# Sure Cross® Wireless Q45RD-KR 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.

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-KR** with a female connector embedded in the front

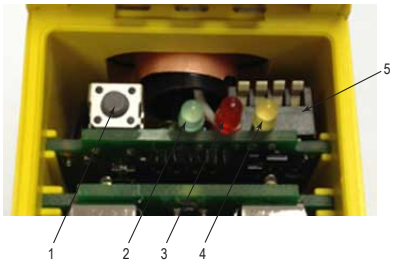
**WARNING:**

- **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.

## Storage Mode

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 binding button (inside the housing on the radio board) for five seconds. To put any Q45 into storage mode, press and hold the binding 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 |

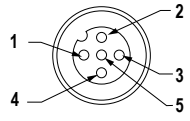
* Default position

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.

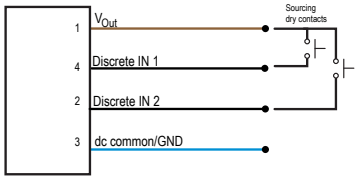
To use with Turck's Bi10-M30-Y1X-H1141 Namur proximity sensor, set DIP switch 1 and 3 to ON and DIP switches 2 and 4 to OFF.

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

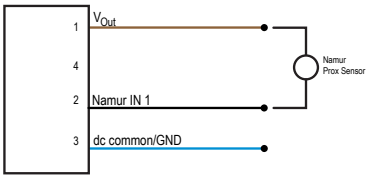
## Wiring

| 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 | - |

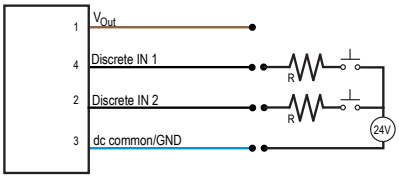
### Wiring for Dry Contact Mode




### 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

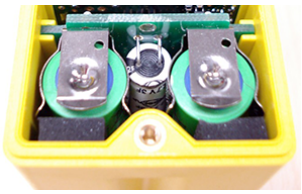
## Modbus Register Table

| 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 | | | | |

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

## Replace or Install 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.

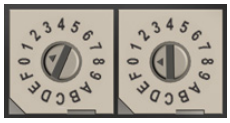
The replacement battery model number is BWA-BATT-006. For pricing and availability, contact Banner Engineering.

## 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.


*Figure 1. Buttons on a housed Gateway*

1. Enter binding mode on the Gateway.
   - For housed DX80 Gateways, triple-click button 2 on the Gateway. Both LEDs flash red.
   - For board-level DX80 Gateways, triple-click the binding button on the Gateway. 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. 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 binding 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 Q45 as are needed for your network.
7. After binding all Q45, exit binding mode on the Gateway.
   - For housed DX80 Gateways, double-click button 2 on the Gateway.
   - For board-level DX80 Gateways, double-click the binding button on the Gateway.

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.

# Specifications

## Performance Radio with Internal Antenna Specifications

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

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

**Radio Transmit Power**
2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP

**Spread Spectrum Technology**
FHSS (Frequency Hopping Spread Spectrum)

**2.4 GHz Compliance for Korean Radio Models**
KCC-CRM-BE2-DX

**Link Timeout**
Gateway: Configurable via User Configuration Tool (UCT) software
Node: Defined by Gateway

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

## Wireless Q45RD-KR Specifications

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

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

**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

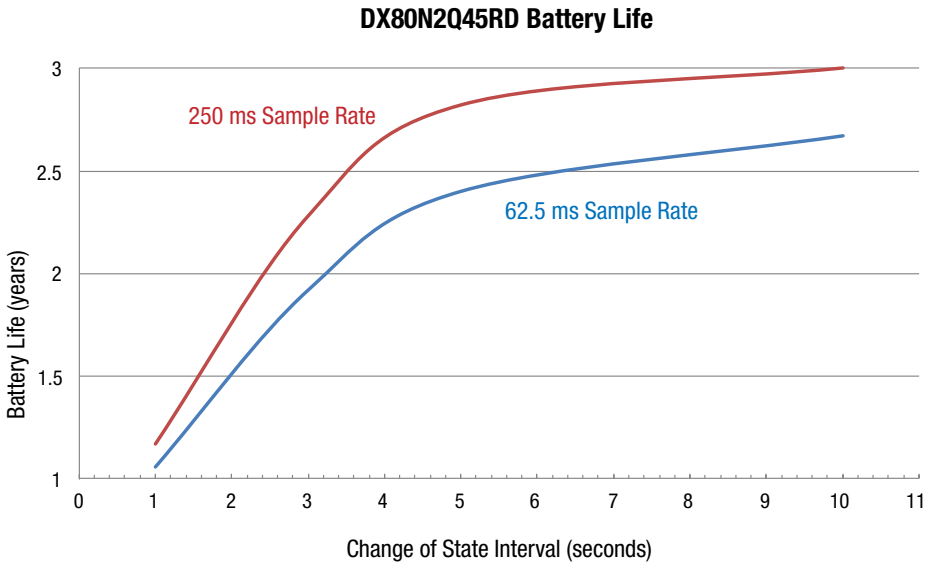
**Operating Conditions**
–40 °C to +70 °C (–40 °F to +158 °F); 90% at +50 °C maximum relative humidity (non-condensing)

**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.

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

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[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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