M12FTH3Q Temperature and Humidity Sensor

Features of the M12FTH3Q Sensor

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.
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 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 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 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.
GPS	**GPS50M**	USB-to-RS-485 adapter cable model **BWA-HW-006** AND a field-wireable M12/Euro-style connector or connecter with pigtail OR USB to RS-485 adapter cable model **BWA-UCT-900** AND a field-wireable M12/Euro-style connector or connecter with pigtail (datasheet p/n 140377)

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

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

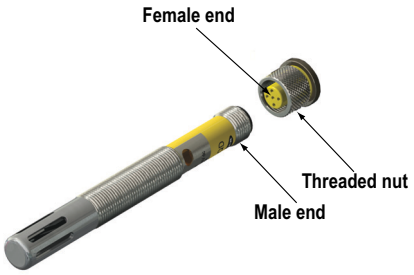


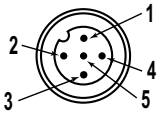
Figure 1: Connect the sensor

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 for the M12FTH3Q Sensor

Table 2:*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

Table 3:*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.

Table 4:*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
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

Table 5:*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

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.

Indicators
Green flashing: Power ON
Red flicker: Serial Tx

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

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

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

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

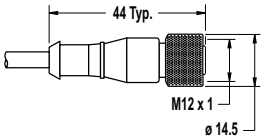
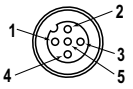
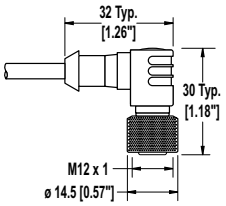
Accessories

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.)

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		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
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		
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

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: M12FTH3Q Temperature and Humidity Sensor
Part number: 163751
Revision: M
Original Instructions

163751