



**AirSENCE Version 4.5**

# **INSTALLATION MANUAL**

**March 2024, Edition 1**



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## 1. Unpacking and Inspection

Upon receipt, inspect all packages for any signs of damage such as dents or holes. It is a good idea to photograph any packages suspected of containing damaged products before opening.

After removing AirSENCE from its packaging, inspect the exterior of the product for any signs of damage that may have occurred during shipment. Holes, dents, and/or cracks in the enclosure will negatively affect the performance of AirSENCE, and AUG or your distributor should be notified prior to use.

Open the AirSENCE enclosure by using a flat blade or Philips-head screwdriver to loosen the screws at the four corners of the front cover. Carefully inspect the interior for obvious signs of damage, e.g. disconnected wires or loose components. Keep in mind that the three U.F.L./mini-RF antenna cables are disconnected during shipment. These are to be connected to the cellular module if/when it is installed (see Section 3).

## 2. Power Connection

### 2.1 Standard AC Connection

AirSENCE requires a 9–36 V DC power supply at 15 W minimum, therefore **an AC adapter is required** when connecting to standard AC power outlets. **The AC adapter must** (a) be rated for outdoor usage, (b) have a DC cable of 5.5–12 mm diameter, and (c) be supplied with positive (red) and negative (black) wire leads on the DC circuit side. No more than 1 cm of bare wire should be exposed on each lead, and it is strongly recommended that leads be covered by crimped ferrules.

1. Open the AirSENCE enclosure and locate the power terminal block at the lower left side of the mainboard (see Figure 2.1)
2. Insert the wire leads of the DC cable through the cable gland labeled “Power” on the bottom of the enclosure (see Figure 2.2)
3. With a precision flat blade screwdriver, loosen the set screws in the 1 and 3 positions on the terminal block and insert the wire leads, positive in slot 1 and negative in slot 3. The terminal block can be easily removed from the mainboard to simplify this connection.
4. Tighten the set screws over the leads such that a gentle tug on the wires does not cause them to come loose. If the terminal block was removed, place it back on the mainboard.
5. Tighten the nut of the cable gland such that there is adequate slack on the power cable within the enclosure.

 *If using the AC adapter supplied by AUG, the user is responsible for providing a power cable for the AC circuit that meets local wall outlet specifications.*

This power cable must terminate with three wire leads, which are used to connect to the AC adapter via an IP68 rated power junction connector. This connector comes supplied with the AC adapter along with wiring instructions.

### 2.2 Direct DC Connection

Some users will opt to use external power sources, such as batteries or solar cells, to power AirSENCE in locations removed from the power grid. In these cases an AC adapter is not required, however the requirements for the DC cable and the steps to connect to the AirSENCE mainboard shown in Section 2.1 still apply.

### 2.3 Power Over Ethernet

Users wishing to use power over Ethernet (PoE) will have made arrangements with AUG during the ordering process to have the AirSENCE unit outfitted with a PoE splitter and an RJ-45 receptacle. The **outdoor-rated** Ethernet cable provided by the user is plugged into the RJ-45 receptacle labelled “Ethernet” on the underside of the AirSENCE enclosure (see Figure 2.2). This receptacle is covered by a protective cap during shipment which must be removed by rotating counter-clockwise.

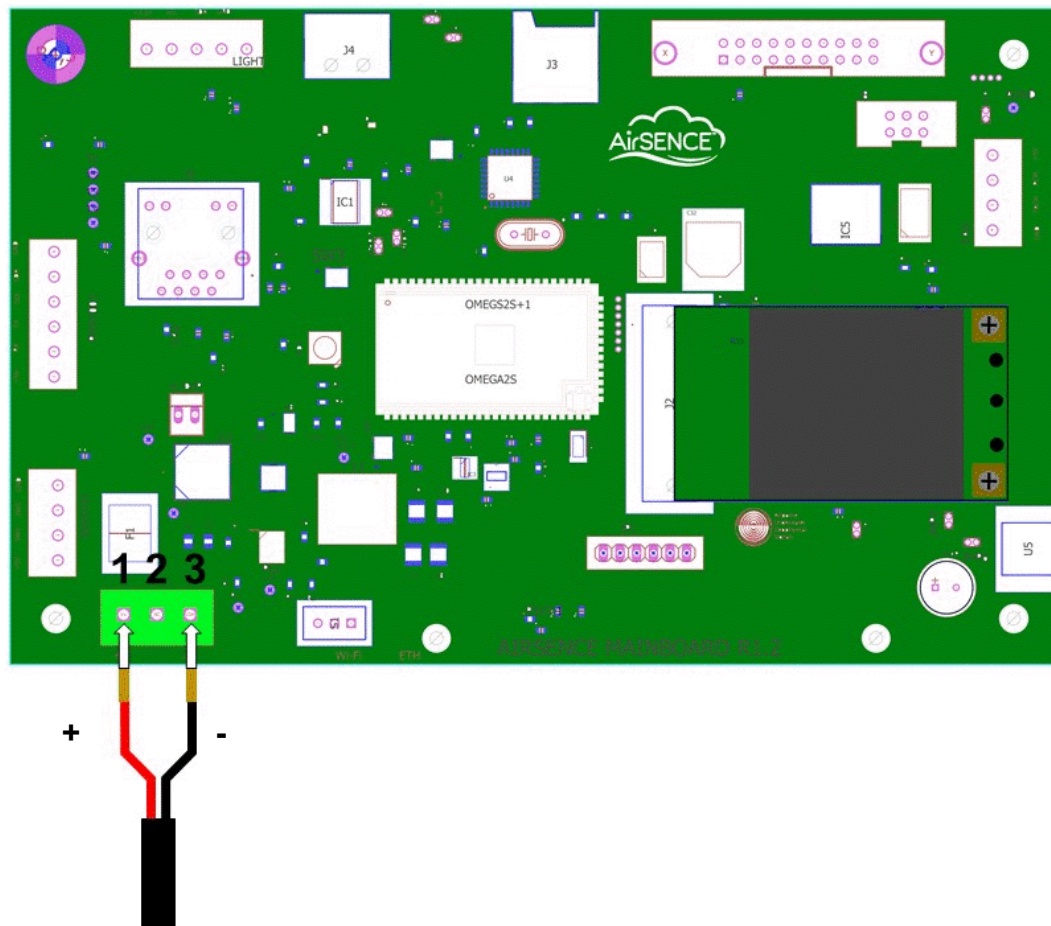


Figure 2.1. Mainboard diagram with power terminal block indicated.

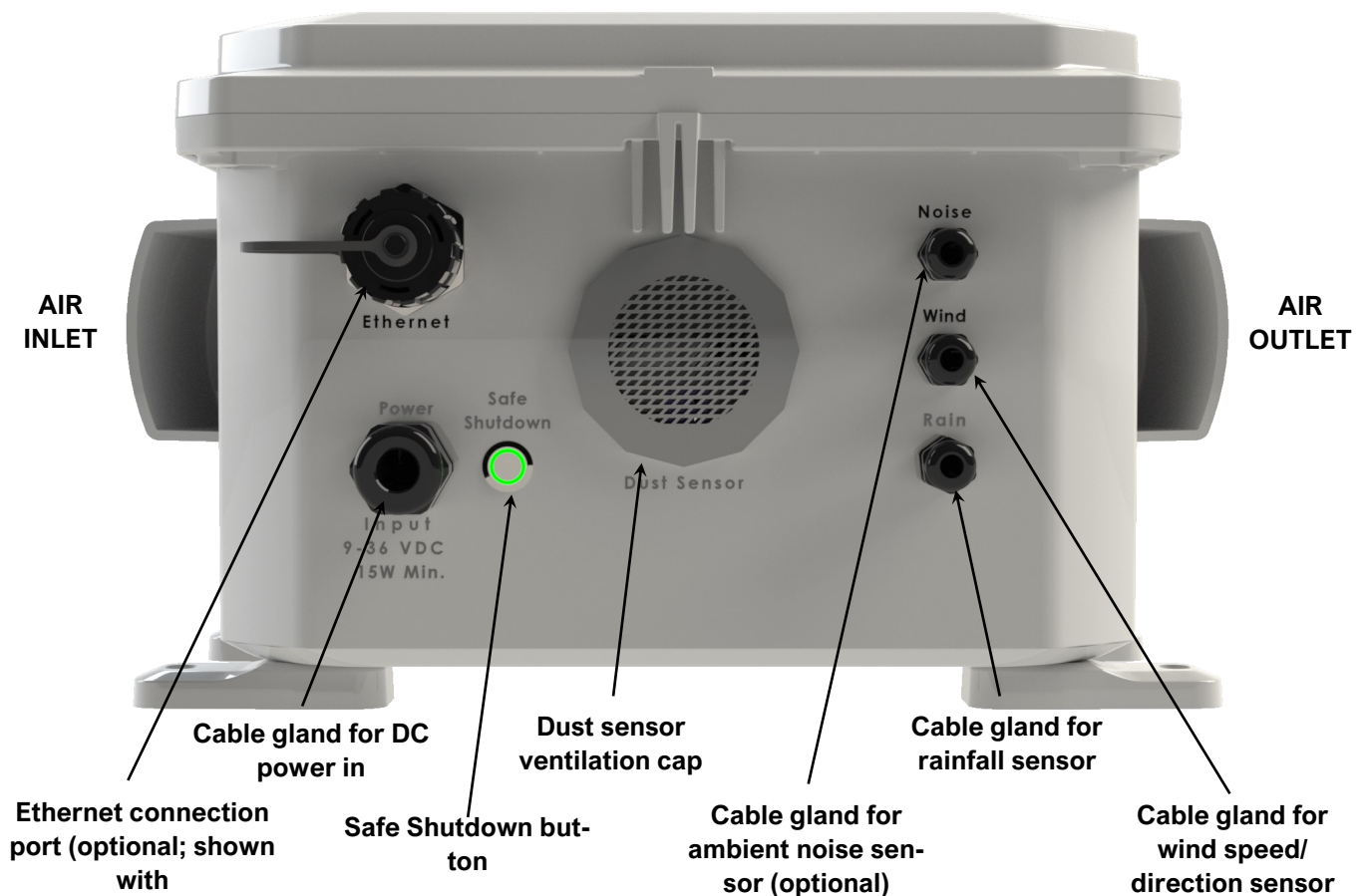


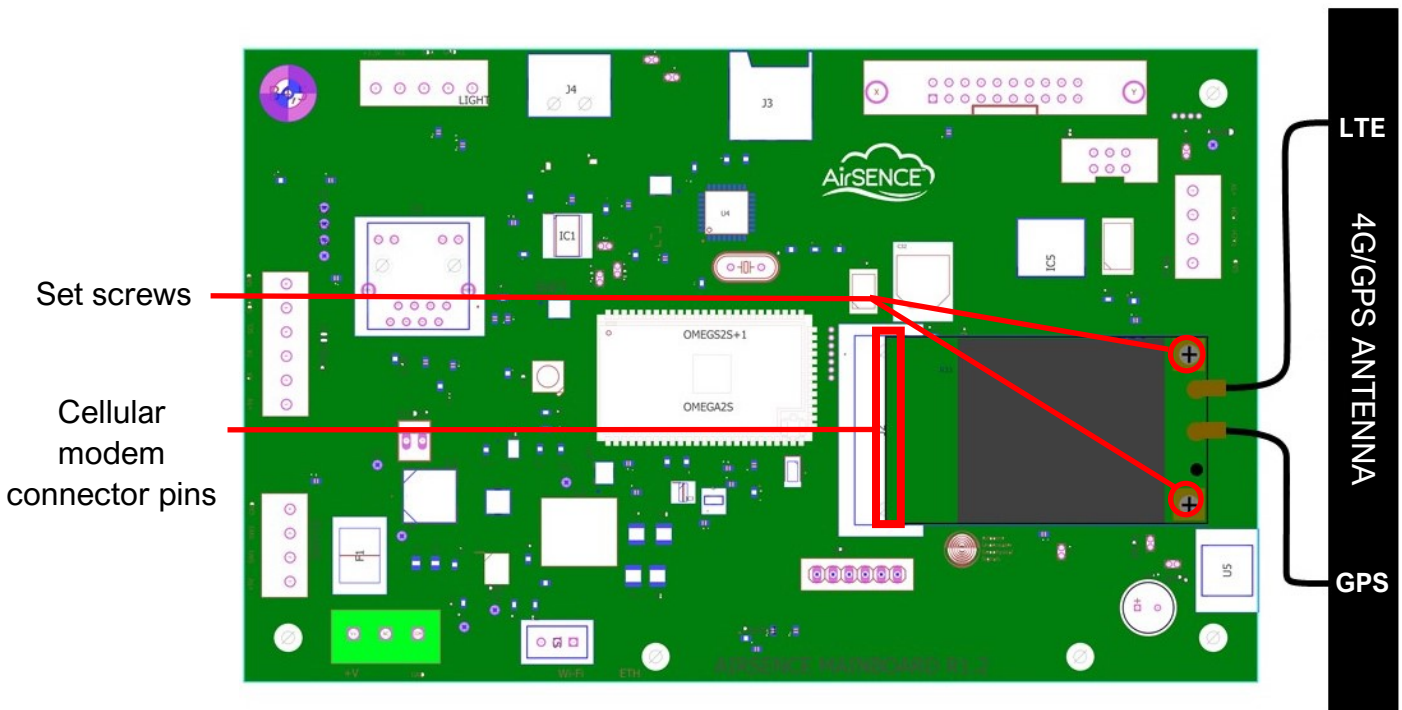
Figure 2.2. Underside of AirSENCE enclosure with electrical and sensor ports labelled.

### 3. Cellular Modem Installation

**!** *This operation must be performed with the device powered OFF.*

Users wishing to connect to AirSENCE using cellular service must provide their own SIM card which is compatible with either 4G LTE or 3G EDGE/GSM/GPRS. The SIM must be supplied in the mini-SIM (standard SIM, 2FF) format; micro- and nano- format SIMs cannot be used without an adapter.

1. Open the enclosure lid and remove the cellular modem from its inner surface. Ensure that the antenna connectors (indicated at the right of Figure 3.1) are securely fastened in place by gently pulling on them—if loose, press down firmly until a snap is heard indicating proper seating. There may be 2 or 3 antenna connectors depending on the antenna model; this has no impact on the modem's performance.
2. Insert the SIM card into the slot on the cellular modem packaged with AirSENCE. The SIM card should align with the white outline on the cellular modem, with the contacts facing downward.
3. Using a precision Philips-head screwdriver, remove the two set screws from the AirSENCE mainboard in the location indicated in Figure 3.1. Connect to modem to the mainboard by inserting the pins into the receptacle as shown (the SIM card will be facing down) and replace the two set screws to secure it in place.
4. If desired, users may peel the backing from the 4G/GPS antenna and adhere it to the inner wall of the enclosure for convenience or aesthetic reasons; this is not a necessary step and should not impact the performance of the antenna.



**Figure 3.1. Cellular module connection points on mainboard.**

## 4. Mounting

### 4.1 Key Considerations

- AirSENCE is designed for outdoor use in a variety of environments. Nonetheless, for optimal performance, care should be taken to install the device in a location with adequate airflow so as to ensure that air quality measurements are representative of the intended sampling location. If the intended use of AirSENCE is for ambient air quality monitoring, installations nearby to building exhaust vents or other interfering pollutant sources may result in false positive results.
- The recommended method of mounting AirSENCE is on a pole (see Section 4.2), as this ensures that air is properly sampled regardless of wind direction. If wall mounting is required (see Section 3.3), users should carefully consider local environmental conditions such as prevailing wind direction before deciding on the installation location.
- Due to the unique requirements of each installation location, some customers may prefer to generate their own mounting solution unique to their intended application. Figures 4.1 and 4.2 provide the dimensions of the AirSENCE enclosure which should be taken into account during design.
- Rooftop or terrace mounting is generally not recommended. If absolutely necessary, users may mount AirSENCE on a custom-built rack with the following considerations:
  - In cold climates, care must be taken to ensure snow does not accumulate to within 20 cm of the unit's underside to ensure adequate airflow to the sensors.
  - In hot climates, it is highly recommended that roof-mounted devices be sheltered from direct sunlight. Temperatures near a roof surface can be considerably higher than the ambient air, which may lead to false temperature readings and poor sensor performance.
- Due to the power cable which protrudes from the underside of AirSENCE (not shown in Figures 4.1 and 4.2), a minimum of 20 cm clearance must be provided underneath the enclosure for all mounting solutions. This also ensures adequate space for airflow to the particulates sensor inlet.
- Mounting equipment should be composed entirely of corrosion- and UV-resistant materials, and be firmly anchored in place to prevent vibrations, shifting, and damage due to falls. If AirSENCE cannot be mounted in a secure location, it should be placed out of reach, yet low enough to sample the same air that would be breathed by passersby. A typical installation height for ambient air monitoring would be no less than 3 meters from the ground surface.
- Regardless of how it is mounted, AirSENCE must always be positioned right-side-up, i.e. with the power cable and switch on the underside. The air inlet and outlet vents are louvered to prevent the ingress of water in this position; laying the unit on its back, front, or side will negate this feature and possibly result in sensor damage due to water infiltration. AUG is not responsible for damage incurred to the unit due to improper device mounting.
- It is recommended that the steps shown in Sections 2 and 3 be carried out before mounting to minimize time spent at height during installation.

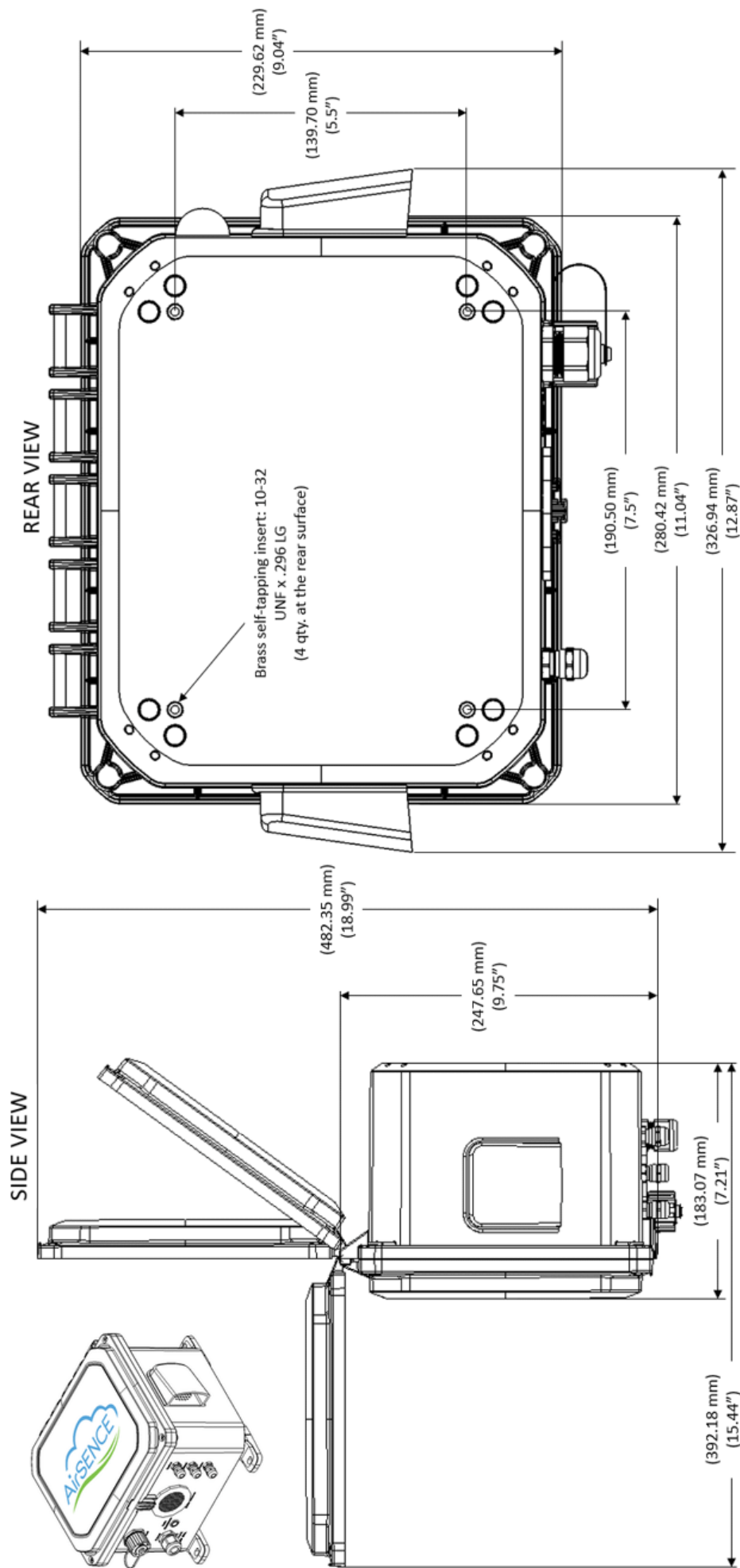


Figure 4.1. Important dimensions for AirSENCE installation, side view (left), rear view (right).

## 4.2 Pole Mounting

Each AirSENCE unit comes packaged with a pole mounting kit. This kit should be used on a pole of no more than 30 cm (12 inches) diameter, assuming a circular cross section (see Figure 4.2).

1. Attach the four polycarbonate mounting feet to the back of the enclosure using the four  $\frac{3}{4}$ " pan head Philips machine screws.
2. Align the round holes of the aluminum mounting brackets with the holes of the mounting feet. Thread a washer onto each of the 1" pan head Philips screws provided, then insert the screws through the holes of the mounting brackets and mounting feet. Thread another washer onto the screw from the other side, and secure with a  $\frac{1}{4}$ " hex nut. Use a wrench or  $\frac{1}{4}$ " hex socket to hold the nut while tightening with a Philips head screwdriver.
3. Thread the steel clamping bands through the oblong slots on the mounting brackets. With the AirSENCE unit held securely in position on the pole, insert the loose end of each band through the other end between the band and the captive screw. Push the screw down into the locked position. Using a slotted screwdriver or  $\frac{5}{16}$ " (8 mm) hex socket, rotate each screw until the banding is tight.
4. Ensure the AirSENCE unit is securely fastened by gently shaking; if it feels loose, tighten both bands until the device can no longer be moved by reasonable force.

## 4.3 Wall Mounting Kit

Each AirSENCE unit comes packaged with a wall mounting kit (see Figure 4.3).



*Users are responsible for providing fasteners appropriate to their wall material.*

1. Attach the four polycarbonate mounting feet to the back of the enclosure using the four  $\frac{3}{4}$ " pan head Philips machine screws.
2. Position the unit against the wall at the desired mounting location. Mark the positions of the mounting holes on the flanges using a pencil or marker. Using a hammer drill with carbide bit, drill pilot holes at the marked locations. The appropriate size of drill bit will be specified by the manufacturer of the fastener being used. NOTE: this step may be skipped if mounting on wood or another material softer than concrete or stone.
3. Secure the entire unit to the wall using masonry screws, expanding wall anchors, or another suitable fastener (not provided by AUG). The best-suited fastener will depend on the material of the wall surface. Consult a licensed professional if unsure of the best fastener type.
4. Ensure the AirSENCE unit is securely fastened by gently shaking; if it feels loose, tighten all four mounting screws until it can no longer be moved by reasonable force.

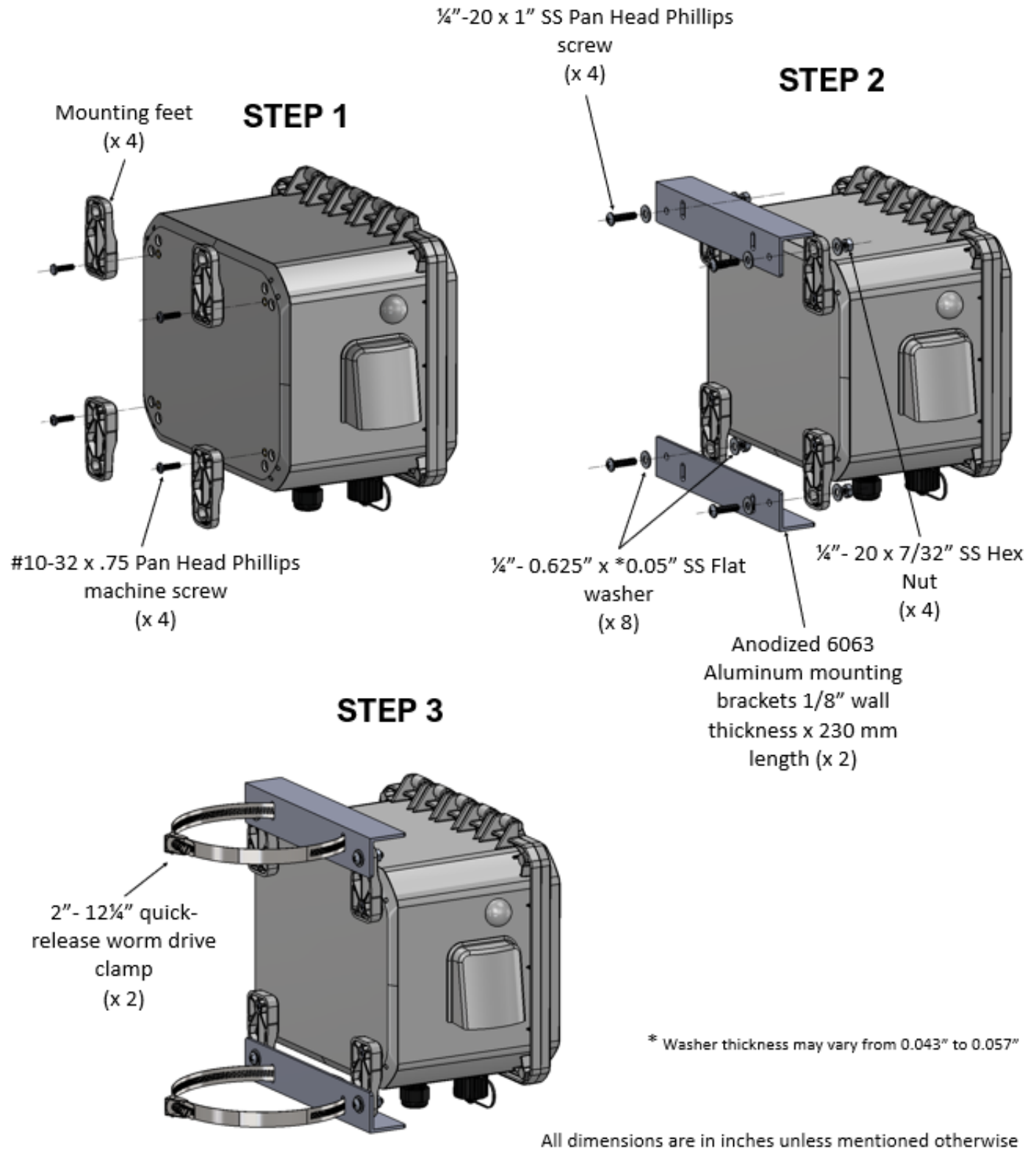
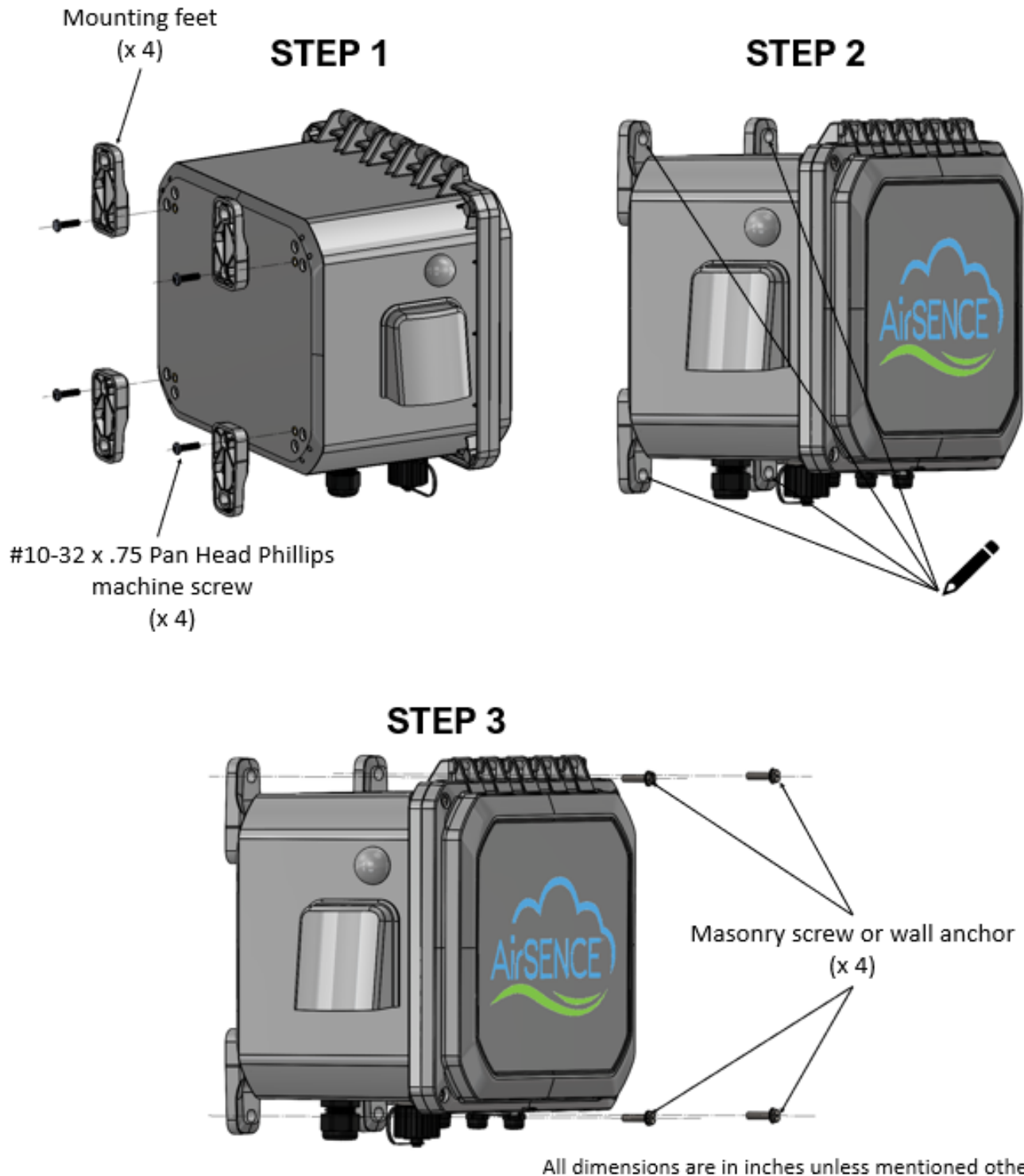


Figure 4.2. Step-by-step instructions for mounting with optional pole mounting kit.



**Figure 4.3. Step-by-step instructions for mounting with optional wall mounting kit on stone or concrete wall.**



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