

## Features

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



- Manufactured with a robust metal housing
- Functions as a Modbus slave device via RS-485
- 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.

For additional information, updated documentation, and a list of accessories, refer to Banner Engineering's website, [www.bannerengineering.com](http://www.bannerengineering.com).

Configure this sensor using the [Sensor Configuration Software](#) and adapter cable BWA-HW-006 (datasheet [140377](#)).

## Models

Models	Accuracy	Serialized Certificate	I/O
M12FTH3Q	±2% at 25 °C	No	Temperature and relative humidity via RS-485 Modbus

[Banner Humidity Sensor Calibration Statement](#). This calibration statement (also 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 M12FTH3Q 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](http://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 <b>BWA-HW-006</b> OR USB to RS-485 adapter cable model <b>BWA-UCT-900</b> (datasheet p/n <a href="#">140377</a> )
	M12FTH4Q and M12FT4Q	USB-to-RS-232 1-Wire adapter cable model <b>BWA-USB1WIRE-001</b> (datasheet p/n <a href="#">170020</a> )
Vibration and Temperature	QM42VT1	USB-to-RS-232 1-Wire adapter cable model <b>BWA-USB1WIRE-001</b> (datasheet p/n <a href="#">170020</a> )
	QM42VT2	USB-to-RS-485 adapter cable model <b>BWA-HW-006</b> OR USB to RS-485 adapter cable model <b>BWA-UCT-900</b> (datasheet p/n <a href="#">140377</a> ). 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 <b>BWA-USB1WIRE-001</b> (datasheet p/n <a href="#">170020</a> )
	QM30VT2	USB to RS-485 adapter cable model <b>BWA-UCT-900</b> (datasheet p/n <a href="#">140377</a> ). 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 <b>BWA-HW-006</b> AND a field-wireable M12/Euro-style connector or connector with pigtail OR USB to RS-485 adapter cable model <b>BWA-UCT-900</b> AND a field-wireable M12/Euro-style connector or connector with pigtail (datasheet p/n <a href="#">140377</a> )
U-GAGE K50U Ultrasonic	K50UX1CRA	USB-to-RS-232 1-Wire adapter cable model <b>BWA-USB1WIRE-001</b> (datasheet p/n <a href="#">170020</a> )
	K50UX2CRA	USB-to-RS-485 adapter cable model <b>BWA-HW-006</b> OR USB to RS-485 adapter cable model <b>BWA-UCT-900</b> (datasheet p/n <a href="#">140377</a> )

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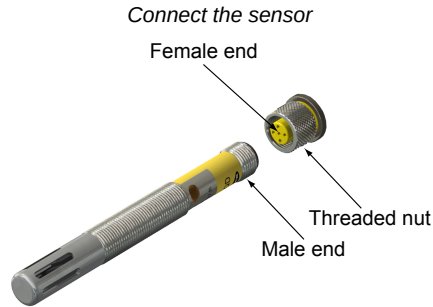


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Sensor Type	Model	USB Adapter Cable
	<b>K50UX1ARA</b>	USB-to-RS-232 1-Wire adapter cable model <b>BWA-USB1WIRE-001</b> (datasheet p/n <a href="#">170020</a> )
	<b>K50UX2ARA</b>	USB-to-RS-485 adapter cable model <b>BWA-HW-006</b> OR USB to RS-485 adapter cable model <b>BWA-UCT-900</b> (datasheet p/n <a href="#">140377</a> )

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

## Connect the Temperature/Humidity 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 for the M12FTH3Q Sensor

5-pin M12 male connector wiring

5-pin M12 Male Connector	Pin	Wire Color	Sensor Connection
	1	Brown	Power IN (+); 12–24 V DC
	2	White	RS485 / D1 / B / +
	3	Blue	Ground (-)
	4	Black	RS485 / D0 / A / -
	5	Gray	Not Used

Refer to the Class I Division 2 control drawings (p/n [143086](#)) for wiring specifications and limitations.

## Holding Registers

Sensor data (read only)

Sensor Address	Description	I/O Range		Holding Register Registration	
		Min Value	Max Value	Min (Dec)	Max (Dec)
40001	Humidity (%RH)	0	100%	0	10000
40002	Temperature (°C)	-1638.4	1638.3	-32768	32767
40003	Temperature (°F)				
40004	Dew Point (°C)				
40005	Dew Point (°F)				

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

Communication settings

Sensor Address	Description	I/O Range	Comments	Default	Access
40601	Baud Rate	0 = 9.6k; 1 = 19.2k; 2 = 38.4k	0 = 9600; 1 = 19200; 2 = 38400	1	RW

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Sensor Address	Description	I/O Range	Comments	Default	Access
40602	Parity	0 = None; 1 = Odd; 2 = Even	0 = None; 1 = Odd; 2 = Even	0	RW
40603	Address	1-254	-	1	RW
40605	Restore Factory Configuration	0 = No Operation; 1 = Restore	-	-	WO

Device information

Sensor Address	Description	I/O Range	Comments	Default	Access
40606-40615	Banner Name	0..65535	-	Banner Engineering	RO
40616-40631	Product Name	0..65535	-	M12FTH3Q	RO
40644-40659	User Defined Tag	0..65535	User writable space	More Sensors. More Solutions.	RW

## Specifications for the M12FTH3Q Sensor

**Supply Voltage**

12 to 24 V DC OR 3.6 to 5.5 V DC low power option

**Current**

Default sensing: 45 µAmps  
 Disabled sensing: 32 µAmps  
 Active comms: 4 mA

**Temperature and/or Humidity Input**

Sample Rate: 5 seconds

**Humidity**

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

**Mounting Threads**

M12 × 1

**Communication**

Interface: RS-485 serial  
 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)  
 Protocol: Modbus RTU

**Indicators**

Green flashing: Power ON  
 Red flicker: Serial Tx

**Operating Temperature**

–40 °C to +85 °C (–40 °F to +185 °F)

**Environmental Rating**

IEC IP67; NEMA 6

**Temperature**

Measuring Range: –40 °C to +85 °C (–40 °F to +185 °F)  
 Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.  
 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

Operating the Modbus temperature/humidity sensor at voltages greater than 12 V can increase the temperature accuracy error by up to 1 °C. The amount of error depends upon the application's device mounting and airflow characteristics.

**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

**Certifications**



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 1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House  
 Blenheim Court  
 Wickford, Essex SS11 8YT  
 GREAT BRITAIN

## Accessories

### Temperature-Humidity Filter Caps

<p><b>FTH-FIL-001</b></p> <p>Aluminum grill filter cap (factory default, ships with the M12FT*Q and Q45 All-in-One sensors)</p>		<p><b>FTH-FIL-002</b></p> <p>Stainless steel, sintered to 10 micrometer porosity (for high dust environments.)</p>	
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## 5-Pin M12 Cordsets (MQDC1)

5-Pin Threaded M12 Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC1-501.5	0.5 m (1.5 ft)	Straight		
MQDC1-503	0.9 m (2.9 ft)			
MQDC1-506	2 m (6.5 ft)			
MQDC1-515	5 m (16.4 ft)			
MQDC1-530	9 m (29.5 ft)			
MQDC1-560	18 m (59 ft)			
MQDC1-5100	31 m (101.7 ft)			
MQDC1-506RA	2 m (6.5 ft)	Right-Angle		<p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray</p>
MQDC1-515RA	5 m (16.4 ft)			
MQDC1-530RA	9 m (29.5 ft)			
MQDC1-560RA	19 m (62.3 ft)			

## Banner Engineering Corp Limited Warranty

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For patent information, see [www.bannerengineering.com/patents](http://www.bannerengineering.com/patents).

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