M12FTH4Q Temperature and Humidity Sensor

Features

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 the 10 to 30 V DC powered 1-Wire Serial Interface Node models DX80N9X6S-P6 and DX80N2X6S-P6, 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	Serialized Certificate	I/O
M12FTH4Q	No	Temperature and relative humidity via a 1-wire serial interface

Banner Humidity Sensor Calibration Statement. This calibration statement (available online) lists the chain in which the Banner temperature and humidity sensors are calibrated. Sensing components are calibrated at the point of manufacture. Serialized certificates of accuracy are not provided for the M12FTH4Q sensor.

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.

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	**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.
	QM30VT3	
GPS	**GPS50M**	USB-to-RS-485 adapter cable model **BWA-HW-006** AND a field-wireable M12 connector or connecter with pigtail OR USB to RS-485 adapter cable model **BWA-UCT-900** AND a field-wireable M12 connector or connecter 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)

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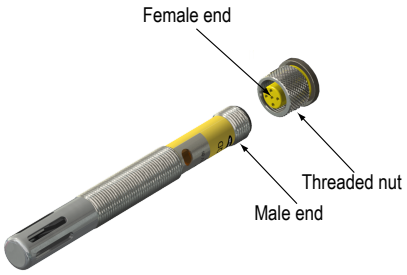
Continued from page 1

Sensor Type	Model	USB Adapter Cable
	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

Connect the sensor



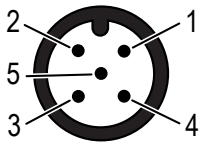
To install the sensor to a device with a 5-pin M12 female end:

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.

5-pin A-Code M12 Male 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.

5-pin A-code M12 male connector wiring

5-pin A-Code M12 male connector	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.

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

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Mounting Threads

M12 × 1

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)

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

Communication Protocol

Sure Cross DX80 Sensor Node 1-Wire Serial Interface

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

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:

±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

Operating Temperature

–40 °C to +85 °C (–40 °F to +185 °F) (1)

Environmental Rating

IEC IP67

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

Certifications

CE

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

Accessories

Temperature-Humidity Filter Caps

FTH-FIL-001

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



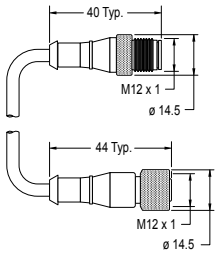
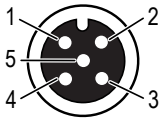
FTH-FIL-002

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



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 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)				

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