Sure Cross® Temperature and Humidity Sensor

Datasheet

The SureCross 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 *Flex*Power 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: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

For additional information, updated documentation, and accessories, refer to Banner Engineering's website, *www.bannerengineering.com/surecross*.

Model	Power Requirements	I/O
M12FTH4Q	3.6 to 5.5 V dc	Temperature and relative humidity via a 1-wire serial interface
M12FT4Q		Temperature via a 1-wire serial interface

Configure this sensor using the *Sensor Configuration Tool* and adapter cable BWA-USB1WIRE-001 (datasheet *170020*).

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 temperature/humidity or temperature sensor. Although your certificate will be specific to your product, a sample certificate is available for *download*.
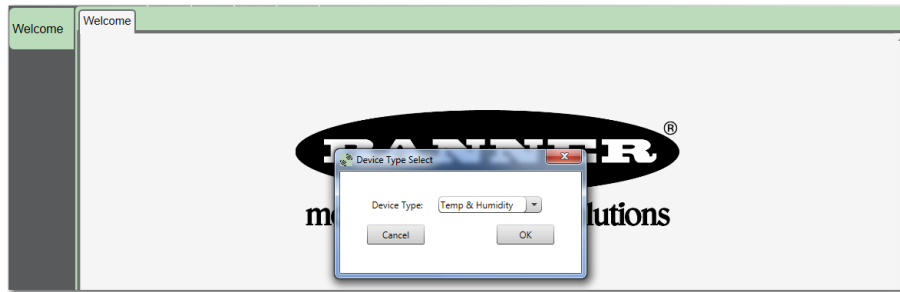
Sensor Configuration Tool

The Sensor Configuration Tool offers an easy way to manage sensor parameters, retrieve data, and visually show sensor data from a number of different sensors. The Sensor Configuration Tool 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 Sensor Configuration Tool from Banner Engineering's website: *www.bannerengineering.com/wireless*. The Sensor Configuration Tool currently supports the following sensors:

Sensor Type	Model	USB Adapter Cable
Temperature and Humidity	M12FTH3Q and M12FT3Q	Model BWA-HW-006: USB-to-RS-485 adapter cable
	M12FTH4Q and M12FT4Q	Model BWA-USB1WIRE-001: USB-to-RS-232 1-Wire adapter cable
Vibration and Temperature	QM42VT1	Model BWA-USB1WIRE-001: USB-to-RS-232 1-Wire adapter cable
	QM42VT2	Model BWA-HW-006: USB-to-RS-485 adapter cable
GPS	GPS50M	Model BWA-HW-006: USB-to-RS-485 adapter cable AND a field-wireable M12/Euro-style connector or connecter with pigtail
U-GAGE K50U Ultrasonic	K50UX2RA	Model BWA-USB1WIRE-001: USB-to-RS-232 1-Wire adapter cable

Launch the Sensor Configuration Tool and from the drop-down list, select your sensor type and click OK.
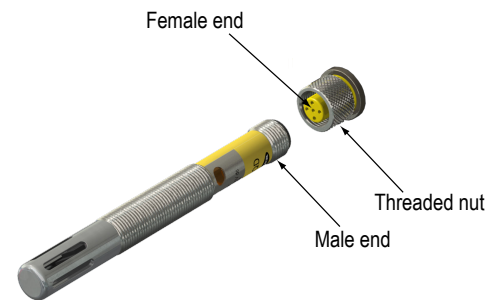
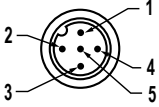## Connecting the Temperature/Humidity Sensor

To install the sensor to a device with a 5-pin Euro-style female end, follow these instructions:

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 or limitations.

5-pin M12/Euro-style 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

The temperature = (Holding register value) ÷ 20.

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

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[1] Only available on the M12FTH4Q model. Humidity sensor is not included with the M12FT4Q model.

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

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

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	2.4 GHz Models
DX80N9X1S-P6	DX80N2X1S-P6
DX80N9X6S-P6	DX80N2X6S-P6
DX80DR9M-H6 and -H6L	DX80DR2M-H6 and -H6L
DX80N9Q45TH	DX80N2Q45TH

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
Resolution: 0.1% relative humidity
Accuracy: ±2% relative humidity at 25 °C

Temperature
Measuring Range: −40 °C to +85 °C (−40 °F to +185 °F)
Resolution: 0.1 °C
Accuracy: ±0.3 °C at 25 °C

Environmental Rating
IEC IP67; NEMA 6

Operating Temperature
−40 °C to +85 °C (−40 °F to +185 °F) [2]

Shock and Vibration
IEC 68-2-6 and IEC 68-2-27
Shock: 30g, 11 millisecond half sine wave, 18 shocks
Vibration: 0.5 mm p-p, 10 to 60 Hz

Certifications

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 or limitations. All battery-powered devices must only use the lithium battery manufactured by Xeno, model XL-205F.
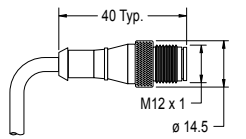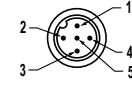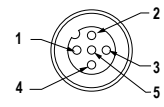
Replacement Filters

Replacement Filters	Description	
FTH-FIL-001	Aluminum grill filter cap (factory default, ships with M12FT*Q sensors)	
FTH-FIL-002	Stainless steel, sintered to 10 micrometer porosity (for high dust environments.)	

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).

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

5-Pin Threaded M12/Euro-Style Cordsets—Double Ended and Less Than 3 m Long				
Model	Length	Style	Dimensions	Pinout
DEE2R-51D	0.31 m (1 ft)	Female Straight/ Male Straight	40 Typ. M12 x 1 ø 14.5 — 44 Typ. M12 x 1 ø 14.5	Male 1 2 3 4 5 — Female 2 1 3 4 5 — 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Green/Yellow
DEE2R-53D	0.91 m (3 ft)			
DEE2R-58D	2.44 m (8 ft)			

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