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BAPI BA-WTH-BLE-D-BB-PWR Wireless Duct Temp Humidity Sensor Instruction Manual

Contents

BAPI BA-WTH-BLE-D-BB-PWR Wireless Duct Temp Humidity Sensor

Product Information

The Wireless Duct Temp/Humidity Sensor is a device manufactured by BAPI. It is designed to measure environmental values such as temperature and humidity and transmit the data wirelessly viaBluetooth Low Energy (BLE) to a receiver or gateway. The sensor is housed in a rugged IP66-rated BAPI-Box enclosure.

The sensor can be adjusted to suit the needs of the installation, with user-adjustable settings that can be configured either through BAPI's cloud-based Wireless Asset Monitoring (WAM) or the receiver.

There are two options for receiving the data from the sensor:

- **Receiver (Wireless-to-Analog):** The wireless receiver receives data from one or more wireless sensors and transfers it to analog output modules, converting it to an analog voltage or resistance. The receiver supports up to 32 sensors and up to 127 different analog output modules.
- **Gateway:** The wireless gateway receives data from one or more wireless sensors and provides it to the cloud via MQTT. The gateway also sends a confirmation signal to each sensor upon successful reception of data. The gateway supports up to 32 sensors.

For more information on adjusting settings and establishing communication between the sensors and the receiver or gateway, refer to the WAM or receiver instructions available on the BAPI website.

Product Usage Instructions

1. **Initial Activation:**
   - *Battery Power Units:*
     1. Open the cover of the unit to access the batteries.
     2. Find the battery tab insulators and pull them out.
     3. Press the Service button. The Service LED should flash once to confirm power.

- ***Wire Power Units:***
    1. Open the cover of the unit to access the circuit board.
    2. Apply a 9 to 30 VDC or 24 VAC power supply to the power terminals as shown.
    3. Press the Service button. The Service LED should flash once to confirm power.
2. **Mounting:**
    1. Place the sensor in the middle of the duct, away from temperature-stratified air, coils, or humidifiers for accurate readings.
    2. Drill a 1″ (25mm) diameter probe hole and insert the probe into the duct.
    3. Use the enclosure tabs to mark pilot hole locations and drill 1/8″ (3.2mm) pilot holes.
    4. Mount the enclosure to the duct using the provided mounting screws.
    5. Tighten the screws until the foam backing is slightly depressed to prevent air leakage.
    6. Note: Do not drill into the enclosure, as it will violate the NEMA and IP rating.

Refer to Fig. 1, Fig. 2, and Fig. 3 for visual references.

Overview and Identification

- User-adjustable settings via receiver or WAM
- Onboard memory to store readings when communication is interrupted
- Transmits to a digital Gateway or a wireless-to-analog ReceiverBAPI's Duct Wireless Sensor measuresenvironmental values and transmits the data via Bluetooth Low Energy to a receiver or gateway.
- This unit features a rugged IP66-rated BAPI-Box enclosure.

Adjustable Settings

BAPI's wireless devices have several settings that can be field-adjusted to suit the needs of the installation.

All settings are configured by either BAPI's cloud-based Wireless Asset Monitoring (WAM) or the receiver. (See the WAM or receiver instructions documents available on the BAPI website for more information on adjusting the settings.)

Sample Rate/Interval – The time between when the sensor wakes up and takes a reading. The available values are 10 sec, 30 sec, 1 min, 3 min or 5 min with the gateway, or 30 sec, 1 min, 3 min or 5 min with the receiver.

Transmit Rate/Interval – The time between when the sensor transmits the readings to the gateway or receiver. The available values are 30 sec, 1, 2, 3, 4, 5, 10, 15, 20 or 30 minutes, or 1, 6 or 12 hours with the gateway, or 1, 5,10 or 30 minutes with the receiver.

Delta Temperature – The change in temperature between sample intervals that will cause the sensor to override the transmit interval and immediately transmit the changed temperature. The available values are 0.1, 0.2, 0.3, 0.4, 0.5, 1, 2, 3, 4, 5 °F or °C with the gateway, and 1 or 3 °F or °C with the receiver.

Delta Humidity – The change in humidity between sample intervals that will cause the sensor to override the transmit interval and immediately transmit the changed humidity. The available values are 0.5, 1, 2, 3, 4 or 5 % RH with the gateway and 3 or 5 %RH with the receiver.

Temperature Min/Max – The maximum or minimum temperature that will cause the sensor to override the transmit interval and immediately transmit a reading to the gateway. (Only available when using a gateway.)

Temperature Offset – Adjusts the temperature value being transmitted to match that of a calibrated reference device. The available values are ±0.1, 0.2, 0.5, 1, 2, 3, 4 or 5 °F or °C. (Only available when using a gateway.)

Humidity Offset – Adjusts the humidity value being transmitted to match that of a calibrated reference device. The available values are ±0.5, 1, 2, 3 or 5 %RH. (Only available when using a gateway.)

Wireless Duct Temp/Humidity Sensor

Associated Receiver or Gateway

RECEIVER (Wireless-to-Analog)

The wireless receiver from BAPI receives the data from one or more wireless sensors. The data is then transferred to the analog output modules and converted to an analog voltage or resistance. The receiver supports up to 32 sensors and up to 127 different analog output modules.

GATEWAY
The wireless gateway receives the data from one or more wireless sensors. The gateway then provides the data to the cloud via MQTT. The gateway also sends a confirmation signal to each sensor upon successful reception of data. The gateway supports up to 32 sensors.

Please see BAPI's Wireless Quick Start Guide, or the gateway or receiver instructions available on the BAPI website (www.bapihvac.com/gateway-quick-start) to establish communication between the sensors and the gateway or receiver.

Initial Activation

Battery Power Units
The unit comes with two pre-installed batteries. To activate the unit, open the cover to access the batteries. Find the battery tab insulators and pull them out. Press the Service button and the Service LED should flash once to confirm power.
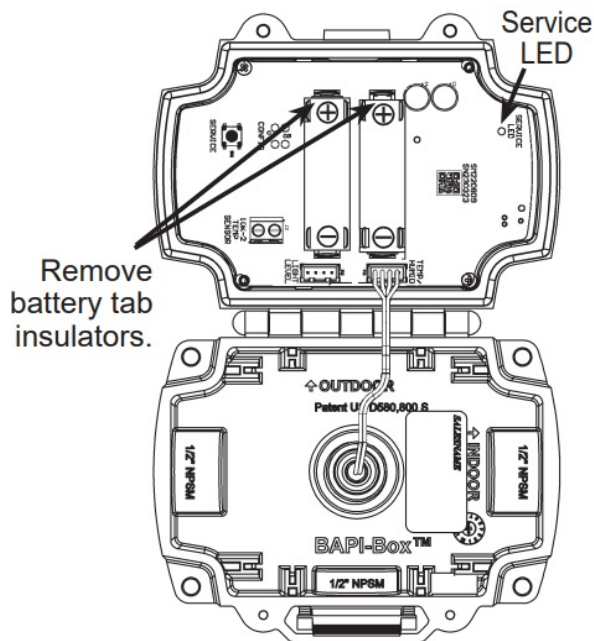
Fig. 1: Battery Power Unit

Wire Power Units

To activate the unit, open the cover to access the circuit board and apply the to 30 VDC or 24 VAC to the power terminals as shown. Press the Service button and the service LED should flash once to confirm the power
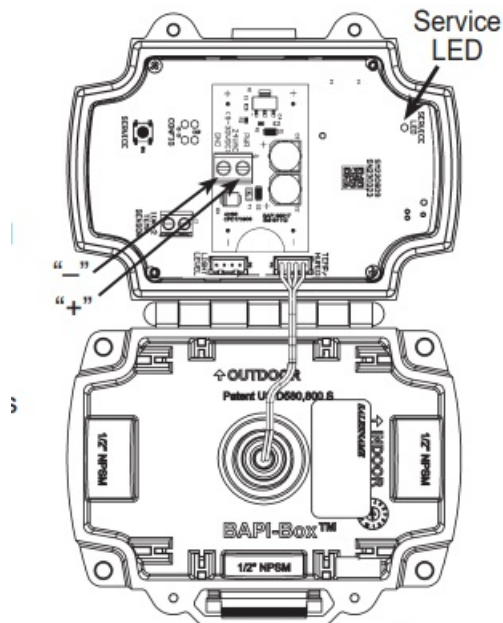

Fig. 2: Wire Power Unit

Mounting

1. Place the sensor in the middle of the duct away from temperature-stratified air, coils or humidifiers to achieve the best reading.

2. Drill a 1" (25mm) diameter probe hole and insert the probe into the duct. Use the enclosure tabs to mark the pilot hole locations and drill the 1/8" (3.2mm) pilot holes. Mount the enclosure to the duct using the provided mounting screws.

3. Tighten the screws until the foam backing is depressed slightly to prevent air leakage.
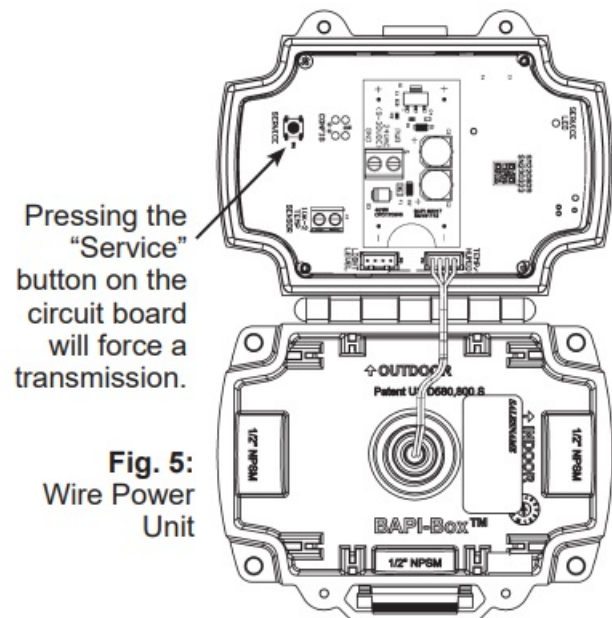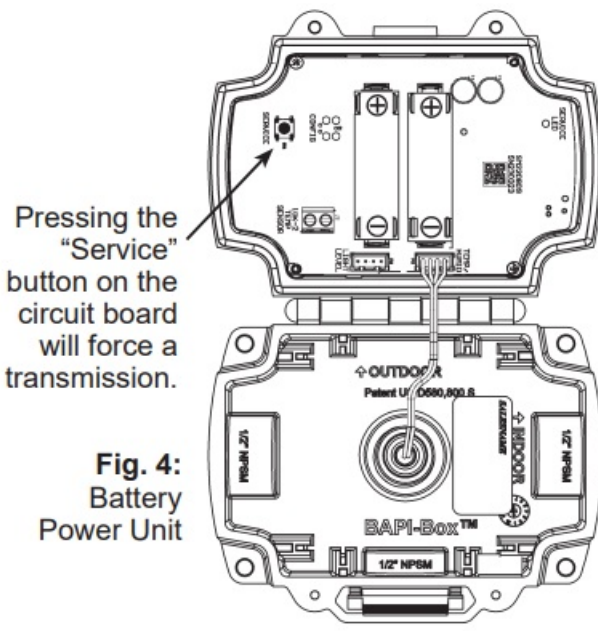
Note:

Do not drill into the enclosure which will violate the NEMA and IP rating.

Fig. 3: Duct Sensor Mounting
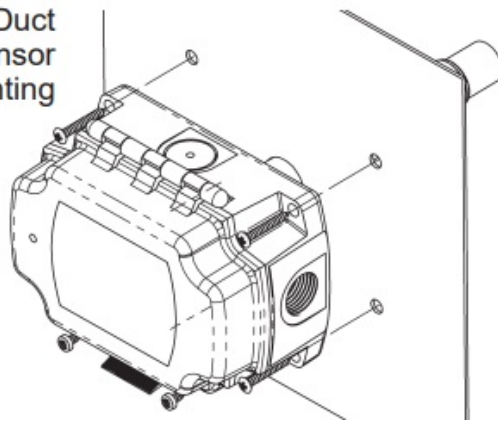
Operation

Power the unit as described in the "Initial Activation" section. Follow the gateway or receiver instructions for pairing the unit and changing the adjustable settings.
(The instructions are available on the BAPI website.)

Pressing the "Service" button on the circuit board will force a transmission.

Fig. 4: Battery Power Unit

Pressing the "Service" button on the circuit board will force a transmission.

Fig. 5: Wire Power Unit

Wireless Sensor Reset

Sensors remain paired to the gateway or receiver and output modules when power is interrupted or the batteries are removed. To break the bonds between them, the sensors need to be reset. To do this, press and hold the "Service Button" on the sensor for about 30 seconds. During those 30 seconds, the green LED will be off for about 5 seconds, then flash slowly, then begin flashing rapidly. When the rapid flashing stops, the reset is complete. The sensor can now be paired to a new receiver or gateway. To re-pair to the same receiver or gateway, you must reset the receiver or gateway. Output modules that were previously paired to the sensor do not need to be re-paired.

Onboard Memory

The sensor retains up to 16,000 readings should the communication become interrupted. The sensor only stores readings from missed transmissions and only when the sensor is paired to a gateway. Once communication is re-established with the gateway, the stored readings are transmitted and then erased from the sensor. The current reading and nine previous readings are sent at each transmit interval until the sensor is caught up. Temporarily shortening the transmit interval will allow the sensor to more quickly clear any stored readings.

Battery Replacement

Open the cover to access the batteries (Fig 6). Remove the batteries from their holders and discard in an environmentally safe manner. Replace with new batteries in the correct orientation.

- **Battery Specifications:**
- **Two 3.6V Lithium batteries:**
- (#14505, 14500 or equivalent)

Remove and replace batteries in the correct orientation as shown.

Fig. 6: Battery Power Unit
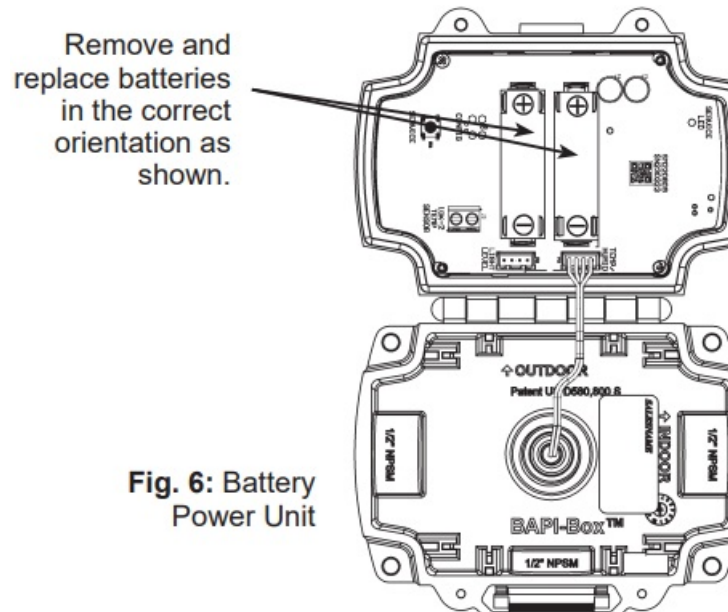
Diagnostics

Possible Problems:
The sensor is not communicating with the gateway or receiver, or the transmitted values are incorrect.

Possible Solutions:
Make sure the sensor is within range of the gateway or receiver. Verify that the green LED on the sensor circuit board flashes when the "Service" button is pressed, indicating a transmission. If it does not flash, replace the batteries.
Verify that the sensor is properly paired to the gateway or receiver and analog output modules as described in the gateway or receiver instructions available on the BAPI website. Repair them if needed. If necessary, perform the "Wireless Sensor Reset" procedure as described on the pg 3.

Specifications

- **Battery Power:** Two included 3.6V 14505, 14500 or equivalent lithium batteries
- (**Note:** Standard AA batteries are not compatible)
- **Wire Power:** 9 to 30 VDC or 24 VAC, halfwave rectified
- **Sensor Accuracy:**
- **Temp:** ±1.0°F (0.55°C) from 32 to 158°F (0 to 70°C)
- **Humidity:** ±2%RH @ 77°F (25°C), 20 to 80%RH
- **Temperature Range:** -4 to 221°F (-20 to 105°C)
- **Transmission Distance:** Varies by application*
- **Environmental Operation Range:**
- **Temp:** -4 to 149°F (-20 to 65°C)
- **Humidity:** 10 to 90%RH, non-condensing
- **Enclosure Rating, Material & Material Rating:**

- IP66, UV-Resistant Polycarbonate, UL94 V-0

- **Frequency:** 2.4 GHz (Bluetooth Low Energy)

- **Receiver Sensitivity:** -97 dBm

- **User Adjustable Settings:**

- **Delta T (Temp):** 0.1°F/C to 5.0°F/C

- **Delta T (Humidity):** 0.1%RH to 5.0%RH

- **Transmit Interval:** 30 sec to 12 hour

- **Sample Interval:** 10 sec to 5 min

- **Temp Offset:** ±0.1°F/C to ±5.0°F/C

- **Humidity Offset:** ±0.1%RH to ±3.0%RH

- **Onboard Memory:**

  The sensor retains up to 16,000 readings should the communication become interrupted. If using a Gateway, the data is re-transmitted once communication is re-established.

- **Agency:** RoHS
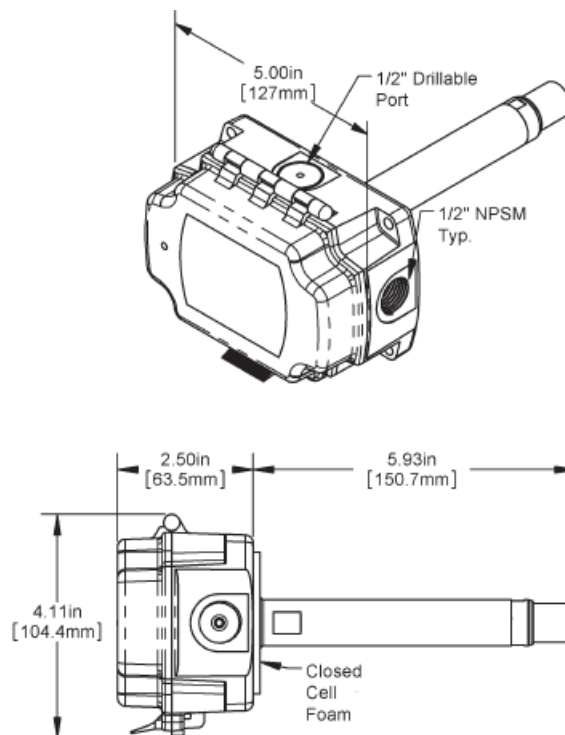
- In-building range is dependent on obstructions such as furniture and walls and the density of those materials. In wide open spaces, the distance may be greater; in dense spaces, the distance may be less.
- Actual battery life is dependent on the sensor's adjustable settings and environmental conditions

BAPI-Box Units Calculated Battery Life**		
Transmit Interval	Sample Rate	Estimated Life (years)
30 sec	30 sec	1.04
1 min	1 min	1.95
3 min	1 min	3.46
5 min	5 min	4.63
10 min	5 min	7.02

Specifications are subject to change without notice.

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Documents / Resources

[BAPI BA-WTH-BLE-D-BB-PWR Wireless Duct Temp Humidity Sensor](#) [pdf] Instruction Manual
BA-WTH-BLE-D-BB-PWR Wireless Duct Temp Humidity Sensor, BA-WTH-BLE-D-BB-PWR, Wireless Duct Temp Humidity Sensor, Temp Humidity Sensor, Humidity Sensor

References

- [BAPI - Sensor Products for HVAC/R Duct and Room](#)
- [User Manual](#)