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 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.

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 93265.
	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.
GPS	GPS90M	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)

Continued on page 2

© Banner Engineering Corp.

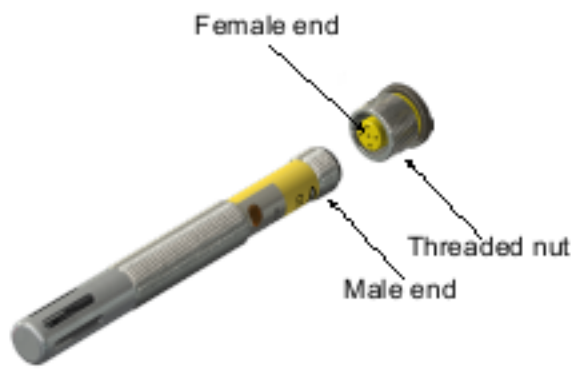
Continued from page 1

Sensor Type	Model	USB Adapter Cable
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

Connect the sensor



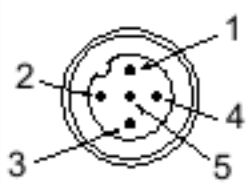
To install the sensor to a device with a 5-pin M12 female end:

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.

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.

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)	-1639.4	1639.3	-32768	32767
3	Temperature (°F)	-1639.4	1639.3	-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

© Banner Engineering Corp.

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)

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: ±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

Operating Temperature

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

Environmental Rating

IEC IP67; NEMA 6

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

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

Banner Engineering LTD Blackwater House
Rankine Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

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

Accessories

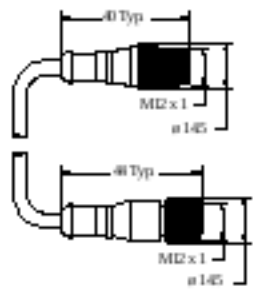
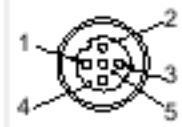
Temperature-Humidity Filter Caps

FTH-FIL-001 Aluminum grill filter cap (factory default, ships with the 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).

© Banner Engineering Corp.

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

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: www.bannerengineering.com.

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

Document title: M12FTH4Q Temperature and Humidity Sensor
Part number: 162669
Revision: K
Original Instructions
© Banner Engineering Corp. All rights reserved.

162669