Sure Cross® Wireless Q45 Sensor Node - Temperature/Humidity

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.



(Shown with the temperature/ humidity sensor connected)

The Sure Cross Temperature and Humidity Sensor works in a variety of environments to provide temperature and humidity measurements.

The Wireless Q45 Temperature and Relative Humidity Sensor Node:

- Works with one of two sensor options: temperature and relative humidity or temperature only
- Provides high accuracy temperature and humidity measurements
- Achieves humidity accuracy of ±2% relative humidity and temperature accuracy of 0.3 °C
- Houses the sensor element in a robust stainless steel case
- Includes a red/green LED that can be used to provide local visual indication of change in environmental conditions

Available Models

- **DX80N2Q45TH** - Must be paired with M12FTH4Q Temperature and Humidity Sensor or M12FT4Q Temperature Sensor (sold separately)

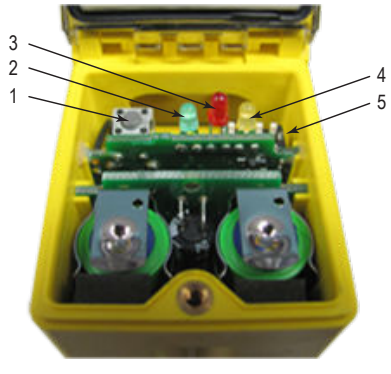
Banner Humidity Sensor Calibration Statement. This calibration statement (also available online) lists the chain with which the calibration of Banner humidity sensors is traceable to NIST standards.

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, LEDs, and DIP Switches



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 is not used.
5 DIP Switches

DIP Switch Settings

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. 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.

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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Description	DIP Switches			
	1	2	3	4
Sample/Report Rate: User configured (64 seconds by default)	OFF *	OFF *		
Sample/Report Rate: 16 seconds	OFF	ON		
Sample/Report Rate: 64 seconds	ON	OFF		
Sample/Report Rate: Sample on Demand	ON	ON		
Reserved (keep in OFF position)			OFF *	
Light mode: flash (recommended to conserve the battery) [1]				OFF *
Light mode: solid				ON

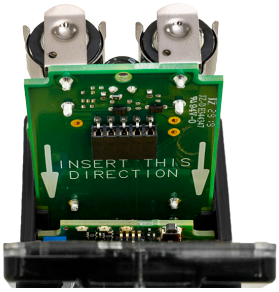
* Default position (as shown above)

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 1. 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 the Wireless Temperature/Humidity Q45 to the B2T Gateway and Assign the Node Address

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

1. Enter binding mode on the Gateway by triple-clicking the button.
   The green and red LED flashes.
2. Assign the Q45 a Node address or 01 using the Gateway's rotary dials. Set the left dial to 0 and the right dial to 1.
3. Loosen the clamp plate on the top of the Wireless Q45 and lift the cover.
4. Enter binding mode on the Wireless Q45 by triple-clicking the 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. After binding the Wireless Temperature/Humidity Q45, exit binding mode on the Gateway by double-clicking the button.

Modbus Register Table

The temperature = (Holding register value) ÷ 20.

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)	Humidity (%RH)	0	100.00%	0	10,000
2	2	2 + (Node# × 16)	Temperature (°C)	–1638.3	1638.4	–32768	32767
3	3	3 + (Node# × 16)	Temperature (°F)	–1638.3	1638.4	–32768	32767
		...					
7	7	7 + (Node# × 16)	Reserved				

[1] 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.

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				
9	9	9 + (Node# × 16)	Discrete OUT 1 (Red Light)	0	1	0	1
10	10	10 + (Node# × 16)	Discrete OUT 2 (Green Light)	0	1	0	1
		...					
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.

Range
Range: 2.4 GHz, 65 mW: Up to 1000 m (3280 ft) with line of sight (internal antenna) [2]
Transmit Power: 2.4 GHz: 65 mW

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)

Construction
Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Designed to withstand 1200 psi washdown.

Connection
Integral 5-pin M12 female quick-disconnect connector

Indicators
Red and green LEDs (radio function)

Typical Battery Life
Up to 2 years
Battery life is reduced to 1 year when the sample/report rate is increased to 16 seconds

Default Sensing Interval
64 seconds

Temperature Sensor
Measuring Range: –40 °C to +85 °C (–40 °F to +185 °F)
Resolution: 0.1 °C
Accuracy: ±0.3 °C

Humidity Sensor
Measuring Range: 0% to 100% relative humidity
Resolution: 0.1% relative humidity
Accuracy: ±2% relative humidity at 23 °C

Environmental Rating
NEMA 6P, IP67

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

Accessories

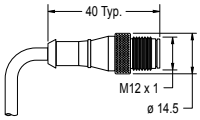
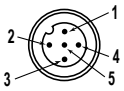
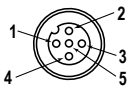
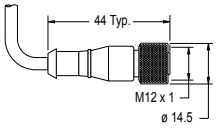
FTH-FIL-001
- Aluminum grill filter cap (factory default, ships with the M12FT*Q and Q45 All-in-One sensors)



FTH-FIL-002
- Stainless steel, sintered to 10 micrometer porosity (for high dust environments.)



5-Pin Threaded M12 Cordsets Less Than 3 m Long—Double Ended

Model	Length	Style	Dimensions	Pinout (Male)	Pinout (Female)
DEE2R-51D	0.3 m (1 ft)	Female Straight/ Male Straight			
DEE2R-53D	0.91 m (3 ft)				
DEE2R-58D	2.44 m (8 ft)			1 = Brown 2 = White 3 = Blue	4 = Black 5 = Green/Yellow

[2] 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.

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.

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For patent information, see www.bannerengineering.com/patents.

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