

# SureCross Wireless Q45 Sensor - Convergent



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



The convergent sensor is ideal for reflective sensing of very small parts or profiles, and can accurately sense the position of parts approaching from the side. The sensor will ignore all but the most highly reflective objects that are outside the sensing range.

### Available Models

- DX80N2Q45CV-KR: 1½ inch focal point



### WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

## Storage Mode for the Wireless Q45 Sensors

While in **storage mode**, the Wireless Q45 Sensor's radio does not operate. All Wireless Q45 Sensors ship from the factory in storage mode to conserve the battery. To wake the device, press and hold the button for five seconds. To put any Wireless Q45 Sensor into storage mode, press and hold the button for five seconds. The Wireless Q45 Sensor is in storage mode when the LEDs stop blinking.

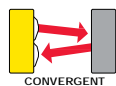
## Optical Alignment Mode (Convergent)

Convergent-mode sensors use a lens system to focus emitter and the receiver elements to an exact point in front of the sensor. The sensor detects an object when that object completes or "makes" the light beam. Convergent-mode sensors produce a small, intense, and well-defined sensing area, at a fixed distance from the sensor lens.

The Wireless Q45 Sensor enters and remains in optical alignment mode for 15 minutes after the button is pushed, after the Wireless Q45 Sensor exits binding mode, or after the Q45 is powered up (battery replaced).

During optical alignment mode, the sensor's beam is bright enough to see when aligned with a target, making alignment and mounting easier to accomplish. During this alignment mode, the sensor's yellow LED lights up whenever the sensor detects the reflected beam.

After 15 minutes, the Wireless Q45 Sensor automatically exits optical alignment mode and begins normal operation. After the sensor begins normal operation, the amber/yellow sensor state LED is inactive. To exit alignment mode earlier, click the button five times.

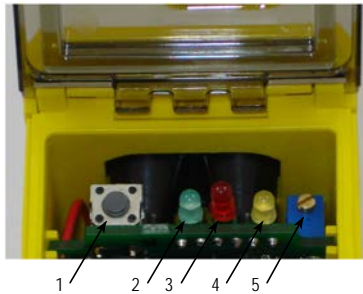


## Modbus Register Table

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)	Sensor IN 1	0	1	0	1
		...					

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.)
7	7	7 + (Node# × 16)	Reserved				
8	8	8 + (Node# × 16)	Device Message				
		...					
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

## Button and LEDs

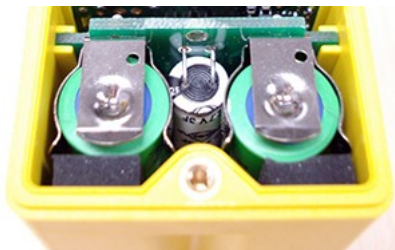


- 1 Button
- 2 Green LED (flashing) indicates a good radio link with the Gateway.
- 3 Red LED (flashing) indicates a radio link error with the Gateway.
- 4 Alignment or Test Mode: the yellow LED indicates sensor function (optical sensor models) or when input 1 is active (dual dry contact model). The yellow LED is not used during normal operation.
- 5 Excess gain potentiometer. Turn clockwise to increase the gain.

## Replacing the Batteries

To replace the lithium "AA" cell battery, follow these steps.

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. 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.



1. Lift the plastic cover.
2. Slide the board containing the batteries out of the Q45 housing.
3. Remove the discharged batteries and replace with new batteries. Use two 3.6V AA lithium batteries, such as Xeno's XL-60F or equivalent.
4. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case. Caution: There is a risk of explosion if the battery is replaced incorrectly.
5. Slide the board containing the new batteries back into the Q45 housing.

Replacement battery model number: BWA-BATT-006. For pricing and availability, contact Banner Engineering.

## Bind the Q45s to the Gateway and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices.

Binding Wireless Q45 Sensors to their Gateway ensures the Q45s only exchange data with the Gateway they are bound to. After the Gateway enters binding mode, the Gateway generates and transmits a unique extended addressing, or binding, code to all Wireless Q45 Sensors 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.

For Gateways with LCDs, after binding your Wireless Q45 Sensors 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. To create your network, bind the Wireless Q45 Sensors to the Gateway and assign them a Node address using the Gateway's rotary dials. Valid Node addresses are 01 through 47. The following instructions are specific to binding Wireless Q45 Sensors to a Gateway.

1. Enter binding mode on the Gateway.

**Model**

-B2Q Board Modules

-Q and -QC Gateway Radios

**To Enter Binding Mode:**

Triple-click the button.

Triple-click button 2.

On the board modules, the green and red LED flashes. On the -Q and -QC Gateway models, both LEDs flash red.

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 01, set the left dial to 0 and the right dial to 1.
3. Loosen the clamp plate on the top of the Wireless Q45 Sensor and lift the cover.
4. Enter binding mode on the Wireless Q45 Sensor by triple-clicking the 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 and place the sticker on the Wireless Q45 Sensor.
6. Repeat steps 2 through 5 for as many Wireless Q45 Sensors as are needed for your network.
7. After binding all Wireless Q45 Sensors, exit binding mode on the Gateway.

**Model**

-B2Q Board Modules

-Q and -QC Gateway Radios

**To Exit Binding Mode:**

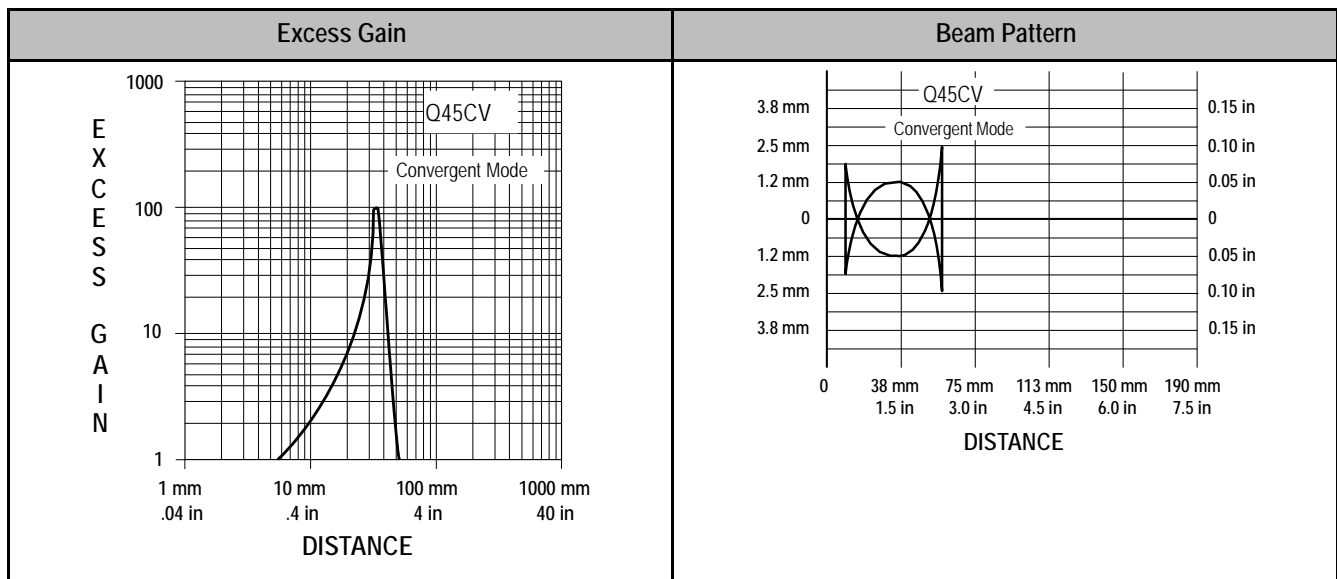
Double-click the button.

Double-click button 2.

## Specifications

The following specifications refer to both the radio and the wireless sensor.

Radio	Wireless Q45 Sensor
<p><b>Range</b> 2.4 GHz: Up to 1000 meters (3280 feet) with line of sight</p> <p><b>Transmit Power</b> 2.4 GHz: 65 mW EIRP</p> <p><b>2.4 GHz Compliance</b> FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.7.1 (2006-05) IC: 7044A-DX8024</p> <p><b>Spread Spectrum Technology</b> FHSS (Frequency Hopping Spread Spectrum)</p> <p>The actual range significantly decreases without line of sight. Always verify your wireless network's range by running a site survey.</p>	<p><b>Typical Battery Life:</b> Two years, typical. A typical battery life assumes an average of 10 seconds between sensor changes of state and the default 62.5 millisecond sample rate. Battery life is reduced to one year with an average of one second between changes of state.</p> <p><b>Default Sensing Interval:</b> 62.5 milliseconds</p> <p><b>Report Rate:</b> On Change of State</p> <p><b>Sensing Range:</b> 1½ inch focal point</p> <p><b>Adjustments:</b> Multi-turn sensitivity control (allows precise sensitivity setting; turn clockwise to increase gain).</p> <p><b>Indicators:</b> Red and green LEDs (for radio function); yellow LED (only for alignment mode)</p> <p><b>Construction:</b> Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.</p> <p><b>Environmental Rating:</b> NEMA 6P, IEC IP67</p> <p><b>Operating Conditions:</b> -40° to +70°C (-40° to +158°F); 90% relative humidity at 50°C (non-condensing)</p>



Performance curves are based on a 90% reflectance white test card.

## Warnings

The manufacturer does not take responsibility for the violation of any warning listed in this document. **Make no modifications to this product.** Any modifications to this product not expressly approved by Banner Engineering could void the user's authority to operate the product. **All specifications published in this document are subject to change.** Banner reserves the right to modify product specifications or to update documentation at any time. For the most recent version of any documentation, refer to: [www.bannerengineering.com](http://www.bannerengineering.com). © 2006-2013 Banner Engineering Corp. All rights reserved.

## Exporting SureCross 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.** A list of approved countries appears in the *Agency Certifications* section of the product manual. The SureCross 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. Consult with Banner Engineering if the destination country is not on this list.

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