Sure Cross® Wireless Q45 Sensor - Remote Device

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.

Figure 1. Model DX80N2Q45RD-QPF-0.5



Figure 2. Model DX80N2Q45RD



The Remote Device model is designed to interface with isolated dry contacts (pushbuttons), sourcing outputs, or Namur inductive proximity sensors.

Although these models support two dry contact inputs, the default Gateway I/O mapping configuration of the Banner Q45 wireless system supports one dry contact input. To map the second dry contact input on the Q45, use the Gateway's DIP switches to map the I/O. See the Gateway's datasheet for details.

Important: Because these sensors run on very low battery power, the contact wetting voltage is 3.3 volts. High voltage contacts are not designed to reliably switch these low voltages. Use a contact rated for operation at 3.3 volts.

Models

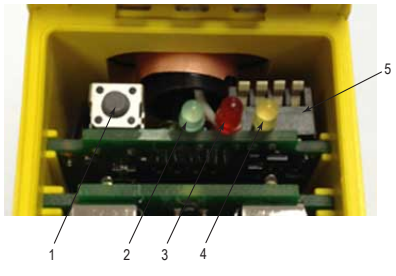
Model	Radio Frequency	Description
DX80N2Q45RD-QPF-0.5	2.4 GHz ISM Band	18 inch cable with a 5-pin M12 female quick disconnect connector
DX80N2Q45RD		Integral 5-pin M12 female quick disconnect connector embedded in the front

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

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 Amber LED indicates when input 1 is active. The LED is active at power up and disabled after 15 minutes to conserve power. To enable the LED for another 15 minutes, press button once. To disable the LED, press the button 5 times.

5 DIP Switches

DIP Switches

DIP Switches for Dry Contact Input Mode (DIP Switch 1 OFF)

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. You may also reboot the device by removing the battery pack, then re-installing it.

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 one through four are numbered from left to right.

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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Description	DIP Switches			
	1	2	3	4
Dry contact input mode	OFF *			
3.3 V contact wetting voltage		OFF *		
5.5 V contact wetting voltage		ON		
Two dry contact inputs			OFF *	
One dry contact input			ON	
62.5 millisecond sample rate				OFF *
250 millisecond sample rate				ON

* Default position

DIP Switches for Namur Input Mode (DIP Switch 1 ON)

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. You may also reboot the device by removing the battery pack, then re-installing it.

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 one through four are numbered from left to right.

Description	DIP Switches			
	1	2	3	4
Namur input mode	ON			
5.5 V sensor voltage		OFF *		
8.2 V sensor voltage		ON		
2 millisecond warmup time, 62.5 ms sample rate			OFF *	OFF *
2 millisecond warmup time, 250 ms sample rate			OFF	ON
5 millisecond warmup time, 125 ms sample rate			ON	OFF
5 millisecond warmup time, 500 ms sample rate			ON	ON

* Default position

To use with Turck's Bi2-M12-Y1X-H1141, Bi5-M18-Y1X-H1141 Namur proximity sensor, set DIP switch 1 to ON and DIP switches 2 through 4 to OFF.

To use with Turck's Bi10-M30-Y1X-H1141 Namur proximity sensor, set DIP switch 1 and 3 to ON and DIP switches 2 and 4 to OFF.

Use cable MQDEC-406SS (male to female cable) to connect the Namur sensors to the Wireless Q45 Sensor - Remote Device model's interface.

Wiring

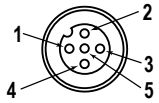
5-pin M12 Female Connection	Pin	Wire Color	Description
	1	Brown	V_{Out}
	2	White	Discrete IN 2 or Namur IN 1
	3	Blue	DC common (GND)
	4	Black	Discrete IN 1
	5	Gray	-

Figure 3. Wiring for dry contact mode

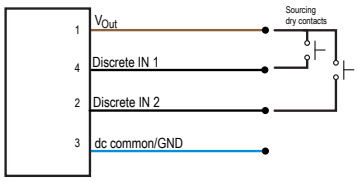


Figure 4. Wiring for NAMUR mode

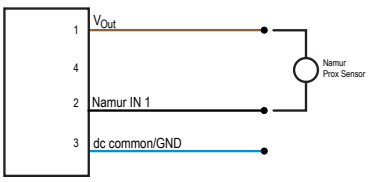
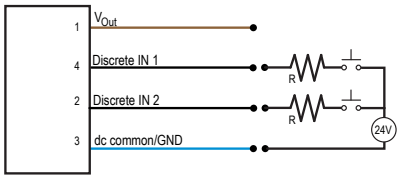


Figure 5. Wiring for externally-powered sourcing sensors



Voltage at the discrete IN:

- 0 V to 1 V = OFF
- 2 V to 5 V = ON
- More than 6 V will damage the Q45 sensor's input

Internal resistance is 800 Ohms. To connect the Wireless Q45 Sensor to a 24 V sourcing output, add a 3.0 KOhm to 5.6 KOhm external resistor in series to reduce the voltage applied to the Q45 Sensor's discrete input to less than 6 V.

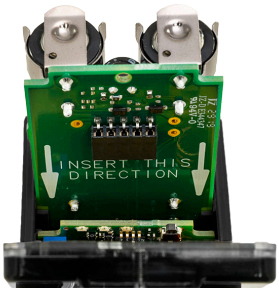
R = 3.0 to 5.6 KOhm at 24 V

Apply Power to the Q45

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

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.

Figure 6. Q45 battery board



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 an 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. Caution: There is a risk of explosion if the battery is replaced incorrectly.
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 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.

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)	Discrete IN 1 OR Namur 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.)
2	2	2 + (Node# × 16)	Discrete IN 2	0	1	0	1
		...					
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				

Specifications

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

Radio
Range: 2.4 GHz, 65 mW: Up to 1000 m (3280 ft) with line of sight (internal antenna) [1]
Transmit Power: 2.4 GHz: 65 mW EIRP

Minimum Separation Distance
2.4 GHz, 65 mW: 0.3 m (1 ft)

2.4 GHz Compliance
FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247
Radio Equipment Directive (RED) 2014/53/EU
IC: 7044A-DX8024
ANATEL: 15966-21-04042 Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL www.gov.br/anatel/pt-br/

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Externally Powered Sourcing Sensors
ON Condition: 2 V to 5 V
OFF Condition: Less than 1 V

Report Rate
On Change of State

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

Environmental Rating
NEMA 6P, IP67

Typical Battery Life for One Dry Contact Input
Up to 3 years at a 62.5 ms sample rate or 250 ms sample rate.
Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Typical Battery Life for Bi2 and Bi5 Namur Inputs
Up to 2 years at a 2 ms warmup time and 62.5 ms sample rate; 4 years at a 2 ms warmup time and 250 ms sample rate.
Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

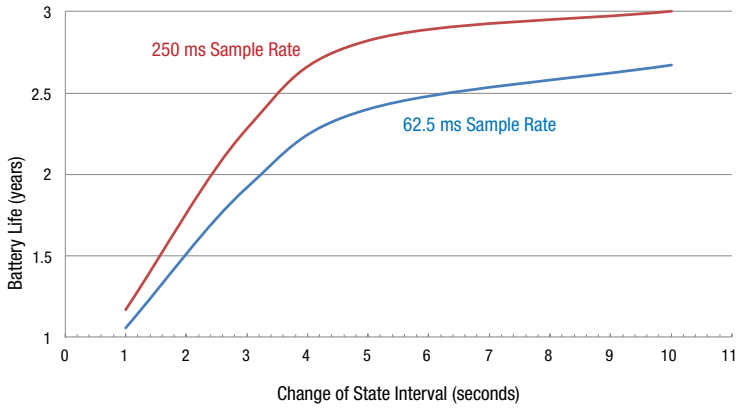
Typical Battery Life for Bi10 Namur Inputs
Up to 2 years at a 5 ms warmup time and 125 ms sample rate; 4 years at a 5 ms warmup time and 500 ms sample rate.
Assumes an average of 10 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Default Sample Rate
62.5 milliseconds (dry contact) or 125 milliseconds (Namur)

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

Certifications
CE
Banner Engineering Europe Park Lane, Culliganlaan 2F bus 3, 1831 Diegem, BELGIUM
(CE approval only applies to 2.4 GHz models)

DX80N2Q45RD Battery Life



[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.

Warnings

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.

Important: Please download the complete Wireless Q45 Sensor 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 Q45 Sensor 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 Q45 Sensor 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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