COPPERSTONE
TECHNOLOGIES

G900 User Manual

Doc: 1011-PDS-0001

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Disclaimer

Revision History

Rev	Date	By	Review	Approve	Description
A	2018-10-16	JDY			Initial release

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Description

The G900 Sensor is a ruggedized asset monitoring device for use in industrial environments. It includes GPS location, temperature, orientation and vibration sensors to monitor the state of an asset. Data is broadcast to LoRa gateways in the area which can forward the data over the internet to a server for processing and display. Data transmission can be triggered via a magnetic switch or motion detection. Data is also transmitted once every 24 hours if no other triggers have occurred in that time period. A status LED indicates the current state of the device and provides feedback for specific operations as detailed in Operation. Figure 2 shows the sensor and user interaction areas.

Specifications

Dimensions	4.35" x 3.05" x 2.15" 110 mm x 78 mm x 55 mm
Weight	12.7 oz 360 g
Operating and Storage Temperature	-40 ℉ - 140 ℉ -30 ℃ - 60 ℃
Ingress Protection	IP67
Battery	ER34615/S (Approved Suppliers Only)
Regulatory Compliance	FCC 15.247 FCC 15.209 FCC 15.109 RSS-247 RSS-Gen

Installation

Safety Precautions

WARNING: Fire, explosion, and severe burn hazard. The G900 contains a Lithium metal battery. Do not recharge, crush, disassemble, heat above 100C (212F), incinerate, or expose contents to water. Replace only with approved ER34615 batteries. Contact Copperstone Technologies for more information.

WARNING: Magnets can pose a serious choking hazard. Keep magnets away from all children. If multiple magnets are swallowed, contact a doctor immediately.

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Unpacking

Inspect the packaging and report any significant damages to Copperstone Technologies and the carrier. Do not use any devices showing signs of physical damage.

Mounting

There are four UNC 6-32 threaded inserts on the base of the enclosure for mounting the device. When selecting a mounting location and bracket, the G900 must:

- Be well protected from impacts
- Mounted with the top label facing up with a clear view of the sky for good GPS reception
- Use appropriate fasteners for the mounting application
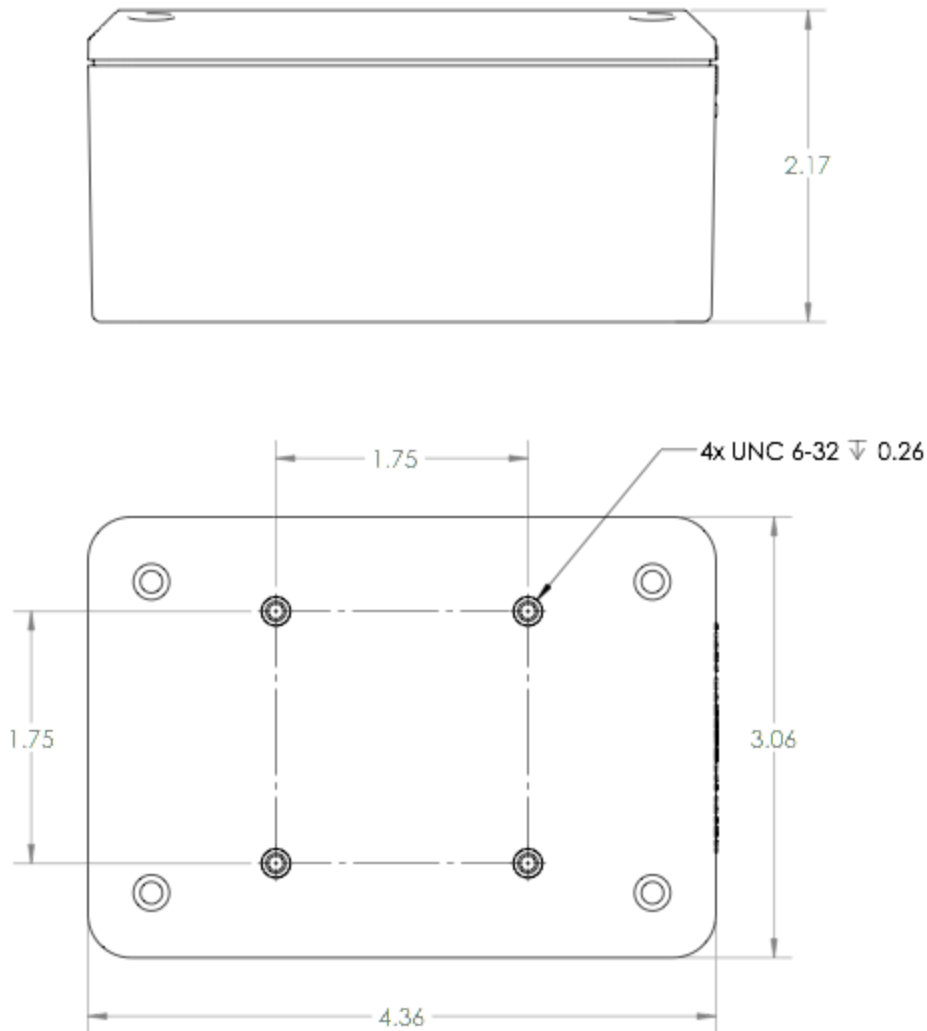
Figure 1: Device size and mounting hole details

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Operation

See below images for location of serial number, status indicator, and magnetic switch. Video demonstration links are provided for each operation.

Figure 2: Serial number, status indicator, and switch location. Place magnet at marked location to activate switch.

The following states are indicated by the status LED (https://youtu.be/rE3U0P0CyeI)

Status Indicator	Sensor State	
Solid ON	Boot	
Blink once every 2 seconds	Wait for GPS Data	
Fast Blinking (4 times per second)	Transmitting	
Two short blinks	Entering sleep	

Ship Mode

(https://youtu.be/-TA6ZwzGg0k)
All sensors are delivered in a low power ship mode, and must be activated with the magnetic switch prior to use. To activate a sensor:

1. Hold a magnet against the magnetic switch to turn ON. Status will start blinking quickly.
2. When blinking slows, pull magnet away to turn switch OFF.
3. When fast blinking starts again, hold magnet against the switch to turn ON.
4. When blinking slows, pull magnet away to turn switch OFF.
5. Sensor will boot up with Status ON solid

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Battery Replacement

(https://youtu.be/GSHIDmlx6jc)

Replacing the battery requires a magnet, replacement desiccant, Phillips #1 (PH1) screwdriver and Phillips #2 (PH2) screwdriver. Use only Copperstone approved replacement batteries.
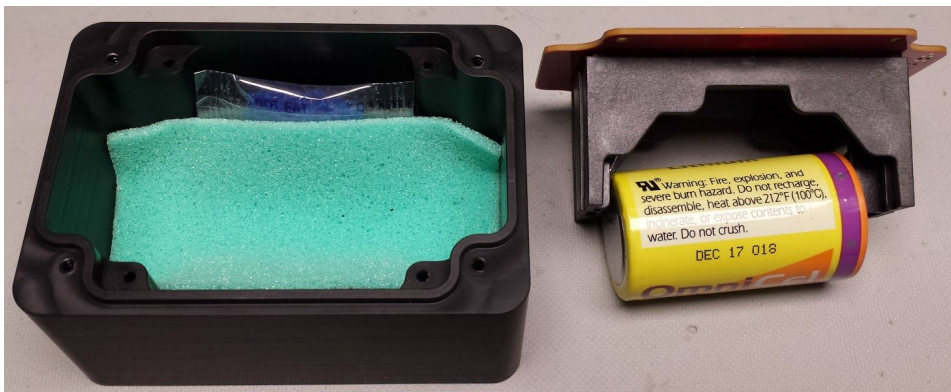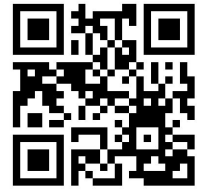
1. Remove 4x lid screws with PH2 screwdriver. Remove lid.

2. Remove 4x board screws with PH1 screwdriver. Remove board.

3. Remove battery from holder.

4. When installing a new battery, the sensor must given the *new battery command*. See video for a walkthrough of this procedure (https://youtu.be/GSHIDmlx6jc).
    a. Push new battery into holder, noting polarity markings.
    b. LEDs will start alternating green and red.
    c. Hold a magnet against the magnetic switch.
    d. When blinking slows, pull magnet away to turn switch OFF.
    e. When fast blinking starts again, hold magnet against switch to turn ON.
    f. When blinking slows, pull magnet away to turn switch OFF.
    g. Green LED will blink 5 times to indicate success, then sensor will boot.
        i. If 5 green blinks are not seen, remove and reinstall battery to try again.

5. Prepare to reassemble sensor:
    a. Clean o-ring groove and case walls with lint-free cloth to ensure clean seal.
    b. Check desiccant - if pink replace with fresh desiccant pack.
    c. Ensure foam and desiccant are placed as shown.
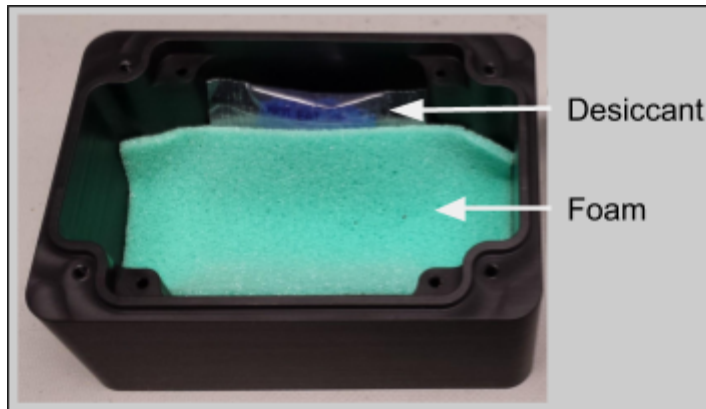
6. Place board back in case, secure with 4x PH1 screws.
7. Ensure lid seal area is clean, then reinstall with 4x PH2 screws. Note orientation for serial number visibility.

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Regulatory Declarations

Federal Communications Commission

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 undesired operation.

WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: To comply with FCC exposure limits for general population / uncontrolled exposure, this device should be installed at a distance of 20 cm from all persons and must not be co-located or operating in conjunction with any other transmitter.

Industry Canada

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

This radio transmitter (24222-G900D01) has been approved by Industry Canada to operate with the integrated antenna only. Modifications or external antennas are strictly prohibited for use with this device. This device complies with IC radiation exposure limits set forth for an uncontrolled environment.

WARNING: This device should be installed and operated with minimum distance 0.2 m between the radiator and your body.