touch Button Inputs* (p/n b_51135628).

(1)
The light consumes most of the sensor's power. If the light remains off most of the time, the batteries will last much longer.

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Apply Power to the Q45 AA-Cell Models

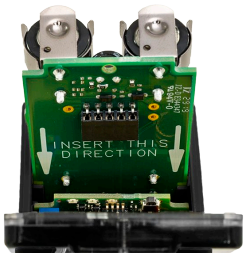
Follow these instructions to install or replace the lithium "AA" cell batteries.

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.

Q45 battery board



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.

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Modbus Holding Registers

Modbus holding 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)	Discrete IN 1 (push button)	0	1	0	1
2	2	2 + (Node# × 16)	NOT Discrete IN 1	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				

The NOT Discrete IN register holds the logical NOT of the register value of Discrete IN 1. If Discrete IN 1 has a value of 1, NOT Discrete IN 1 holds a value of 0.

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:

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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.

Q45BL Specifications

Construction

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

Indicators

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

Default Sensing Interval

62.5 milliseconds

Report Rate

On Change of State

Operating Conditions

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

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

Button Input

Sample Rate: 62.5 milliseconds

Report Rate: On Change of State

ON Condition: Button pressed

OFF Condition: Button not pressed

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

Environmental Rating

IP67

Certifications

CE/UKCA approval only applies to 2.4 GHz models

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Accessories

Replacement Batteries (AA Cells)

BWA-BATT-006
- 3.6 V Lithium AA cell
- Two batteries



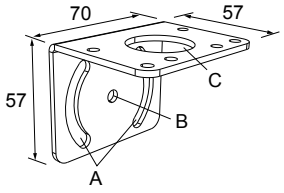
Mounting Brackets

- 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:

SMB30MM
- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



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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 Q45BL 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 Q45BL 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 Q45BL 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.

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

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Approved Antennas

BWA-9O2-C--Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho
BWA-9O5-C--Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho
BWA-9O6-A--Antena, Omni 902-928 MHz, 6 dBd, fibra de vidrio, 1800mm, N Hembra
BWA-9Y10-A--Antena, Yagi, 900 MHz, 10 dBd, N Hembra

Mexican Importer

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