

M12FTH4Q 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. 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](#)).



- 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



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.

Models

Model	Accuracy	Serialized Certificate	I/O
M12FTH4Q	±2% at 25 °C	Yes	Temperature and relative humidity 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 each M12FTH4Q 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 (Sheet 1 of 2)

Sensor Type	Model	USB Adapter Cable
Temperature and Humidity	M12FTH3Q	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	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)
	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.

Table 1:The Sensor Configuration Software supports the following sensors (Continued) (Sheet 2 of 2)

Sensor Type	Model	USB Adapter Cable
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

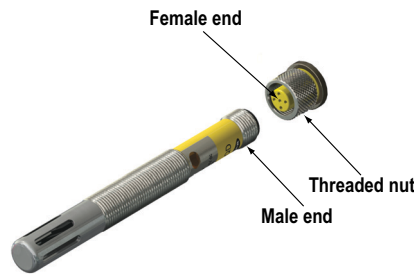


Figure 1: Connect the sensor

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 (Sheet 1 of 2)

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

Table 3: Modbus holding registers (Continued) (Sheet 2 of 2)

Sensor Register	Output Type	I/O Range		Holding Register Representation	
		Min	Max	Min (Dec)	Max (Dec)
3	Temperature (°F)	-1638.4	1638.3	-32768	32767

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

Specifications for the M12FTH4Q Sensor

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

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)

Operating Temperature

-40 °C to +85 °C (-40 °F to +185 °F)^a

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

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

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)

Communication Protocol

Sure Cross DX80 Sensor Node 1-Wire Serial Interface

Environmental Rating

IEC IP67; NEMA 6

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

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

Certifications



Banner Engineering Europe
 Park Lane, Culliganlaan 2F
 bus 3, 1831 Diegem,
 BELGIUM



Turk Banner LTD Blenheim House, Blenheim Court, Wickford, Essex SS11 8YT, Great Britain



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.)



Cordsets - Double-Ended M12

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

1 = Brown
2 = White
3 = Blue

4 = Black
5 = Green/Yellow

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

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 Revision: K
 Original Instructions
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