Sure Cross® Wireless Q45 Sensor Node - Universal 1-Wire Serial

Datasheet

Sure Cross® Wireless Q45 Sensors combine the best of Banner’s flexible Q45 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 internal battery supply, this product line is truly plug and play.

The Sure Cross Universal 1-Wire Serial Sensor is designed to read the primary inputs of devices in the 1-Wire Serial Sensor family. The Wireless Q45 Universal 1-Wire Serial Sensor Node:

- Reads the 1-Wire Serial Interface sensor
- Determines an efficient power setting
- Includes a red/green/yellow/blue LED to provide local visual indication

Available Models

- DX80N9Q45U or DX80N2Q45U - Must be paired with a 1-Wire Serial interface sensor (sold separately)
- Supported 1-Wire Serial Interface sensors include but are not limited to: M12FT4Q, M12FT4H4Q, QM42VT1, K50UX1RA

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.

General Operation

For the first 15 minutes after power up, the Node samples the sensor every two seconds (fast sample mode). After 15 minutes, the Node defaults to 5 minute sample intervals. Activate fast sample mode by single clicking the button (the amber LED is solid).

Storage Mode for the Q45

While in storage mode, the Q45’s radio does not operate. The Q45 ships 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 Q45 into storage mode, press and hold the button for five seconds. The Q45 is in storage mode when the LEDs stop blinking.

Button and LEDs

1. 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 is not used.
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.

The DIP switches are in the OFF position. To turn a DIP switch on, push the switch toward the battery pack. DIP switches one through four are numbered from left to right.

<table>
<thead>
<tr>
<th>Description</th>
<th>DIP Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit power: 1 Watt</td>
<td>OFF *</td>
</tr>
<tr>
<td>Transmit power: 250 mW (compatible with 150 mW radios)</td>
<td>ON</td>
</tr>
<tr>
<td>Reserved</td>
<td>OFF *</td>
</tr>
<tr>
<td>Sample/Report Rate: User configured (5 minutes by default)</td>
<td>OFF *</td>
</tr>
<tr>
<td>Sample/Report Rate: 16 seconds</td>
<td>OFF</td>
</tr>
<tr>
<td>Sample/Report Rate: 64 seconds</td>
<td>ON</td>
</tr>
<tr>
<td>Sample/Report Rate: Sample on Demand</td>
<td>ON</td>
</tr>
<tr>
<td>Reserved (keep in OFF position)</td>
<td>OFF *</td>
</tr>
<tr>
<td>Light mode: flash (recommended to conserve the battery)</td>
<td>OFF *</td>
</tr>
<tr>
<td>Light mode: solid</td>
<td>ON</td>
</tr>
</tbody>
</table>

* Default position

**Bind the Q45 to the Gateway and Assign the Node Address**

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

1. Enter binding mode on the Gateway.
   - For single-button models, triple-click the button.
   - For two-button models, triple-click button 2.
   On the board modules, the green and red LED flashes. On the housed 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. Valid Node addresses are 01 through 47.

3. 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 button. For the opposed mode sensor, the button is on the receiver.
   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 Q45.

6. Repeat steps 2 through 5 for as many Q45 as are needed for your network.

7. After binding all Q45, exit binding mode on the Gateway.
   - For single-button models, double-click the button.
   - For two-button models, double-click button 2.

For Gateways with 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.

**Modbus Register Table**

<table>
<thead>
<tr>
<th>I/O #</th>
<th>Modbus Holding Register</th>
<th>I/O Type *</th>
<th>I/O Range</th>
<th>Holding Register Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gateway</td>
<td>Any Node</td>
<td></td>
<td>Min.</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1 + (Node# × 16)</td>
<td>1-Wire Serial Sensor Primary Input 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2 + (Node# × 16)</td>
<td>1-Wire Serial Sensor Primary Input 2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3 + (Node# × 16)</td>
<td>1-Wire Serial Sensor Primary Input 3</td>
<td></td>
</tr>
</tbody>
</table>

* The light consumes most of the sensor’s power. If the light remains off most of the time, the batteries will last much longer. In flashing mode, the light can be on for up to one year on a pair of batteries.
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 3.6 V 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.

Specifications

Radio Range
900 MHz, 1 Watt: Up to 3.2 km (2 miles)
2.4 GHz, 65 mW: Up to 1 km (3280 feet)

Minimum Separation Distance
900 MHz, 1 Watt: 4.57 m (15 ft)
2.4 GHz, 65 mW: 0.3 m (1 ft)

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Default Sensing Interval
5 minutes

Indicators
Red and green LEDs (radio function)

900 MHz Compliance (1 Watt)
FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance
FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247
ETSI EN 300 328 V1.8.1 (2012-06)
IC: 7044A-DX8024

Typical Battery Life
See chart.

* These are the default data types that output from the 1-Wire Serial Interface sensor, corresponding to inputs 1 through 6 of the Q45 Node. Refer to the datasheet of the 1-Wire Serial Interface sensor for information about the register function.
**Connection**
One 5-pin threaded M12/Euro-style female quick disconnect

**Construction**
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.

**Environmental Rating**
NEMA 6P, IEC IP67

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

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**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.

**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. A list of approved countries appears in the Radio Certifications section of the product manual. 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. Consult with Banner Engineering Corp. if the destination country is not on this list.