Q45TH Wireless Temperature-Humidity Sensor Node (900 MHz)

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.

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/yellow/blue LED that can be used to provide local visual indication of change in environmental conditions

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.

Shown with the M12 sensor connected



Models

Model	Radio Frequency	Description
DX80N9Q45TH	900 MHz ISM Band	Must be paired with M12FTH4Q Temperature and Humidity Sensor or M12FT4Q Temperature Sensor (sold separately)

Apply Power to the Q45 AA-Cell Models

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

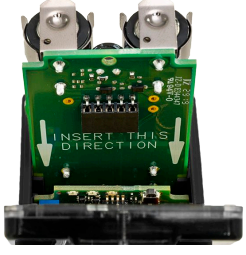
CAUTION:

- **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



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.

Original Instructions
11-Oct-24

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192694
p/n: 192694 Rev. D

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

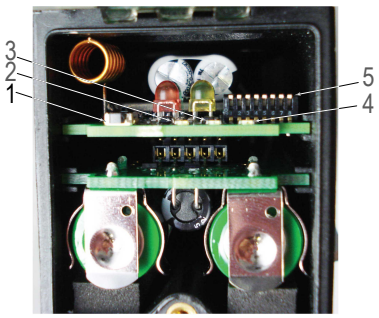
Q45TH Modbus Register Table

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				
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
11	11	11 + (Node# × 16)	Discrete OUT 3 (Yellow Light)	0	1	0	1
12	12	12 + (Node# × 16)	Discrete OUT 4 (Blue Light)	0	1	0	1
		...					
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

Q45TH Button, LEDs, and DIP Switches

1. 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 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. As shown in the image, 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	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				
Sample/Report Rate: User configured (64 seconds by default) (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) (default)							OFF	
Light mode: flash (recommended to conserve the battery) (default) [1]								OFF
Light mode: solid								ON

(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.

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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 Q45TH 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 Q45TH 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 Q45TH and lift the cover.
4. Enter binding mode on the Q45TH by triple-clicking the Q45TH's button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q45TH is bound, the LEDs stay solid momentarily, then they flash together four times. The Q45TH exits binding mode.
5. Label the sensor with the Q45TH's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q45THs as are needed for your network.
7. On the Gateway: After binding all Q45THs, 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 Q45TH 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 Q45THs if your Gateway is ever replaced.

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.

Q45TH (900 MHz) Specifications

Typical Battery Life

Up to 1.5 years, typical

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Battery life is reduced to 9 months when the sample/report rate is increased to 16 seconds

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

One 5-pin M12 female quick-disconnect connector

Indicators

Red and green LEDs (radio function)

Temperature Sensor

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

Default Sensing Interval

64 seconds

Humidity Sensor

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

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

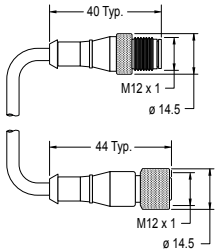
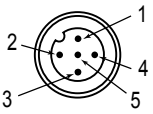
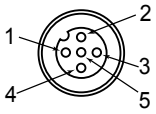
FTH-FIL-001
- Aluminum grill filter cap
- Factory default, ships with the S15S-TH*Q, M12FT*Q, and Q45 All-in-One sensors



FTH-FIL-002
- Stainless steel
- Sintered to 40-micrometer porosity (for high dust environments.)



5-Pin Double-Ended M12 Female to M12 Male Cordsets (Less Than 3 M)

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)			1 = Brown 2 = White 3 = Blue	4 = Black 5 = Green/Yellow
DEE2R-58D	2.44 m (8 ft)				

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 Q45TH Wireless Temperature-Humidity Sensor Node (900 MHz) 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 Q45TH Wireless Temperature-Humidity Sensor Node (900 MHz), disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.

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IMPORTANT: Veuillez télécharger la documentation technique complète des Q45TH Wireless Temperature-Humidity Sensor Node (900 MHz) 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

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

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Mexican Importer

Banner Engineering de Mèxico, S. de R.L. de C.V. | David Alfaro Siqueiros 103 Piso 2 Valle oriente | San Pedro Garza Garcia Nuevo Leòn, C. P. 66269

81 8363.2714

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