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BAPI-Stat Quantum Slim Wireless Temperature or Temp-Humidity Sensor Installation Guide

Contents

BAPI-Stat Quantum Slim Wireless Temperature or Temp-Humidity Sensor

Overview and Identification

- Built in or remote temperature sensor
- Onboard memory and user adjustable settings
- Transmits to a digital Gateway or a wireless-to-analog Receiver

The BAPI-Stat "Quantum Slim" Wireless Sensor measures the temperature or Temp/Humidity and transmits the data via Bluetooth Low Energy to a receiver or gateway. The units are perfect for monitoring the temperature inside refrigerator and freezer cases. The sensor body mounts on the outside of freezers and can be mounted either inside or outside of refrigerators. It is available with an internal sensor or an external probe or thermobuffer. The external cable fits between the door seal or through a hole without affecting appliance efficiency.

Internal Sensor

Thermobuffer

Remote Probe

Adjustable Settings

BAPI's wireless devices have several settings that can be can be field adjusted to suit the needs of the installation. All settings are configured by either the gateway or the receiver. (See the gateway 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 transmit the changed temperature at the next sample interval. 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 humidity between sample intervals that will cause the sensor to override the transmit interval and transmit the changed humidity at the next sample interval. 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 minumum 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.)

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.

Wireless Receiver with 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 a 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 documents available on the BAPI website to establish communication between the sensors and the gateway or receiver.

Wireless Gateway

Initial Activation

For convenience, BAPI recommends pairing the sensor to the intended receiver or gateway prior to mounting either device. Both devices need to be powered-on to pair. See the receiver or gateway installation manual for instructions on pairing the sensor. The unit comes with a pre-installed battery. To activate the unit, remove the base plate and pull out the battery insulator tab as shown in Fig. 1. Press the Service button and the Service LED should flash once to confirm power. If the sensor will not be commissioned for more than a couple of days, BAPI recommends reinstalling the battery insulator tabs to conserve battery life.


Fig. 1: Battery insulator tab removal
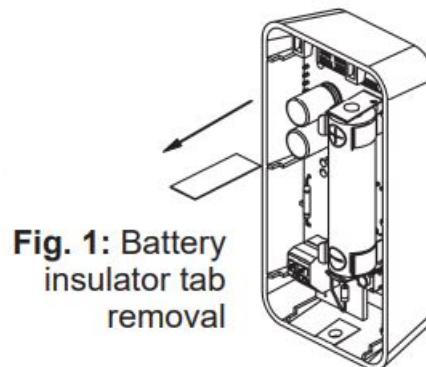
Drywall Mounting

1. Place the base plate vertically against the wall where you want to mount the sensor and mark the two mounting

holes.

2. Drill two 3/16" (4.8mm) holes in the center of each marked mounting hole. Insert a drywall anchor into each hole.

3. Secure the base to the drywall anchors using the #6 x 1" (25mm) mounting screws provided.

4. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place. Secure the cover by backing out the lock-down screw using a 1/16" (1.6mm) Allen wrench until it is flush with the bottom of the cover.

Fig. 2: BAPI-Stat "Quantum Slim" Mounting

Cover Lockdown Screw 1/16 Allen
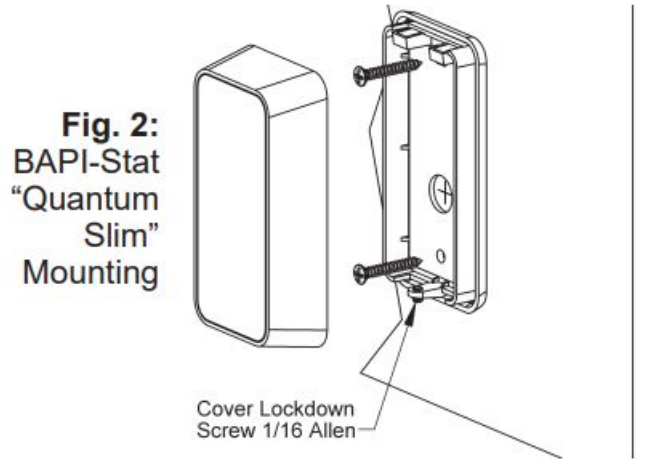
Probe or Thermobuffer Mounting

Mount the External Probe using a Flexible Probe Bracket (Fig. 3) or use the clip or screw hole on the Hanging Bracket Sensor (Fig. 4)
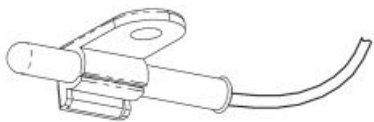

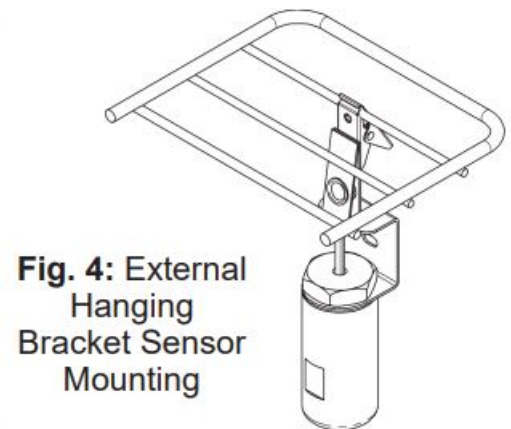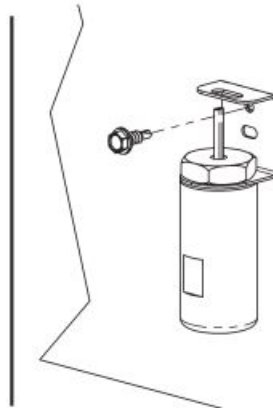Fig. 3: External Probe Mounting with a Flexible Probe Bracket (BA/FPB)
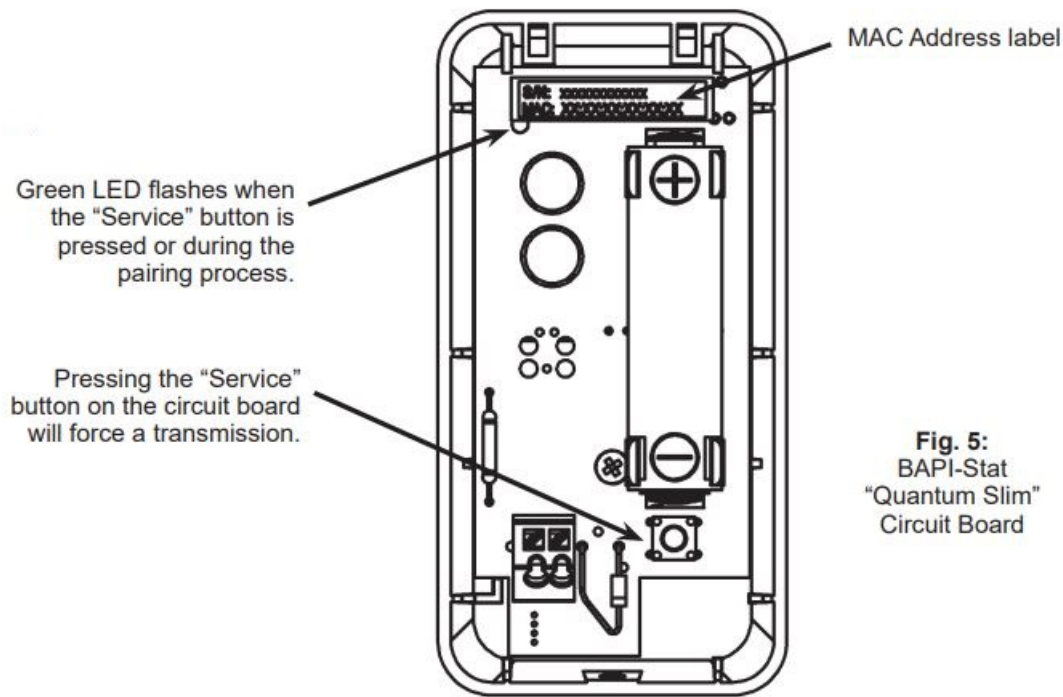

Fig. 4: External Hanging Bracket Sensor Mounting

Operation

Power the unit as described in "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.)

Green LED flashes when the "Service" button is pressed or during the pairing process.

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

MAC Address label

Fig. 5:
BAPI-Stat
"Quantum Slim"
Circuit Board

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

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.

Battery Replacement

1. Remove the cover from the base plate by turning in the cover lockdown screw with a 1/16" (1.6mm) Allen wrench until the cover can be removed.
2. Remove the used battery from its holder and discard in an environmentally safe manner. Replace with a new battery in the correct orientation (Fig 6).
3. Attach Cover by latching it to the top of the base, rotating the cover down and snapping into place. Secure the cover by backing out the lock-down screw using a 1/16" (1.6mm) Allen wrench until it is flush with the bottom of the cover.

Battery Specs: One 3.6V Lithium batteries: (#14505, 14500 or equivalent)
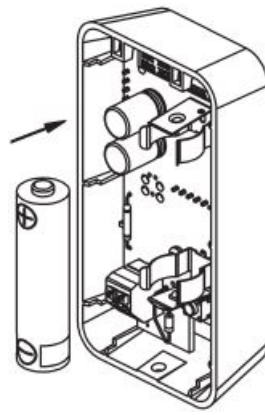
Fig. 6:
Battery replacement

Diagnostics

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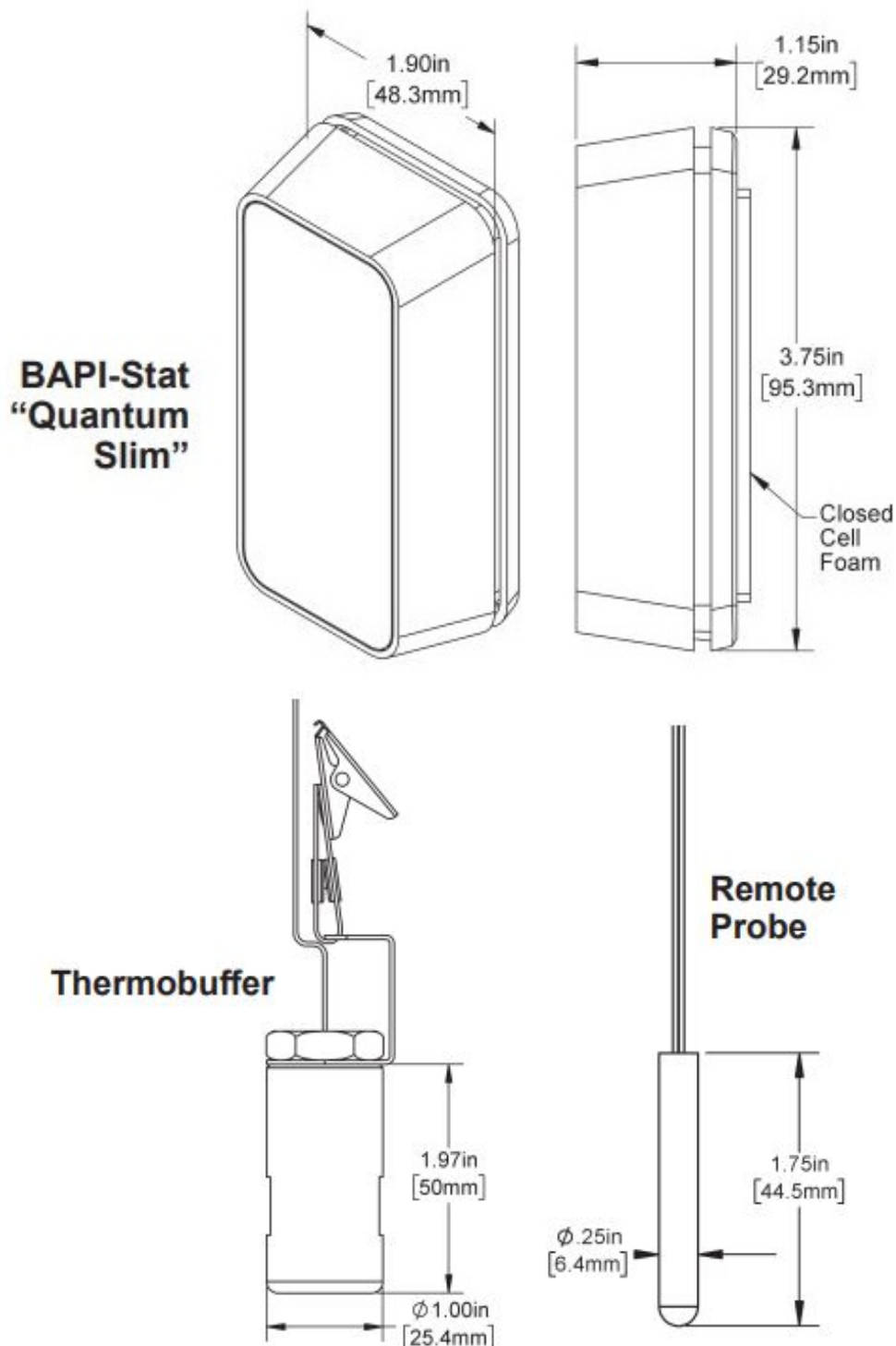
Possible Solutions:
Make sure the sensor is within range of the gateway or receiver. Verify that the green LED on the sensor circuit board flashes when the "Service" button is pressed, indicating a transmission. If it does not flash, replace the battery. Verify that the sensor is properly paired to the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

Specifications

- **Battery Power:** One included 3.6V 14505, 14500 or equiv. lithium battery (Note: Standard AA batteries are not compatible)
- **Wire Power:** 9 to 30 VDC or 24 VAC, halfwave rectified
- **Sensor Accuracy:**
    - **Temp:** ±1.25°F (0.7°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 Material & Rating:** ABS Plastic, UL94 V-0
- **Frequency:** 2.4 GHz (Bluetooth Low Energy)
- **Receiver Sensitivity:** -97 dBm
- **Ext. Probe Material:** 304 Stainless Steel 1.75" (44mm) Bullet Probe with FEP Cable 1" (25mm) Thermobuffer with FEP Cable
- **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

BAPI-Stat "Quantum Slim"

1.90in [48.3mm]

1.15in [29.2mm]

3.75in [95.3mm]

Closed Cell Foam

Thermobuffer

1.97in [50mm]

Ø1.00in [25.4mm]

Remote Probe

1.75in [44.5mm]

Ø.25in [6.4mm]

- 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.

Calculated Battery Life**		
Transmit Interval	Sample Rate	Estimated Life (years)
30 sec	30 sec	0.58
1 min	1 min	1.04
3 min	1 min	2.03
5 min	5 min	3.02
10 min	5 min	4.01

Specifications subject to change without notice.

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Documents / Resources

BAPI BAPI-Stat Quantum Slim Wireless Temperature or Temp-Humidity Sensor [pdf] Installation Guide
BAPI-Stat Quantum Slim Wireless Temperature or Temp-Humidity Sensor, BAPI-Stat, Quantum Slim Wireless Temperature or Temp-Humidity Sensor, Wireless Temperature or Temp-Humidity Sensor, Temperature or Temp-Humidity Sensor, Temp-Humidity Sensor, Humidity Sensor, Sensor

References

- **BAPI - Sensor Products for HVAC/R Duct and Room**