

Sure Cross® 4Q Temperature and Humidity Sensor



Datasheet

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



- Manufactured with a robust metal housing
- Connects via a 1-wire serial interface
- Designed to work with FlexPower 1-Wire Serial Interface Node models DX80N9X1S-P6 and DX80N2X1S-P6, the 10 to 30 V dc powered 1-Wire Serial Interface Node models DX80N9X6S-P6 and DX80N2X6S-P6, MultiHop M-H6 and M-H6L radios, and the Wireless Q45 Sensor Nodes DX80N2Q45TH and DX80N9Q45TH
- Ships with aluminum grill filter cap; optional stainless steel 10 micrometer sintered filter available separately
- 3Q and 4Q models are calibrated and traceable to NIST standards



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.

For additional information, updated documentation, and a list of accessories, refer to Banner Engineering's website, www.bannerengineering.com.

Configure this sensor using the [Sensor Configuration Software](#) and adapter cable BWA-USB1WIRE-001 (datasheet [170002](#)).

Models

Model	Accuracy	Calibrated ¹	I/O
M12FTH4Q	±2% at 25 °C	Yes	Temperature and relative humidity via a 1-wire serial interface
M12FT4Q	±2% at 25 °C	Yes	Temperature via a 1-wire serial interface

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. A Certificate of Factory Calibration ships with every 3Q and 4Q model sensor. Although your certificate will be specific to your product, a sample certificate is available for [download](#).

Configuration Instructions

Sensor Configuration Software

The Sensor Configuration Software offers an easy way to manage sensor parameters, retrieve data, and visually show sensor data from a number of different sensors. The Sensor Configuration Software runs on any Windows machine and uses an adapter cable to connect the sensor to your computer.

Download the most recent version of the software from Banner Engineering's website: www.bannerengineering.com and select **Software** from the **Products** drop-down list.

Table 1: The Sensor Configuration Software supports the following sensors

Sensor Type	Model	USB Adapter Cable
Temperature and Humidity	M12FTH3Q and M12FT3Q	USB-to-RS-485 adapter cable model BWA-HW-006 OR USB to RS-485 adapter cable model BWA-UCT-900 (datasheet p/n 140377)
	M12FTH4Q and M12FT4Q	USB-to-RS-232 1-Wire adapter cable model BWA-USB1WIRE-001 (datasheet p/n 170020)
Vibration and Temperature	QM42VT1	USB-to-RS-232 1-Wire adapter cable model BWA-USB1WIRE-001 (datasheet p/n 170020)
	QM42VT2	USB-to-RS-485 adapter cable model BWA-HW-006 OR USB to RS-485 adapter cable model BWA-UCT-900 (datasheet p/n 140377). When updating the firmware, you must use one of the two USB to RS-485 adapter cables plus a splitter pigtail cable p/n 83265.
	QM30VT1	USB-to-RS-232 1-Wire adapter cable model BWA-USB1WIRE-001 (datasheet p/n 170020)

¹ 3Q and 4Q models are calibrated and traceable to NIST standards

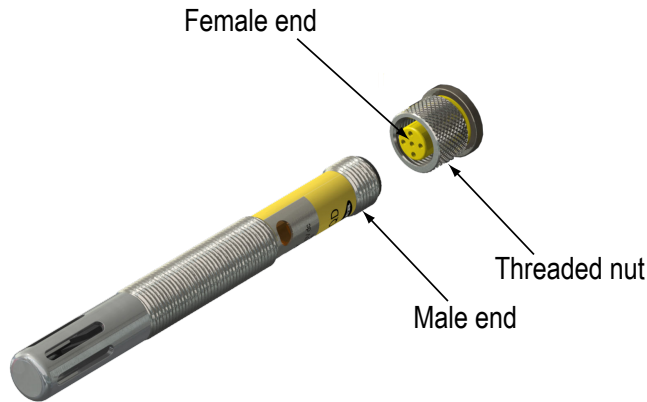


Sensor Type	Model	USB Adapter Cable
	QM30VT2	USB to RS-485 adapter cable model BWA-UCT-900 (datasheet p/n 140377). When updating the firmware, you must use one of the two USB to RS-485 adapter cables.
GPS	GPS50M	USB-to-RS-485 adapter cable model BWA-HW-006 AND a field-wireable M12/Euro-style connector or connector with pigtail OR USB to RS-485 adapter cable model BWA-UCT-900 AND a field-wireable M12/Euro-style connector or connector with pigtail (datasheet p/n 140377)
U-GAGE K50U Ultrasonic	K50UX1CRA	USB-to-RS-232 1-Wire adapter cable model BWA-USB1WIRE-001 (datasheet p/n 170020)
	K50UX2CRA	USB-to-RS-485 adapter cable model BWA-HW-006 OR USB to RS-485 adapter cable model BWA-UCT-900 (datasheet p/n 140377)
	K50UX1ARA	USB-to-RS-232 1-Wire adapter cable model BWA-USB1WIRE-001 (datasheet p/n 170020)
	K50UX2ARA	USB-to-RS-485 adapter cable model BWA-HW-006 OR USB to RS-485 adapter cable model BWA-UCT-900 (datasheet p/n 140377)

Refer to the Sensor Configuration Software Instruction Manual (p/n [170020](#)) to update your sensor's firmware.

Connect the Temperature/Humidity Sensor

Figure 1. Connect the sensor



To install the sensor to a device with a 5-pin M12 female end:

1. Align the notch in the female connector with the key in the sensor's male connector.
2. Gently slide the sensor end into the connector.
3. Rotate the threaded nut to tighten the sensor down. DO NOT attempt to rotate the sensor after it is connected to the device or the cable end because this will damage the sensor.

Wiring

This sensor is designed to be plugged directly into compatible Nodes. The Node powers the sensor and periodically requests data using the 1-wire serial interface. Refer to the Class I Division 2 control drawings (p/n [143086](#)) for wiring specifications and limitations.

Table 2: 5-pin M12 connector (male) wiring

5-pin M12 Connector (Male)	Pin	Wire Color	Sensor Connection
	1	Brown	Power IN (+), 3.6 to 5.5 V DC
	2	White	1-Wire serial device select (sinking input to sensing device)
	3	Blue	Ground (-)
	4	Black	Not used/reserved
	5	Gray	1-Wire serial communications

Holding Registers

Humidity measurements are only available on the **M12FTH4Q** model. A humidity sensor is not included with the **M12FT4Q** model.

Table 3: Modbus holding registers

Sensor Register	Output Type	I/O Range		Holding Register Representation	
		Min	Max	Min (Dec)	Max (Dec)
1	Humidity (%RH)	0	100.00%	0	10,000
2	Temperature (°C)	-1638.4	1638.3	-32768	32767
3	Temperature (°F)	-1638.4	1638.3	-32768	32767

The temperature = (Holding register value) ÷ 20. The humidity = (Holding register value) ÷ 100.

Specifications

Supply Voltage

3.6 to 5.5 V DC

Current

Default sensing: 28 µAmps
 Disabled sensing: 15 µAmps
 Active comms: 4.7 mA

Mounting Threads

M12 × 1

Communication Protocol

Sure Cross DX80 Sensor Node 1-Wire Serial Interface

Communications Line

Level Receive ON: Greater than 2 V
 Level Receive OFF: Less than 0.7 V
 Level Transmit ON: 2.7 to 3 V
 Level Transmit OFF: 0 V (pulldown resistor of 10 kOhm)

Compatible Nodes

900 MHz Models

DX80N9X1S-P6
 DX80N9X6S-P6
 DX80DR9M-H6 and -H6L
 DX80N9Q45TH

2.4 GHz Models

DX80N2X1S-P6
 DX80N2X6S-P6
 DX80DR2M-H6 and -H6L
 DX80N2Q45TH

Environmental Rating

IEC IP67; NEMA 6

Operating Temperature

-40 °C to +85 °C (-40 °F to +185 °F) ²

Shock and Vibration

All models meet IEC 60068-2-6 and IEC 60068-2-27 testing criteria
 Shock: 30G 11 ms duration, half sine wave per IEC 60068-2-27
 Vibration: 10 Hz to 55 Hz, 0.5 mm peak-to-peak amplitude per IEC 60068-2-6

Indicators

Green flashing: Power ON
 Red flicker: Serial Tx

Communication Hardware

Interface: 1-wire serial interface
 Baud rates: 9.6k, 19.2k (default), or 38.4k
 Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)

Humidity

Humidity measurements are only available with the M12FTH4Q model. The M12FT4Q model does not include the humidity sensor.
 Measuring Range: 0 to 100% relative humidity (RH)
 Resolution: 0.1% relative humidity
 Accuracy:
 ±2% at 25 °C
 ±3% at 0 °C to 70°C and 10–90% RH
 ±7% at 0 °C to 70°C and 0–10 % or 90–100 % RH

Temperature

Measuring Range: -40 °C to +85 °C (-40 °F to +185 °F)
 Resolution: 0.1 °C
 Accuracy
 -40 °C to 0 °C: ± 0.6 °C
 0 °C to 60 °C: ± 0.4 °C
 +60 °C to +85°C: ± 1.2 °C

Certifications for the 4Q Models



CSA: Class I, Division 2, Groups A, B, C, D — Certificate 1921239

Refer to the Class I Division 2 control drawings (p/n 143086) for wiring specifications and limitations. All battery-powered devices must only use the lithium battery manufactured by Xeno, model XL-205F (Banner model number **BWA-BATT-001**).

Accessories

Temperature-Humidity Filter Caps

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.)



² Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

Euro-Style Cordsets - Double Ended

When using the FlexPower Node with integrated battery, use a double ended cordset. When using a FlexPower Node with external power supply, use a single ended cordset. **If using the communication lines, the cable length cannot exceed 3 meters (10 ft).**

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)				<p>1 = Brown 2 = White 3 = Blue</p>

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