



Wireless Bluetooth Low Energy Gateway

Installation & Operating Instructions

50387_Wireless_BLE_Gateway

rev. 04/22/24

Overview

- Gateway provides data via MQTT to the cloud
- Each gateway supports up to 32 sensors that can be configured remotely via the gateway and BAPI's WAM user interface

BAPI's gateway receives the data from one or more sensors and provides the data to the cloud via MQTT using your local Wi-Fi connection. Sensors can be configured remotely via the gateway and BAPI's WAM user interface.

The gateway sends a confirmation signal to each sensor upon a successful reception. If the sensor doesn't receive this confirmation, then the sensor retains the readings in its onboard memory and transmits them once communication is re-established.

Note: A WAM subscription is necessary to view sensor data and adjust sensor settings. See "WAM and the WAM Website" on pg 4.



Powering Up and Connecting the Gateway

Power Up of the Gateway

Attach the provided antennas. Power the unit by the included 39" (1m) Micro USB cable and a customer-supplied USB power/adaptor block or by connecting a PoE-enabled cable to the PoE Port. Note: The ethernet port does not have network capabilities at present but is only used for PoE.

Upon power-up, the green "Power" LED will be blinking rapidly (on and off about twice per second). This indicates that the gateway is in SoftAP mode waiting for you to complete the connection process. If the green "Power" LED is blinking slowly (on for a second and off for a second), then the gateway will need to be reset to SoftAP mode. See "Resetting the Gateway to SoftAP Mode" on pg 3.

Connecting the Gateway

Use your phone, tablet or computer to follow the steps below.

1. With the gateway in SoftAP mode as described above, open up the Wi-Fi settings on your mobile device or computer and select "bapi_gateway" from the list of available networks (Fig 2). If your device asks for a password or network security key, enter "changebp".
2. Using the same device, open a web browser and enter "10.10.0.1" into the address bar, not the search bar. The gateway's list of available Wi-Fi Networks will come up (Fig 3).
3. Click on the desired Wi-Fi network from the "Scan List" and enter the password for that network (Fig 4). Click Connect.
4. During the connection process, the various LEDs will blink for 15 to 20 seconds. The connection is complete when the green "Power" LED is blinking slowly (on for a second, off for a second) and is the only LED on. You can now close your web browser window. (Note: If the amber "Wi-Fi" LED doesn't go out and continues to blink, the connection has failed. See "Resetting the Gateway" on pg 3.)

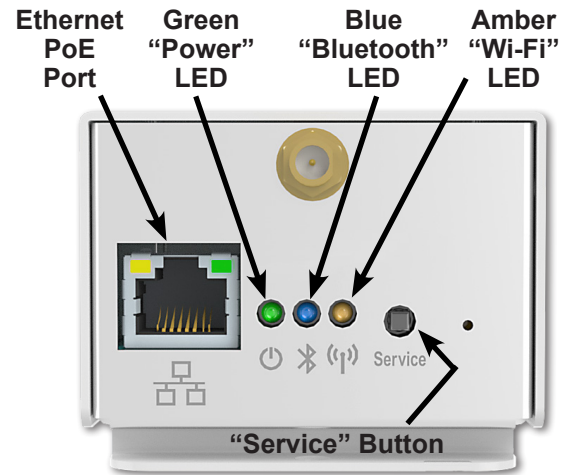


Fig. 1: Gateway PoE Port and LEDs

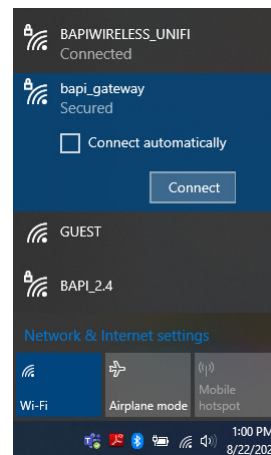


Fig. 2: Gateway on Wi-Fi Network

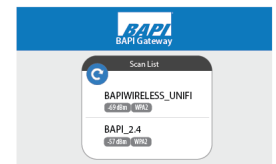


Fig. 3: Available Wi-Fi Networks

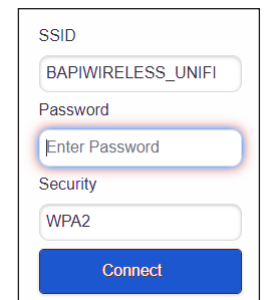


Fig. 4: Wi-Fi Network Password

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Note: the gateway communicates with 2.4 GHz Wi-Fi and will not work on 5.0 GHz networks. Users will need to change their wifi settings to accommodate this for the gateway to connect to the Internet.

Powering Up and Connecting the Gateway continued...

- Pair one of your sensors with the gateway as described in the next section “Pairing Sensors with the Gateway” and then return to Step 6. **At least one sensor MUST be paired with the gateway before going to the next step.**
- Reconnect your phone, tablet or computer to your original Wi-Fi or ethernet network and open the BAPI WAM website (<https://wam.bapisensors.com>) to register and set up your WAM account. Enter the Username and Password for your WAM subscription. (A WAM subscription is required to view your sensor data. If you do not have a subscription, contact your BAPI representative to subscribe and receive your login credentials.)
- Click the “Enter Serial Number” link, or click on the green “+” icon across from the word “Gateway” in the left menu bar (Fig 6), to open the “Enter Gateway Serial Number” window (Fig 7).
- Enter the gateway serial number from the label on the side of the unit and click “Add Gateway”. The gateway will not appear in the gateway menu on the left side of the WAM screen and the sensors will appear in the main window.

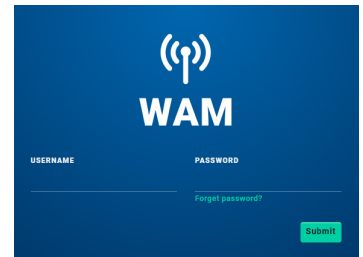


Fig. 5: WAM Website Login

Note: If the gateway loses power or connection, it will attempt to rejoin the network on its own. If the automatic reconnection fails, follow the steps above to reconnect.

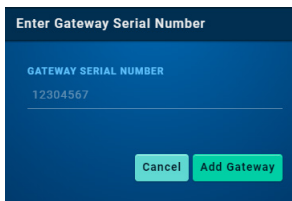


Fig. 7: Enter Gateway Serial Number Window

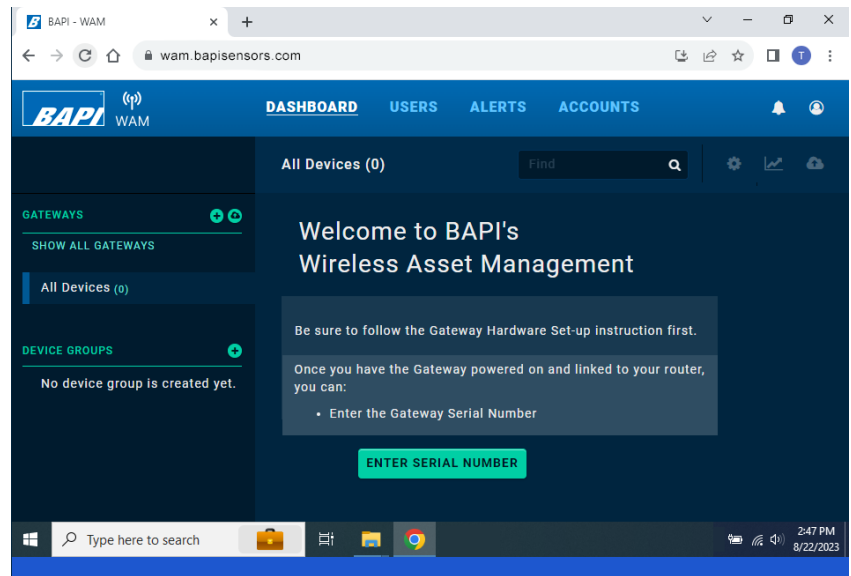


Fig. 6: WAM Website Initial Screen

Pairing Sensors with the Gateway

- Select the sensor that you wish to pair to the gateway. Apply power to the sensor. See its manual for detailed instructions.
- Press and hold the “Service” button on the gateway until the blue “Bluetooth” LED begins to flash (about 3 seconds). Then release the “Service” button to enter pairing mode. NOTE: When in pairing mode, the blue “Bluetooth” LED will continue to flash providing the user a 20 second window to pair the sensor with the gateway.
- Press and release the “Service” button on the sensor to pair it with the gateway. When the sensor is successfully paired, the sensor will flash its green “Service” LED 3 times and the blue “Bluetooth” LED on the gateway will go out. The blue “Bluetooth” LED will then flash each time a sensor communicates with the gateway. The sensor will now appear as one of the devices for that gateway on the WAM website.

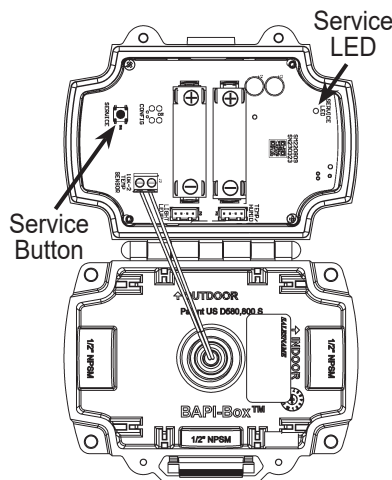


Fig. 8: BAPI-Box Sensor Service Button and LED

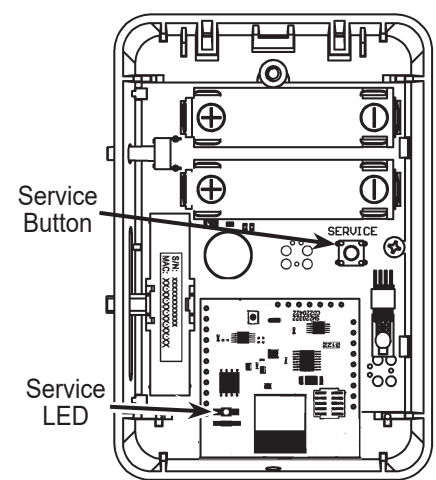


Fig. 9: BAPI-Stat “Quantum” Sensor Service Button and LED

The figures above are shown for reference. Refer to the instructions document for your specific sensor for the location of the “Service” button and “Service” LED.

Mounting

The gateway includes a removable keyhole type base plate that allows you to mount the gateway in a vertical or horizontal position. Remove the base plate from the gateway and use it to mark the mounting hole locations on your mounting surface. If mounting in a vertical position, ensure that the arrows in the base plate and gateway are pointing up. Mount the base plate to the surface. Then slide the gateway on to the base plate.

NOTE ON ANTENNA: The unit must use the supplied antennas. Do not replace the antennas with other antennas. Using antennas other than the ones provided by BAPI may violate FCC regulations.

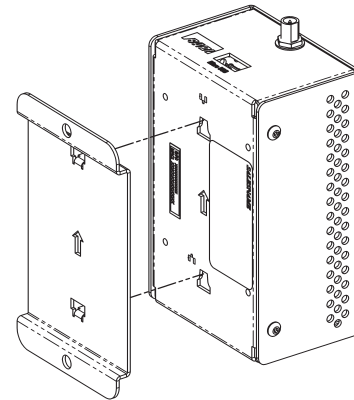


Fig. 10:
Gateway mounting

LED Operation

GREEN “POWER” LED

- **Slow Blink** (one second on, one second off)
Normal Operation. Gateway is connected to the Wi-Fi network.
- **Fast Blink** (on and off twice per second)
Gateway is in SoftAP mode waiting for you to complete the connection process.
- **Constant On**
Gateway is locked up, requiring a physical reset by unplugging and then plugging back in the Micro USB power supply or PoE source.

BLUE “BLUETOOTH” LED

- **Periodic Blink**
Data transmission received from a paired sensor.
- **Fast Blink** (on and off three times a second)
Gateway is in pairing mode and waiting to be paired with a sensor.

AMBER “WI-FI” LED

- **Slow Blink** (one second on, one second off)
Gateway is not connected to the Wi-Fi network.
- **Fast Blink** (on and off twice per second)
Gateway is attempting to connect to the Wi-Fi network.
(Green “Power” LED will be on solid during this time.)

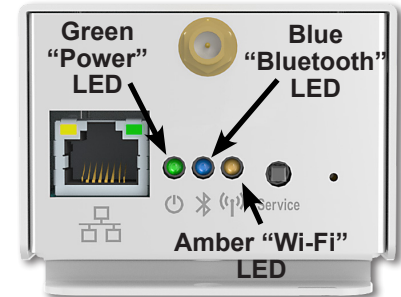


Fig. 11: Gateway LEDs

Note: The gateway shuts off the Bluetooth Low Energy radio when a Wi-Fi connection is lost, forcing the sensors into memory mode until the connection is re-established. (See “Sensor Memory Mode” below for more information.)

Resetting the Gateway to SoftAP Mode

Follow this procedure to reset the gateway to SoftAP mode. This will erase the Wi-Fi credentials and any previous sensor pairings. Press and hold the “Service” button on the gateway for at least 30 seconds. During the first 20 seconds, the green and blue LEDs will blink rapidly and then the green LED will blink rapidly by itself for about 5 seconds, and then all three LEDs will blink rapidly for about a second. When the green LED is blinking rapidly by itself (on and off about twice a second), the reset is complete and you can release the “Service” button. The gateway is now in SoftAP mode and ready for connecting to the WiFi network as described in the “Powering Up and Connecting the Gateway” instructions on pg 1.

Note: If the green LED is blinking slowly (on for a second and off for a second), rather than rapidly, then the reset did not complete. Repeat the reset procedure making sure to keep the “Service” button pressed throughout the entire process described above.



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Resetting a Sensor

Sensors remain paired to the gateway 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 blink slowly for about 10 seconds and then blink rapidly for about 15 seconds. When the rapid blinking stops and the LED goes out completely, the reset is complete and you can release the “Service” button. The sensor can now be paired to a new gateway. To re-pair to the same gateway, you must reset the gateway as described in the section above.

Sensor Memory Mode

The gateway sends a confirmation signal to each sensor upon a successful reception. If communication is lost between the sensor and the gateway, the sensor will enter “Memory Mode” and begin storing its data in its onboard memory. Each sensor retains up to 16,000 readings. Once communication with the gateway is re-established, the sensor will begin sending its stored data to the gateway. The sensor will send 9 past values and 1 current value at each transmit interval until all the stored data is transmitted. Temporarily shortening the transmit interval will allow the sensor to more quickly clear any stored readings.

WAM and the WAM Website

A BAPI Wireless Asset Monitoring (WAM) subscription is necessary to view sensor data and adjust sensor settings. WAM is a cloud application that lets you monitor all of your sensor data and trends via an internet browser on your computer or smart device. WAM also lets you adjust settings for the sensors and receive alerts if the readings go above or below the user-defined thresholds.



Go to <https://wam.bapisensors.com> to register and set up your WAM account.

QR Code to WAM Login Page
<https://wam.bapisensors.com>



Fig. 12: BAPI WAM Website “Dashboard” screen showing multiple sensors and a sensor trend.



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FOTA (Firmware Over The Air) Updating

Any firmware updates for the gateway or sensors are downloaded through the WAM Website and installed directly to the gateway or sensors. See the WAM instruction documents for more information on how FOTA works.

Diagnostics

The LED Operation section describes the various statuses and issues that the gateway may be experiencing. Follow the instructions in the appropriate section to fix the issue. The WAM Website contains additional tools to troubleshoot issues. See the WAM instruction documents for more information.

Specifications

Supply Power:

5 VDC @ 120mA via included 39" (1m) USB cable or Power Over Ethernet (POE) via Ethernet Port. Ethernet port is for power only, TCP/IP is not enabled. Note: USB Power/Adaptor Block not included.

Capacity/Unit: Up to 32 sensors

Antenna: Thread-on Whip Antenna, 2.4 GHz**

Reception Distance: Varies by application* for both the Wi-Fi and Bluetooth signals.

Security: TLS 1.2 authentication and encryption of Wi-Fi data. 128 AES for Bluetooth data. Configuration settings and device readings are user/password protected.

Environmental Operation Range:

Temp: -4 to 158°F (-20 to 70°C)


Humidity: 10 to 90%RH, non-condensing

Frequency: 2.4 GHz**

Receiver Sensitivity: -97 dBm

Mounting: Wall or surface mount

Enclosure Material: Powder coated steel

Agency: RoHS / FCC: T4FSM211221  / IC: 9067A-SM211221

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesirable operation.

Any changes or modifications not expressly approved by BAPI could void the user's authority to operate the equipment.

This device complies with Industry Canada (IC) license-exempt RSS standard(s). Operation is subject to the following two conditions.

This device may not cause interference.

This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes.

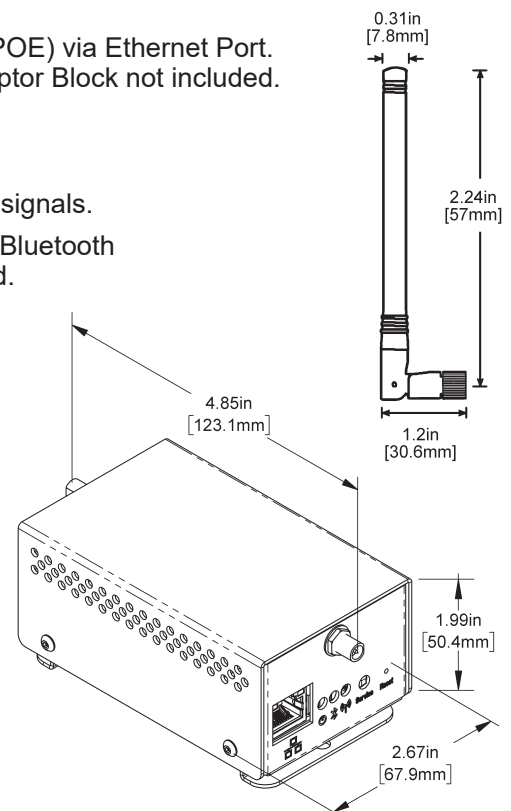
L'appareil ne doit pas produire de brouillage.

L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillard est susceptible d'en compromettre le fonctionnement.

*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.

**The gateway communicates with 2.4 GHz Wi-Fi and will not work on 5.0 GHz networks. Users will need to change their wifi settings to accommodate this for the gateway to connect to the Internet.

Specifications subject to change without notice.





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FCC Compliance Notes

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this product not authorized by BAPI could void the product compliance and negate your authority to operate the product.

To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons. This device should be operated with a minimum separation distance of 20cm between the equipment and a person's body.

Cet appareil doit être utilisé avec une distance de séparation minimale de 20 cm entre l'équipement et le corps d'une personne.