Fusion Sensor Installation Guide

Ensuring Optimal Performance and Accuracy

This guide provides step-by-step instructions for the proper installation of the Fusion Sensor, ensuring optimal performance and accuracy. Follow the steps to correctly mount the sensor and configure the network settings. Following this installation guide will help ensure that the Fusion Sensor is set up correctly and functions optimally in its intended environment. Proper installation is crucial for accurate traffic monitoring and data collection.

For additional support, please contact Omnisight technical support or visit our website for more detailed documentation.

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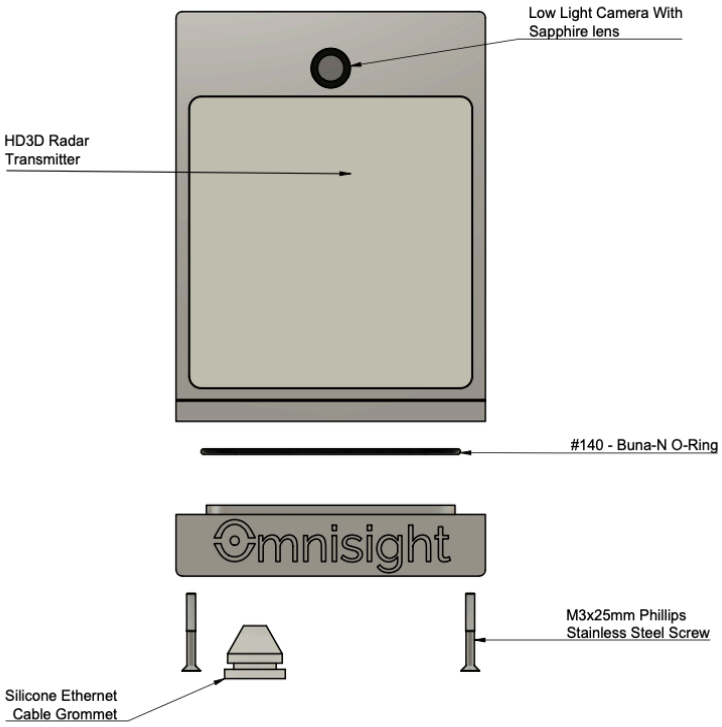
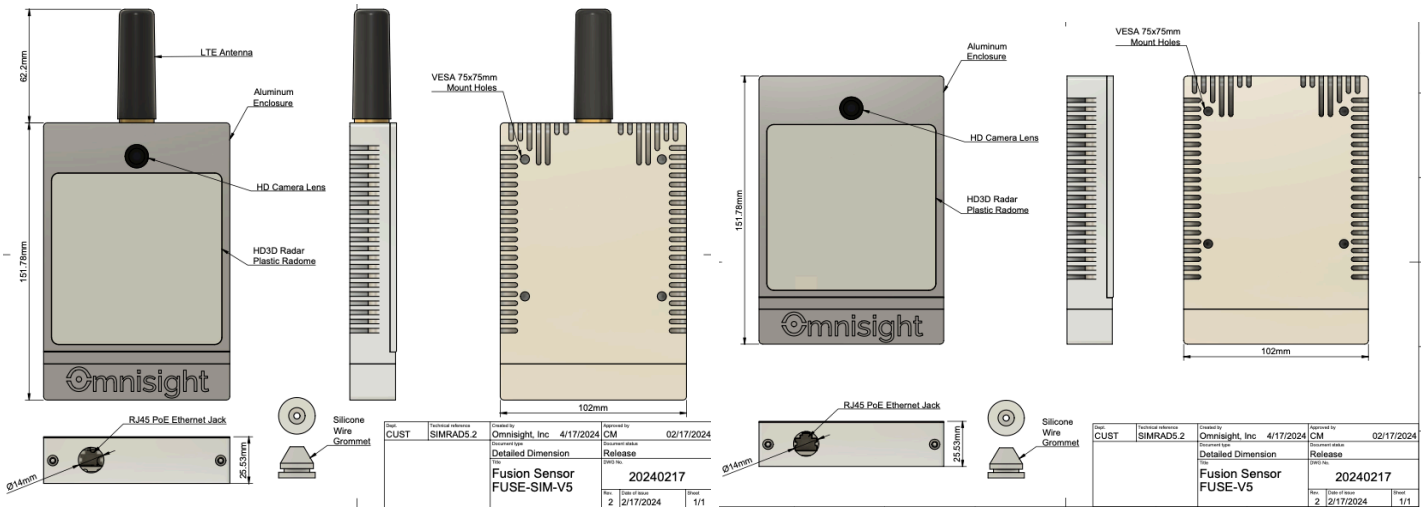
Contents :

Getting To Know Your Fusion Sensor

Here, we'll provide a detailed overview of the Fusion Sensor, including its key components and features.

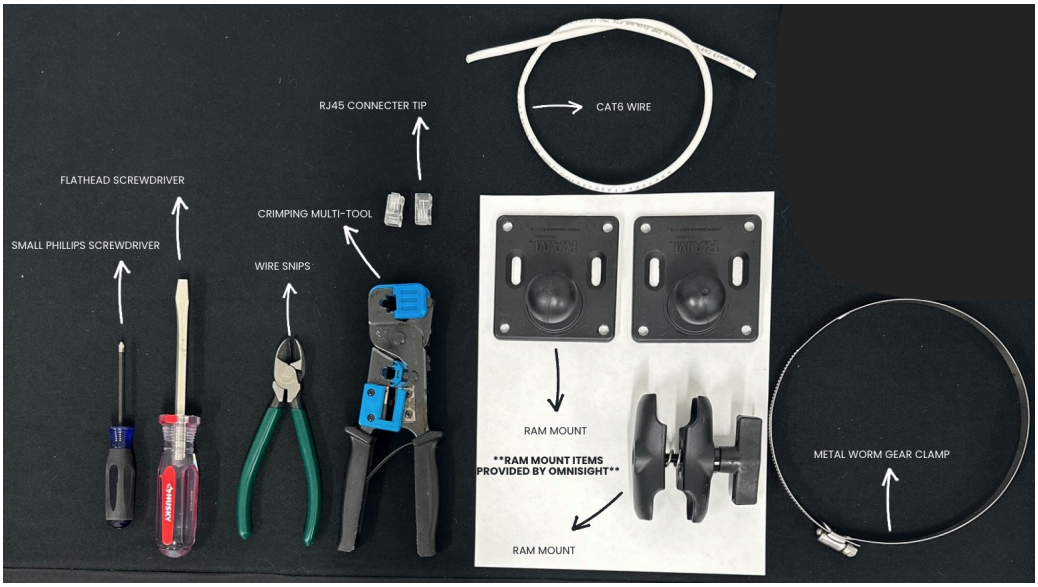




Prerequisites for Installation

Preparation:

1. Gather Tools and Equipment: Collect all necessary tools and equipment before beginning the installation. Tools and Equipment Needed:

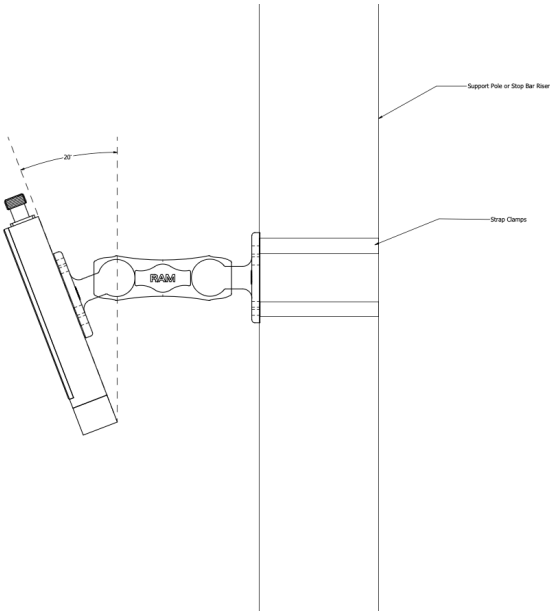


   - ☐ Small Phillips Screwdriver
   - ☐ Flathead Screwdriver
   - ☐ Wire Snips
   - ☐ Crimping Multi-Tool
   - ☐ RJ45 Connector Tip
   - ☐ CAT6 Wire needs to be run from the cabinet to desired sensor location.
   - ☐ Metal Worm Gear Clamp
   - ☐ Ram Mount (Provided by Omnisight - 3 parts included)
2. Verify Installation Site: Ensure that the installation site meets all the mounting requirements (height, angle, positioning, and proximity) Mounting Requirements:
   - Typical Height: 20-25 feet
   - Declination Angle: 18-20 degrees
   - Positioning:
   - Proximity:

Deployment Planning Checklist:

1. Height and Angle
    - Typical Height: 20-25 feet
    - Declination Angle: 18-20 degrees

    Plan to mount the Fusion Sensor at a height between 20 and 25 feet. Adjust the sensor's angle to a declination of 18-20 degrees for optimal performance.



2. Positioning
    - Horizontal Level: Ensure the sensor is horizontally level.
    - Avoid Metal Signage: Do not aim the sensor at large metal signage to avoid interference.
    - Incoming Traffic: Aim the sensor towards incoming traffic to capture accurate data.
    - Lane Coverage: Position the sensor to aim at the middle of the lane(s) being monitored for comprehensive lane coverage.
    - Opposite Side for Parking: If trucks will be parking in front of the radar mount, install the sensor on the opposite side of the road to maintain a clear line of sight.

- Straight Portion of Road: Mount the sensor so it looks at a relatively straight portion of the road to minimize distortion and ensure accurate readings.
- Close Proximity: Mount the sensor as close to the roadway as possible to enhance detection accuracy.

3. Connectivity
    - CAT6 Availability: Ensure that CAT6 cabling is available and can be connected to the radar for data transmission.

Network Requirement Checklist:

- ☐ Confirm that DNS (Domain Name System) services are accessible and properly configured to resolve network addresses.
- ☐ Verify that the network allows outbound traffic to facilitate communication and data transmission from the sensor to the server or cloud.
- ☐ Configure the network to use DHCP (Dynamic Host Configuration Protocol) for automatically assigning IP addresses and other network configurations to the sensor (preferred) or assign a static IP address to the sensor via the Omnisight Dashboard..
- ☐ Verify that a time server is reachable for accurate time synchronization, which is crucial for timestamping and data integrity.

Firewall Provisions:

api.omnisightusa.com:443 - Outbound TCP
ntp.ubuntu.com:123 - Outbound UDP

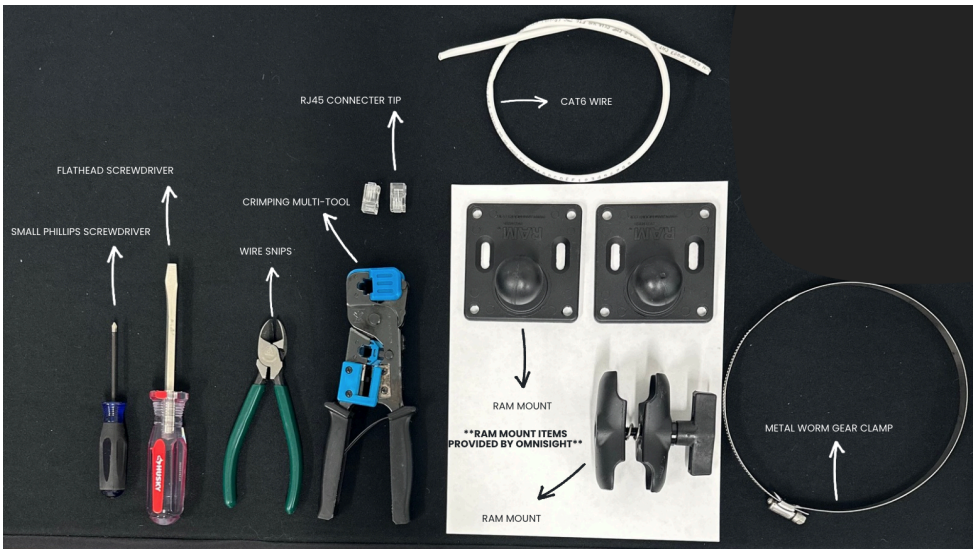
Required WebRTC settings:
stun.l.google.com:19302 - Outbound UDP
rtc.omnisightusa.com:3478 - Inbound / Outbound UDP
openwebtorrent.com:443 - Outbound TCP

Optional WebRTC settings:
Allow UDP inbound / Outbound on Ports 443, 3478, 5349 for rtc.omnisightusa.com
Allow UDP Inbound / Outbound on Ports 1024-65535 for peer media/data

Installation Steps:

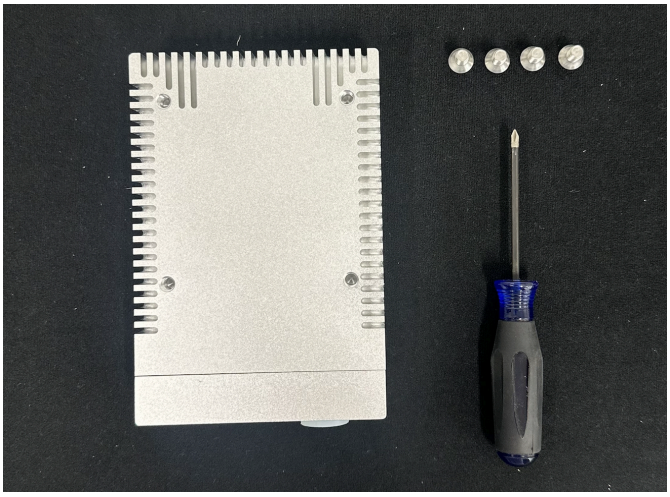
1. When your Fusion Sensor arrives
    - Open the box and verify that you have received a Fusion Sensor and a Ram Mount which consist of (3) individual pieces. (2) RAM ball mounts and a (1) double socket arm.

2. Preparation
    - Gather Tools and Equipment: Collect all necessary tools and equipment before beginning the installation.



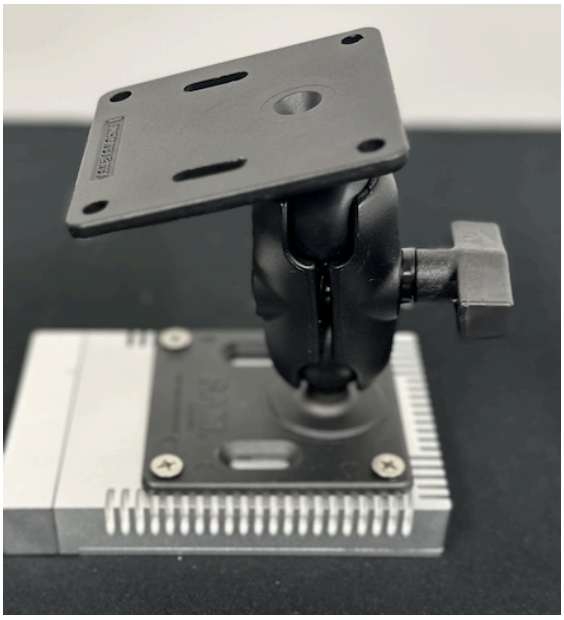
- Verify Installation Site: Ensure that the installation site meets all the mounting requirements listed below (height, angle, positioning, and proximity):
    - Typical Height: 20-25 feet
    - Declination Angle: 18-20 degrees
    - Positioning:
    - Proximity:

3. Mounting Bracket Assembly
    - Remove the Fusion Sensor from the packaging box and remove the 4 screws on the backside using a phillips head screwdriver.

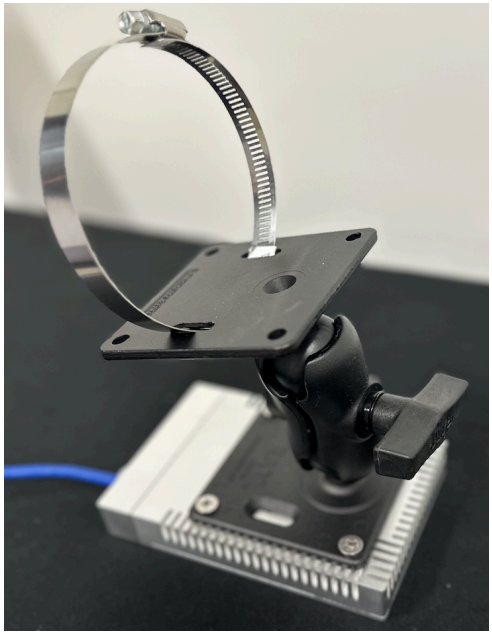


    - Position one of the ram ball mount brackets over the back side of the fusion sensor and use the phillips head screwdriver to attach the mount bracket to the rear of the Fusion Sensor.

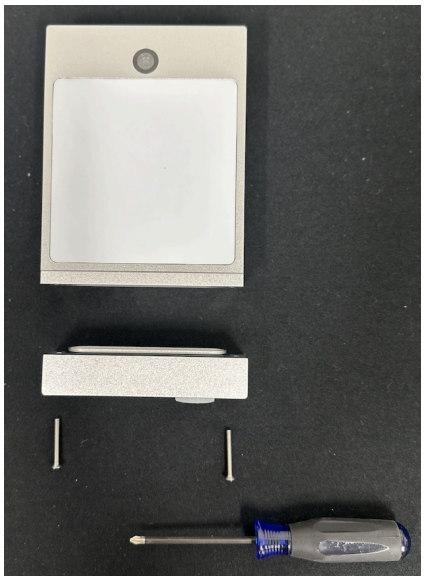
- Use the knob mechanism to loosen the double socket arm and insert each ball mount into the receiving end of the double socket arm and tighten to the appropriate position optimal for mounting the bracket.



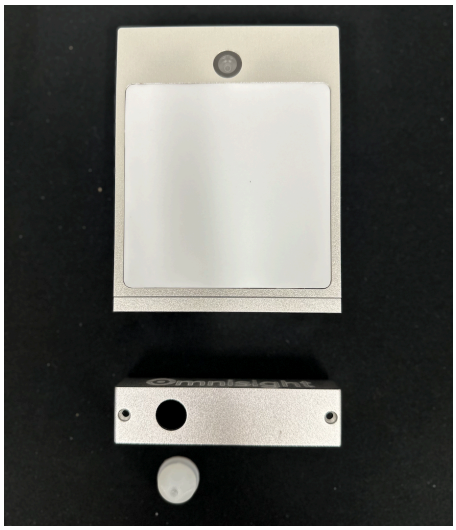
- Feed the metal worm gear clamp (not provided) through the openings contained on the Ram Mount Bracket so you are able to fix the bracket to a pole or stationary object.



4. Power and Communication Connectivity
    - Using a phillips head screwdriver remove the two smaller screws located on the bottom of the Fusion Sensor which will allow you to detach the lower casing from the upper unit.

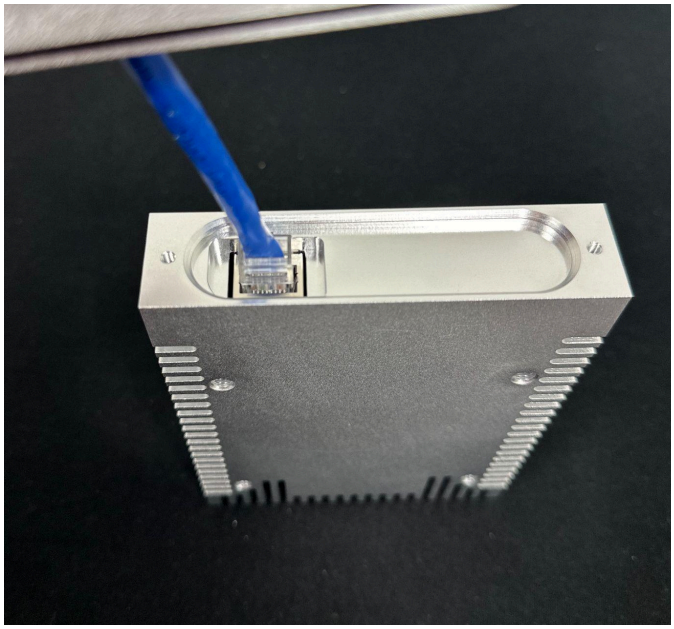


    - Remove the rubber grommet that is in place at the opening of the lower casing and feed the rubber onto the Cat6 wiring near the end you will terminate with an RJ45 jack. Note: - it is possible to push a trimmed RJ45 Jack through the rubber grommet if you already have a terminated CAT6 wire with an RJ45 jack previously installed.



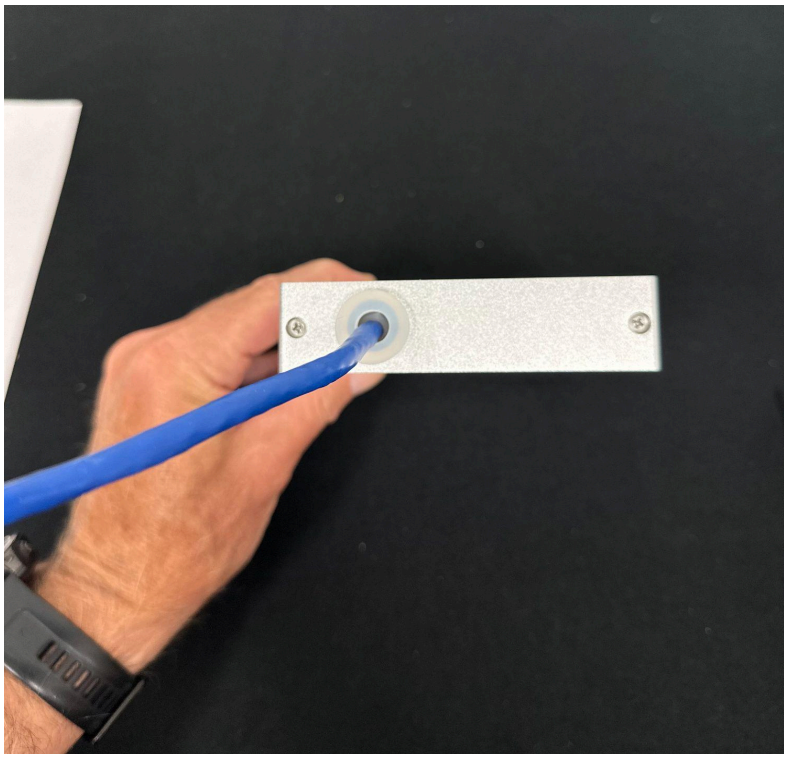
- After pushing the Cat 6 wiring through the rubber grommet insert the wiring through the opening in the lower housing unit.

- Insert the RJ45 Jack into the RJ45 network port on the upper portion of the Fusion Sensor.



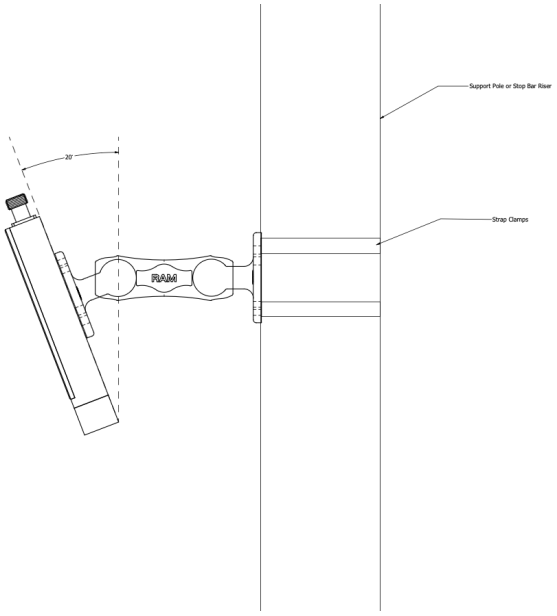
- Connect the lower housing and upper housing of the Fusion sensor and use a small phillips head screwdriver screw in both sides, switching back and forth until the lower housing is firmly snug against the upper housing.

  Please note the fit should be tight with little to no gap between the upper and lower housing.



- Replace the rubber grommet.

5. Mounting the Sensor
    - Use a Stable Mounting Bracket: (Ram Mount Provided)
    - Install at Recommended Height: Mount the sensor at a height between 20-25 feet.
    - Adjust Declination Angle: Set the sensor to a declination angle of 18-20 degrees.

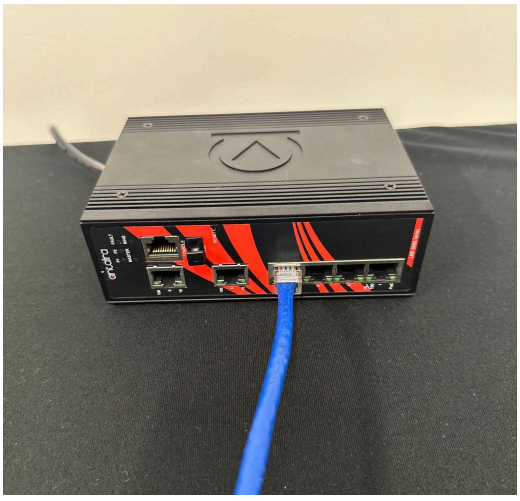


- Ensure Horizontal Level: Confirm that the sensor is horizontally (verify if vertically) level and securely fastened to the mounting bracket.

6. Positioning
    - Aim Towards Incoming Traffic: Direct the sensor towards oncoming traffic (Boresight) for accurate data capture.
    - Focus on Lane Coverage: Position the sensor to cover the middle of the lane(s) being monitored.
    - Avoid Metal Signage: Do not aim the sensor at large metal signage or any obstructions that may interfere with the radar signal.
    - Position for Occlusion or Parking Considerations: If trucks will park in front of the radar mount, install the sensor on the opposite side of the road to maintain clear visibility.
    - Ensure Straight Road Visibility: Mount the sensor to look at a relatively straight portion of the road for consistent readings.
    - Mount Close to Roadway: Position the sensor as close to the roadway as possible to enhance detection accuracy while taking into account occlusion concerns.
7. Connectivity Use CAT6 Cabling:
    - Connect the sensor using CAT6 cabling to ensure optimal data transmission.

8. Table of PoE Options :

Description	**Device Link**
Connecting to a Non-PoE Switch or Router	https://www.antaira.com/products/injectors/INJ-0200G-60-24-T
Connecting Multiple Fusion Sensors to a Non-PoE Switch or Router	https://www.antaira.com/products/poe-managed-gigabit/LMP-0601G-SFP-T-V2
Extending PoE for Long Runs	https://www.fastcabling.com/product/95w-2-port-waterproof-poe-extender-with-60w-output/
Outdoor PoE Injector	https://www.axis.com/products/axis-30-w-outdoor-midspan



9. Final Checks Inspection:
    - Perform a final inspection to ensure all connections are secure and the sensor is properly positioned.
    - Power On: Power on the sensor and verify that it is operational.
    - Network Communication: Confirm that the sensor is communicating with the network and all configurations are functioning correctly.

Recommendations for Mounting Specifications

Install Type	Height	Angle	Positioning
Traffic Counts & In/out Parking Count/Classification	22 Feet	Down 18 degrees (from horizon)	As close to the road as possible
People/Cyclist	12 Feet	Down 18 degrees (from horizon)	As close to the path as possible
Truck Parking Spot Specific Monitoring	30 Feet	Down 13 degrees (from horizon)*	100 feet away from spots**

Notes:

- The reason it's best (for the radar) to be positioned as close to the road/path as possible for traffic counts and people/cyclists is that radar detection performance is best at boresight, and targets will remain closer to boresight for a longer periods of time with this configuration. Also, for multi-lane applications, it minimizes occlusions.
- *Elevation angle for truck parking depends on device positioning. This angle was calculated for the recommended positioning for this application.
- **More than any other application, the recommended positioning for truck parking is dependent on parking spot configuration. This recommendation was based on using a maximum reliable distance for detection of static objects, since more spots can be monitored when the distance is greater (spots with larger azimuth angle measurements have lower detection performance). We recommend reaching out to Omnisight when planning truck parking infrastructure configurations.
    - It's typically best to view parking spots at an angle (versus looking straight at their front-ends or sides). This is because our radar is best at resolving targets in range rather than angle, so if multiple semis are at the same range, with small angle separation, it can be difficult for the device to tell them apart.

Prerequisites for Orientation

Device Setup and Orientation

To ensure accurate installation, you'll need a smartphone equipped with a compass and digital level feature, such as an iPhone. These instructions assume the use of an iPhone, which comes pre-loaded with both tools, eliminating the need for additional downloads.

1. Prepare Your Smartphone:
    - Locate and open the "Compass" app on your iPhone. Similarly, find and open the "Level" app, which is also pre-installed.
2. Fixing the Device:
    - Securely attach your device to the mounting pole or fixture.
3. Aligning and Orienting: Compass Orientation:
    - Hold the smartphone flat and parallel to the ground. Use the Compass app to verify the device's directional alignment relative to magnetic north.
4. Leveling Adjustment:
    - Place the smartphone on its edge against the device. Utilize the Level app to ensure the device is perfectly horizontal or vertical as required.
5. Verification:
    - Double-check both compass alignment and level orientation to confirm accuracy.

Compass and Device Heading Set Up

Using the Compass Application To access and utilize the Compass application for device alignment, follow these steps:

1. Accessing the Compass App:
    - From the home screen, swipe down in the middle of the first page of apps to reveal the search bar.
    - Type "compass" in the search bar and tap on the Compass icon when it appears.
2. Understanding the Compass Display:
    - Upon opening, the Compass app will display the current heading of your device, pointing straight out from the top.
3. Aligning the Phone with the Device:
    - Position the bottom edge of your smartphone flush against the face of the device.
    - Ensure the phone remains perpendicular in both horizontal and vertical planes relative to the device.
4. Adjusting for Desired Heading:
    - The number displayed on the Compass app indicates the device heading.
    - Aim to align this heading within 2 degrees of the desired direction.
    - If adjustments are needed, gently loosen the fixture and carefully reposition until the desired heading is achieved.

Measure Application and Orientation

Using the Measure Application for Leveling To utilize the Measure application for leveling and orientation, follow these steps:

1. Accessing the Measure App:
    - Swipe down on the home screen to reveal the search bar. Type "Measure" and select the icon that matches to open the app.
2. Switching to Bubble Level:
    - By default, the Measure app opens in the distance measurement mode. Tap on the bubble level icon at the bottom to switch to the level mode.
3. Avoiding Screen Tap Errors:
    - Do not tap the screen unintentionally, as this sets a new measurement reference relative to the phone's position at the time of the tap. If inadvertently tapped, tap again to reset to global orientation (indicated by the screen filled with color).
4. Setting the Roll (Horizontal Orientation):
    - Loosen the clamp carefully (ensuring the heading remains unchanged). Hold the phone along the top of the device and aim to keep it perpendicular to the top surface. Adjust until the Measure app shows a 0-degree measurement, indicating no roll in the device.
5. Setting the Pitch (Vertical Orientation):
    - Similar to setting the roll, adjust the phone vertically to align with the device's required orientation. Ensure the phone is perpendicular to the desired vertical plane of the device.

Frequently asked questions

Below, you'll find answers to common questions regarding the installation process. If your question isn't addressed here, please contact our support team for further assistance.

1. How long does it require to deploy each unit?
    - Around 1 hour
2. What is the resilience of your system against cyber security/external attack perspective?
    - Our Fusion Sensor uses secured communications and signing keys and is resilient against cyber-attacks.
3. What is the lifespan of the Fusion Sensor?
    - Expected to be 20+ years.
4. What is the hardware and software maintenance required?
    - All Fusion Sensor's can be managed, updated, and viewed remotely from our cloud based dashboard.
5. What is the warranty?
    - 1 year warranty on the hardware
6. Is the Fusion Sensor susceptible to any kind of interference, e.g. from other non-intrusive vehicle detection products or communication devices, electrical fields?
    - No

Additional Steps:

To help with the install of your Fusion Sensor, here are some additional steps to take:

Wiring Preparation

Follow the wiring preparation steps outlined below. Terminating the end of a CAT6 cable using an RJ45 connector involves several precise steps to ensure a reliable and high-performance connection.

Materials Needed:

- ☐ CAT6 cable
- ☐ RJ45 connectors (CAT6 compatible)
- ☐ Crimping tool
- ☐ Cable stripper
- ☐ Scissors or wire cutters

Steps for Terminating CAT6 Cable:

1. Strip the Cable Jacket:

   Use the cable stripper to remove about 1-2 inches of the outer jacket from the end of the CAT6 cable, exposing the twisted pairs inside.

2. Untwist the Pairs:

   Carefully untwist each pair of wires and straighten them out. You should have four pairs (eight wires) exposed.

3. Arrange the Wires:

   Arrange the wires according to the wiring standard you are using (T568A or T568B):

T568A: White/Green, Green, White/Orange, Blue, White/Blue, Orange, White/Brown, Brown

T568B: White/Orange, Orange, White/Green, Blue, White/Blue, Green, White/Brown, Brown

4. Cut the Wires Evenly:

Use scissors or wire cutters to trim the ends of the wires so that they are even and about 1/2 inch in length from the jacket.

5. Insert Wires into the Connector:

Holding the RJ45 connector with the clip facing down, insert the wires into the connector, ensuring each wire goes into its respective channel. Push firmly until the ends of the wires reach the front of the connector.

6. Check the Alignment:

Verify that the wires are in the correct order and fully inserted to the front of the connector. The wires should be visible at the front end of the connector.

7. Crimp the Connector:

Place the connector into the crimping tool and squeeze the handle firmly to crimp the connector onto the cable. This action secures the wires and completes the connection.

8. Test the Cable:

Use a cable tester to ensure the wiring is correct and that there are no faults in the connection. This step ensures the terminated cable will function properly.

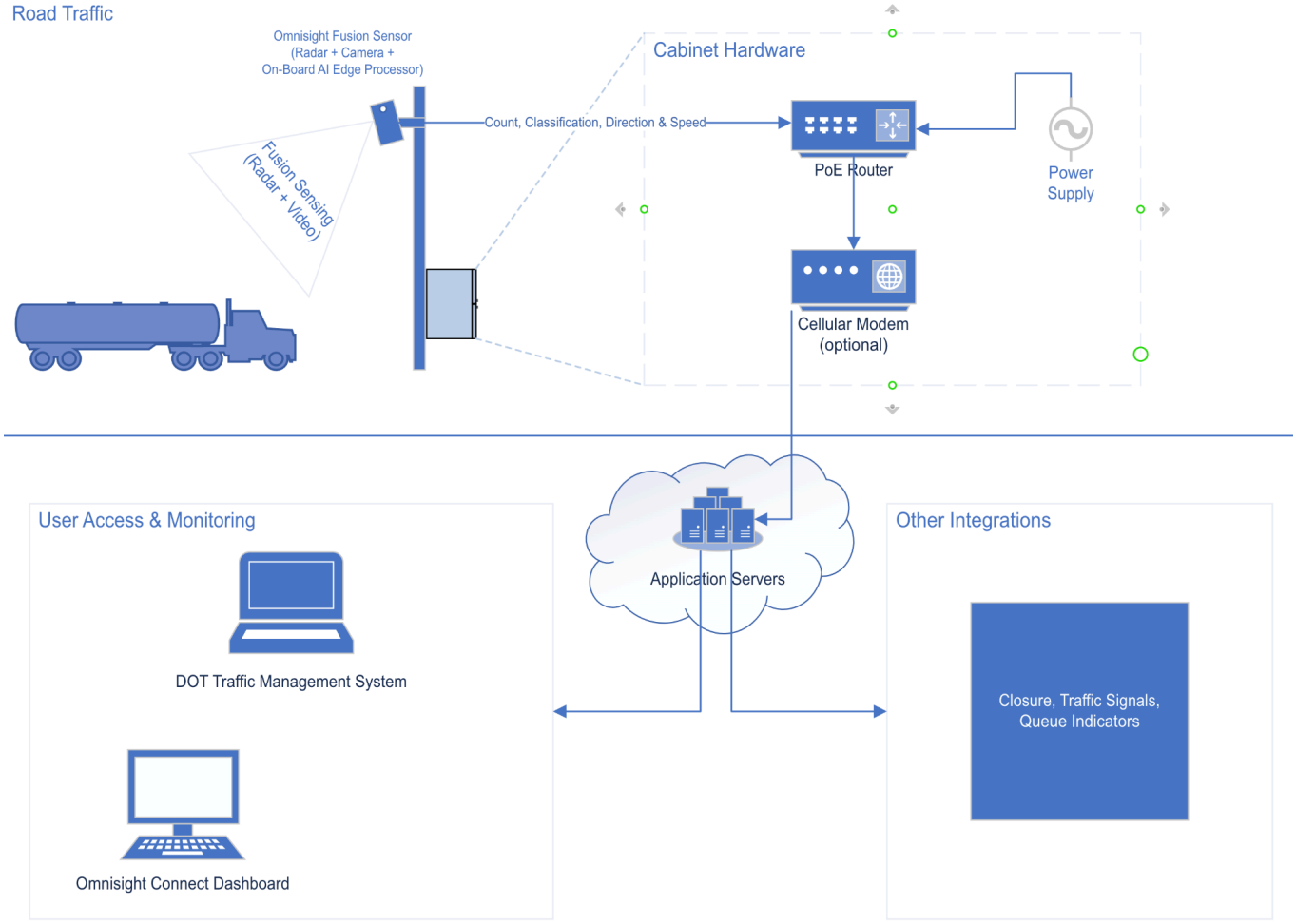
Portal Access

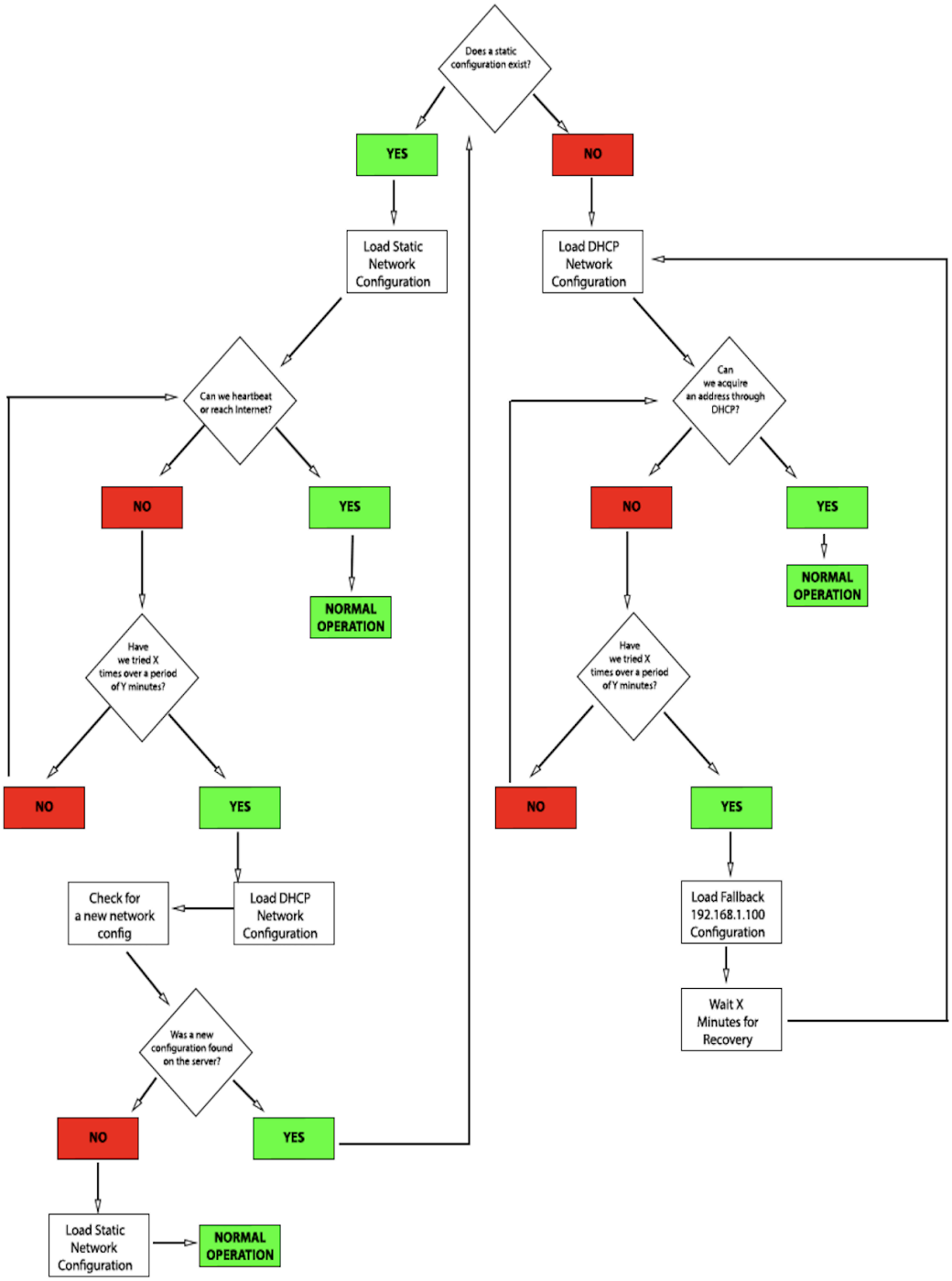
To get the most out of your Fusion Sensor, it's crucial to set it up correctly in the Omnisight portal.

Accessing The Portal:

1. Receiving Your Credentials:
    - You will receive an email invitation to join the organization on the Omnisight Dashboard. The email will prompt you to click a link to accept the invite and create your login credentials.
2. Logging In With your credentials in hand:
    - Open your web browser and navigate to the Omnisight portal login page. Enter your username and password into the respective fields. Click on the "Login" button.
3. Homepage Overview
    - After successfully logging in, you will land on the Omnisight portal homepage. Here, you can access a range of features, including Location Groups, Devices, and People.
4. Explore the Omnisight Portal Guide:
    - For detailed instructions on setting up your Fusion Sensor and learning all aspects of the portal, please refer to our Omnisight Portal Guide.

System Overview




Does a static configuration exist?
YES
NO
Load Static Network Configuration
Load DHCP Network Configuration
Can we heartbeat or reach Internet?
Can we acquire an address through DHCP?
NO
YES
NO
YES
NORMAL OPERATION
NORMAL OPERATION
Have we tried X times over a period of Y minutes?
Have we tried X times over a period of Y minutes?
NO
YES
NO
YES
Check for a new network config
Load DHCP Network Configuration
Load Fallback 192.168.1.100 Configuration
Wait X Minutes for Recovery
Was a new configuration found on the server?
NO
YES
Load Static Network Configuration
NORMAL OPERATION