Sure Cross® Wireless Q45 Sensor - Remote Device

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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 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.

Available Models
- DX80N2Q45RD-QPF-0.5 with an 18 inch female pigtail
- DX80N2Q45RD with a female connector embedded in the front

Figure 1. Model DX80N2Q45RD-QPF-0.5

⚠️ **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.

Figure 2. Model DX80N2Q45RD

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
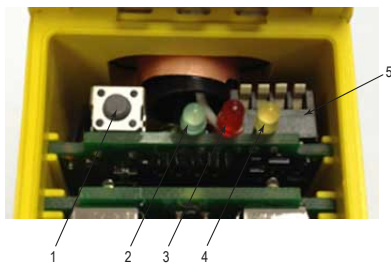
1 Button

2 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.

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.

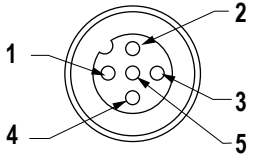| Description	DIP Switches			
	1	2	3	4
Namur input mode	ON			
5.5 V sensor voltage		OFF *		
8.2 V sensor voltage		ON		
2 millisecond warmup time, 62.5 ms sample rate			OFF *	OFF *
2 millisecond warmup time, 250 ms sample rate			OFF	ON
5 millisecond warmup time, 125 ms sample rate			ON	OFF
5 millisecond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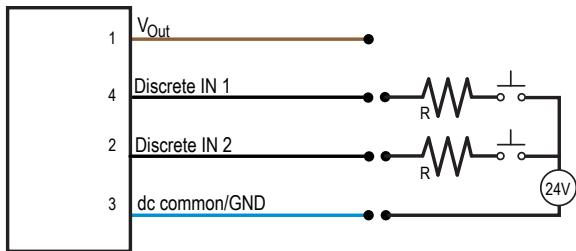
Wiring

5-pin M12/Euro-style 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	-

Wiring for Dry Contact Mode	Wiring for Namur Mode
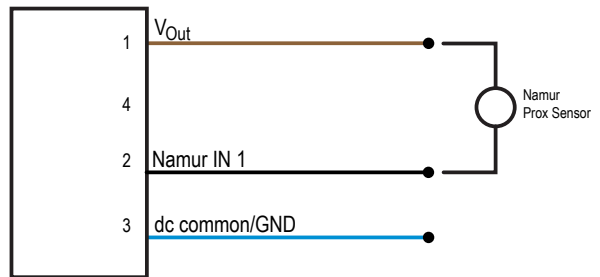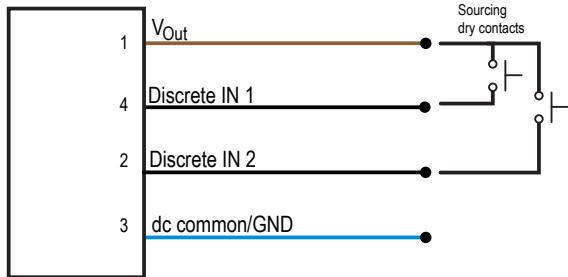
Wiring for Externally Powered Sourcing Sensors

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

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
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				

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.
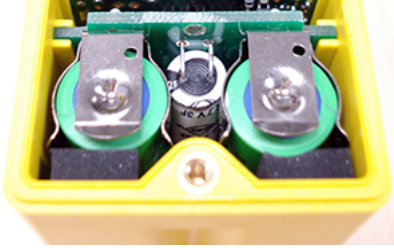
1. Lift the plastic cover.
2. Slide the board containing the batteries out of the Q45 housing.
3. Remove the discharged batteries and replace with new batteries. Use two 3.6 V AA lithium batteries, such as Xeno's XL-60F or equivalent.
4. Verify the battery's positive and negative terminals align to the 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.

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.

Specifications

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

Radio
Range: 2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight[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 - This device complies with FCC Part 15, Subpart C, 15.247
ETSI EN 300 328 V1.8.1 (2012-06)
IC: 7044A-DX8024

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. Q45s are 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, IEC IP67

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

Certifications

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)

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.
Supply wiring leads < 24 AWG shall not be spliced.
For additional product support, go to *http://www.bannerengineering.com*.

Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

DX80N2Q45RD Battery Life
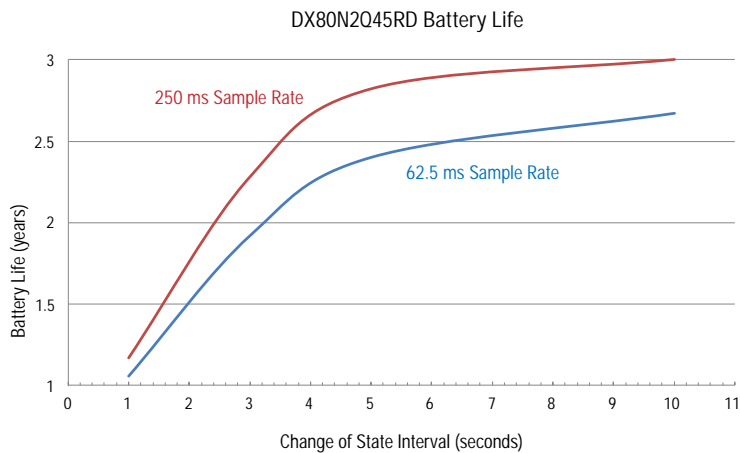
[1] Range depends on the environment and decreases significantly without line of sight. Always verify your wireless network's range by performing a Site Survey.

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