Q45RD Wireless Remote Device 900 MHz Sensor 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.



Model DX80N9Q45RD-QPF-0.5

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.



Model DX80N9Q45RD

Models

Model	Frequency	Connector
DX80N9Q45RD-QPF-0.5	900 MHz ISM Band	18-inch cable with a 5-pin M12 female quick disconnect connector
DX80N9Q45RD		5-pin M12 female quick disconnect connector embedded in the front

Storage Mode

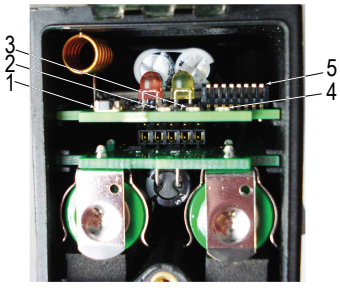
While in **storage mode**, the device's radio does not operate to conserve the battery. To put any device into storage mode, press and hold the binding button for five seconds. The device is in storage mode when the LEDs stop blinking. To wake the device, press and hold the binding button (inside the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

Configuration Instructions

Buttons and LEDs

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

DIP Switches for Dry Contact Input Mode (DIP Switch 5 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.

As shown in the image above, 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 as shown above.

Original Instructions
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p/n: 192692 Rev. D

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

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				
Dry contact input mode (default)					OFF			
3.3 V contact wetting voltage (default)						OFF		
5.5 V contact wetting voltage						ON		
Two dry contact inputs (default)							OFF	
One dry contact input							ON	
62.5 millisecond sample rate (default)								OFF
250 millisecond sample rate								ON

DIP Switches for Namur Input Mode (DIP Switch 5 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.

As shown in the image above, 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 as shown above.

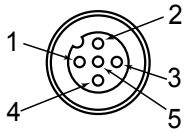
Description	DIP Switches			
	5	6	7	8
Namur input mode	ON			
5.5 V sensor voltage (default)		OFF		
8.2 V sensor voltage		ON		
2 millisecond warmup time, 62.5 ms sample rate (default)			OFF	OFF
2 millisecond warmup time, 250 ms sample rate			OFF	ON
5 millisecond warmup time, 125 ms sample rate			ON	OFF
5 millisecond warmup time, 500 ms sample rate			ON	ON

To use with Turck's Bi2-M12-Y1X-H1141, Bi5-M18-Y1X-H1141 Namur proximity sensor, set DIP switch 5 to ON and DIP switches 6 through 8 to OFF.

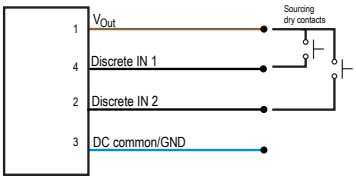
To use with Turck's Bi10-M30-Y1X-H1141 Namur proximity sensor, set DIP switch 5 and 7 to ON and DIP switches 6 and 8 to OFF.

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

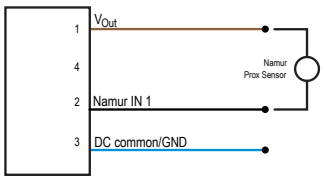
Wiring

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	-

Wiring for dry contact mode



Wiring for NAMUR mode



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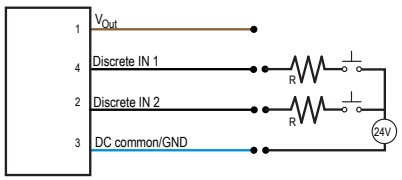
Wiring for externally-powered sourcing sensors



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

Q45RD 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 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				

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 Q45RD 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 Q45RD 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 Q45RD and lift the cover.
4. Enter binding mode on the Q45RD by triple-clicking the Q45RD's button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q45RD is bound, the LEDs stay solid momentarily, then they flash together four times. The Q45RD exits binding mode.
5. Label the sensor with the Q45RD's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q45RDs as are needed for your network.
7. On the Gateway: After binding all Q45RDs, 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 Q45RD 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 Q45RDs if your Gateway is ever replaced.

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Apply Power to the Q45 AA-Cell Models

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

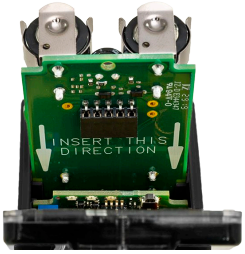
CAUTION:

- **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



Specifications

Radio Specifications for 900 MHz Performance with Internal Antennas

Radio Transmit Power

900 MHz Conducted (internal antenna): 25 dBm

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)

Antenna Minimum Separation Distance

900 MHz radios transmitting at ≥ 500 mW: 4.57 m (15 ft) with the supplied antenna

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

Link Timeout (Performance)

Gateway: Configurable via User Configuration Software

Node: Defined by Gateway

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:

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.

Q45RD Specifications

Externally Powered Sourcing Sensors

ON Condition: 2 V to 5 V

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OFF Condition: Less than 1 V

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 Sample Rate

62.5 milliseconds (dry contact) or 125 milliseconds (Namur)

Report Rate

On Change of State

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 20 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 20 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 20 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Environmental Specifications for the Q45

Operating Conditions

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

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

Environmental Rating

NEMA 6P

IP67

Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

Accessories

Replacement Batteries (AA Cells)

BWA-BATT-006

- 3.6 V Lithium AA cell
- Two batteries



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 Q45RD Remote Device (900 MHz) Wireless 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 Q45RD Remote Device (900 MHz) Wireless 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 Q45RD Remote Device (900 MHz) Wireless 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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For patent information, see www.bannerengineering.com/patents.

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Mexican Importer

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