

# AirVibe User Manual

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## Introduction

Thank you for choosing AirVibe for your vibration monitoring and machine protection. AirVibe is an advanced wireless vibration sensor designed for the predictive maintenance of industrial machinery. This document describes getting started with, and the effective usage of AirVibe including setup, configuration, installation, operation, and maintenance of the AirVibe sensor. AirVibe supports all industrial customers transitioning to LoRaWAN as their industrial IoT network of choice.

### Benefits of LoRaWAN Network

The LoRaWAN network offers several advantages for industrial operations:

- **Scalability:** Supports tens of thousands of sensors.
- **Coverage:** Covers extensive sites with only a few gateways.
- **Security:** Provides a secure communication solution.
- **Efficiency:** Low power consumption extends battery life dramatically.

## System Components

### AirVibe Vibration Sensor Module (VSM)



Picture shown with optional magnet

The AirVibe Vibration Sensor Module (VSM) monitors industrial machinery vibrations, providing high-resolution data for predictive maintenance. This advanced sensor identifies potential issues before equipment failure, enhancing maintenance strategies and ensuring machinery reliability and efficiency. It connects to the AirVibe Transmitter and Power Module via an integral cable.

## AirVibe Transmitter and Power Module (TPM)



Picture shown with optional magnet

The AirVibe Transmitter and Power Module (TPM) processes vibration data from the sensor module and transmits it via LoRaWAN network. Housed within is a D-Cell battery, which powers the vibration sensor module through the integral cable. Key features include:

- Advanced edge processing for both overall and spectrum vibration data collection and transmission.
- Smart logic to filter out non-operational machine data, preserving battery life.
- Data compression and management to optimize LoRaWAN network transmission.

## Specifications

**Voltage Range:** 3.2VDC MIN to 3.6 VDC MAX from built-in battery.

**Vibration Sensor Module (VSM) and Interconnect Cable Temperature Range:** -40°C to +105°C.

**AirVibe Transmitter and Power Module (TPM) Temperature Range:** -40°C to +85°C.

**LoRaWAN Connectivity:** Long-range, low-power communication.

**Extended Battery Life:** 4-8 years of operation due to the unique two-part design of the VSM and TPM which make up the AirVibe.

**Heat-Resistant:** Operates in temperatures from -40°C up to 105°C.

**Long-Distance Data Transmission:** Up to 5 Km in open areas, and 0.5 Km typical in congested areas.

**High Network Capacity:** Supports multiple simultaneous connections.

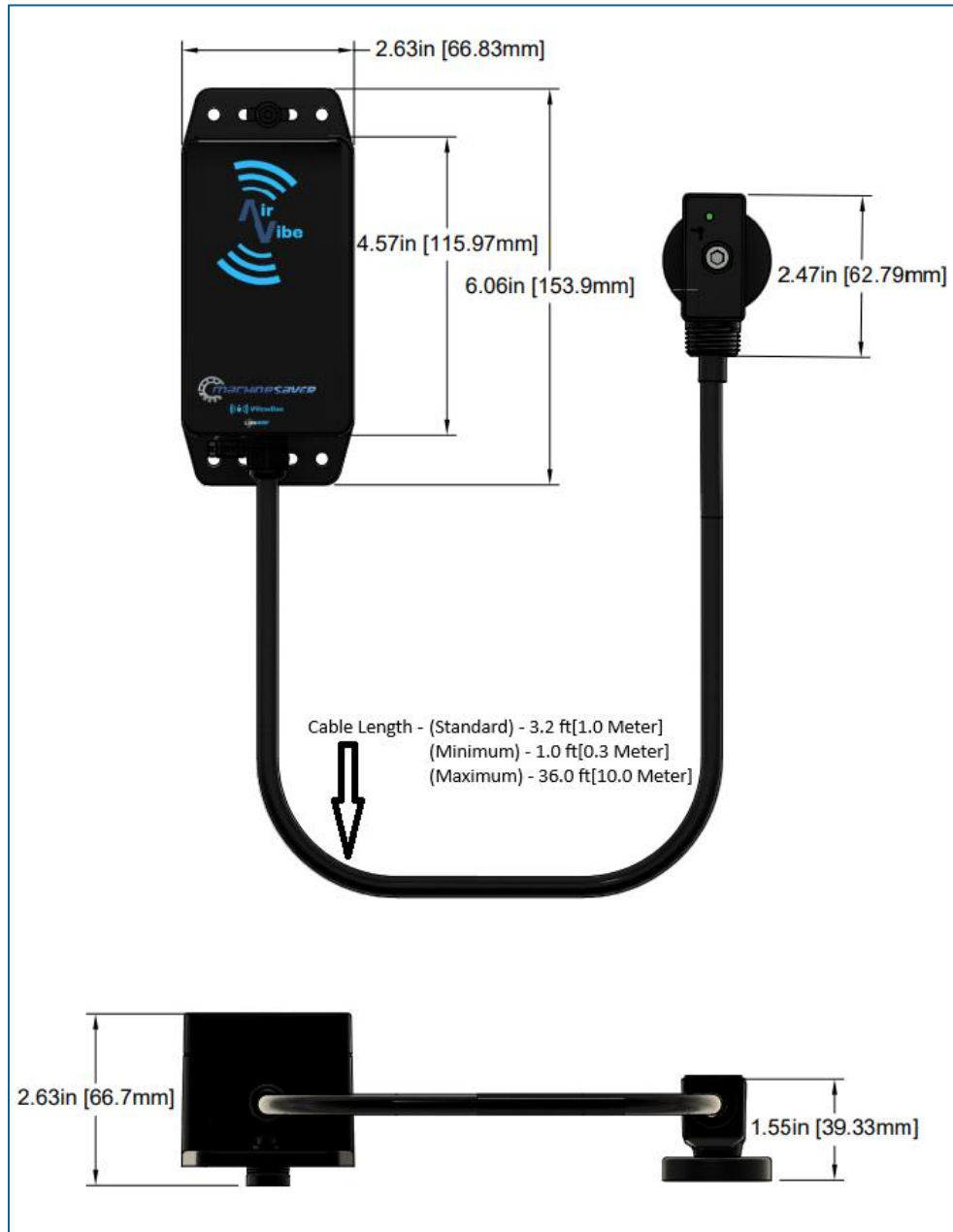
**Built-in Security:** AES-128 encryption for secure data transmission.

**Overall and Analysis Data:** Industry first analysis data over LoRaWAN along with overall vibration data for trending and alarm capabilities.

**Audio Buzzer:** Different tones from the TPM which indicate different modes and functions of the AirVibe.

**Magnetic Reed Switch:** Adds the ability for users to interact with the AirVibe module, without opening the TPM housing, simply by using a magnet to the indicated position on the outside of the TPM so the magnetic flux lines are picked up by the reed switch, then listening for specific buzzer sequences and tones to identify the changes made by the user.

## AirVibe Dimensional Drawing

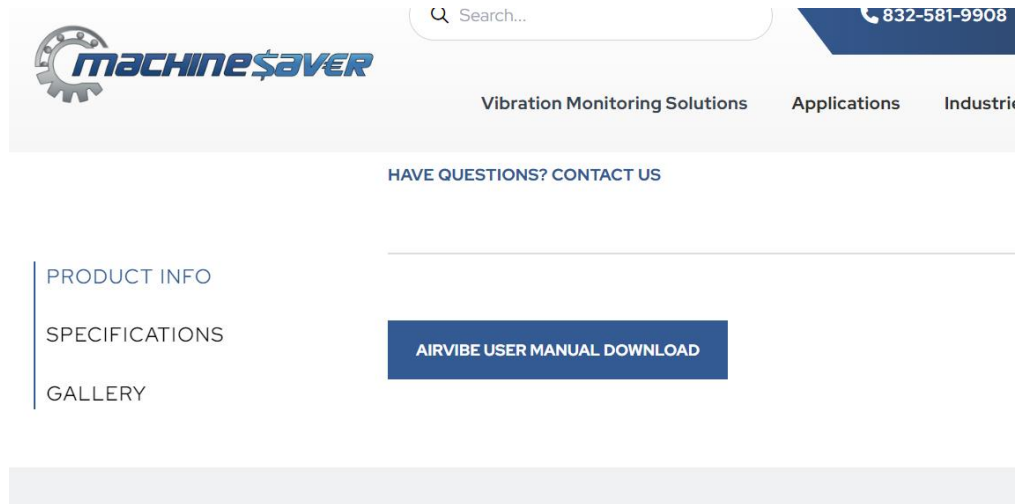


Drawing shown with optional magnets attached.

## Distribution and Availability of this Document

**For Electronic Distribution only:** This document is available on Machine Saver’s website ([www.machinesaver.com](http://www.machinesaver.com)) under the appropriate product page:

Home > Vibration Monitoring Solutions > Hardware > [Product]



# Certifications

## Hazardous Area Certifications (North America, ATEX, IECEX pending)

Class 1 Div. 2 Groups A, B, C, D, T4 (135° C)



Model No.: \_\_\_\_\_  
Serial No.: \_\_\_\_\_  
Mfg Date.: \_\_\_\_\_  
Master Contract No.: XXXX-XXXX  
WARNING! - EXPLOSION HAZARD  
DO NOT CONNECT OR  
DISCONNECT WHEN ENERGIZED



Model No.: \_\_\_\_\_  
Serial No.: \_\_\_\_\_  
Mfg Date.: \_\_\_\_\_  
Master Contract No.: XXXX-XXXX  
WARNING! - EXPLOSION HAZARD  
DO NOT CONNECT OR  
DISCONNECT WHEN ENERGIZED

# Warnings

## Specific Conditions of Use



### WARNING – POTENTIAL ELECTROSTATIC DISCHARGE HAZARD

This product should be installed in such a way that the risk for electrostatic discharge is minimized.

When the equipment is used in hazardous locations, avoid any actions which generate electrostatic discharge:

- Cleaning: The equipment shall only be cleaned using a damp cloth.
- Installation: Only touch metallic parts if using an insulating object to do so.
- Environment: Do not use the product in environments with powerful charge generating processes.

## Battery Warnings

As with all batteries, there are fire, explosion, and severe burn hazards. There is a risk of explosion if the battery is handled or used incorrectly.

Do not burn or expose batteries to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.

When replacing the battery, align the battery's positive and negative terminals to the positive and negative terminals of the battery holder mounted within the case.

Properly dispose of used batteries according to local regulations by taking them to a hazardous waste collection site, an e-waste disposal center, or another facility qualified to accept lithium batteries.

## Installation Warnings

- This equipment shall be installed according to industry best practices and the installation instructions.
- This equipment is intended for fixed installations only.
- This equipment is intended for use in restricted access areas.



### WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT

Under NO circumstances shall the equipment enclosure be opened within a hazardous area. Unless the user has verified the area is safe and followed all local procedures for verification that no hazardous gasses or other hazards are present, the equipment enclosure is to remain sealed and unopened within a hazardous area.

## Operation Warnings

The connector of this equipment may only be used with external equipment as listed in this document.

- The connector of this equipment shall not be connected when an explosive atmosphere is present.
- The TPM module shall only be used within ambient temperatures between -40°C to +85°C.
- The VSM module shall only be used within ambient temperatures between -40°C to +105°C.

## Service Warnings

- This equipment shall only be opened and serviced by Machine Saver trained technicians or by a competent and trained individual.
- Only use batteries approved and tested by Machine Saver for AirVibe.
- The battery is serviceable by the aforementioned, trained persons.
- Only replace the battery while the device is in a non-hazardous location.
- Machine Saver has thoroughly tested the following 3.6-volt D-cell lithium thionyl chloride battery models: ER34615M and LSH20 and has found them suitable for use with AirVibe.
- Machine Saver does not warranty the product for use with other models of battery than those tested and approved above.
- If damage to the enclosure is evident, a trained and competent person shall be immediately informed, who shall remove the device from service as soon as possible.
- If the equipment is or has been in contact with chemical materials, clean it appropriately, if it cannot be cleaned it should be removed from service.

## Transportation and Storage

- The product must be kept in its original packaging until it reaches the installation site to prevent damage while in transit.
- For optimum battery life the storage area should be clean, cool (between +20°C to +30°C), dry and ventilated.
- The product should not be exposed to large vibrations or large force impacts during transit and storage.
- If, after transportation, any part of the AirVibe system appears compromised you should contact a Machine Saver customer service representative immediately.

# Installation

## Installation Site Selection

Choose a location that ensures stable attachment to the machine surface.

Choose a location on the machine that allows for the propagation of the vibrations of interest, such as bearing faults, gear mesh faults, misalignment, and balance issues.

Ensure the sensor is within the transmission range of the LoRaWAN gateway.

## Mounting Considerations

The AirVibe sensor is suitable for temperatures up to +105°C(+221°F). If your machine surface exceeds +80°C(+176°F) contact Machine Saver Inc. for the high temperature mounting options which are suitable for temperatures up to +105°C(+221°F).

When choosing the sensor mounting type the desired high end frequency response should be considered.

- Drill and tap without a flat spot on the machine bearing surface 5 KHz may be achieved.
- Drill and tap with a 0.75-inch flat spot on the machine bearing surface to match the sensor pad on the base of the sensor up to 6 KHz or greater may be achieved.
- Epoxy with mounting pad up to 5 KHz may be achieved.
- With magnet mount 5 KHz or greater may be achieved.

## VSM Mounting Methods Hardware Options

The mounting hardware for the AirVibe Vibration Sensor ensures secure and reliable installation on industrial machinery. This hardware is designed to accommodate various mounting scenarios, providing versatility and stability in harsh environments.

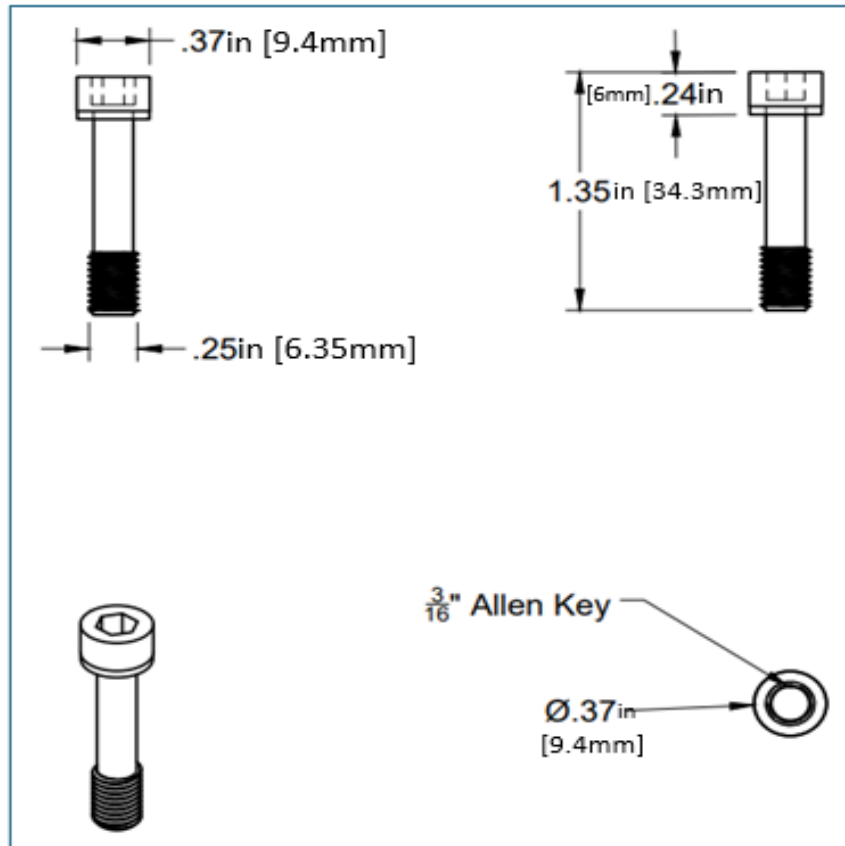
The options for mounting hardware are:

- ¼-28 UNF Mounting Bolt (Standard)
- M6x1 Mounting Bolt
- Magnetic Mounting Pad (Standard) 150°C
- Magnetic Mounting Pad (Heavy Duty) 80°C
- Magnetic Mounting Pad (Curved Surfaces) 120°C.
- Epoxy Mounting Pad
- Fin Mount Pad (Small) AKA “Shark tooth”
- Fin Mount Pad (Large) AKA “Shark tooth”
- High Temperature Thermal Blocking Mounting Pad AKA “Toad stool”

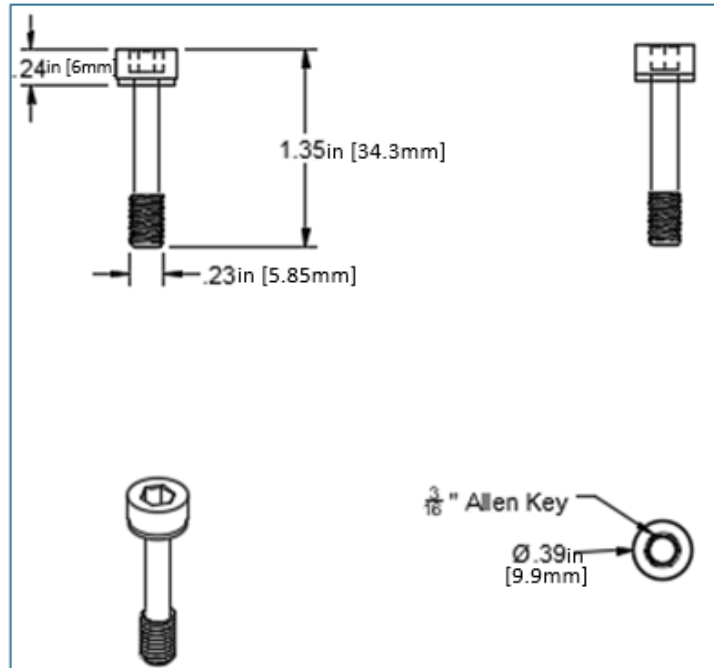
## Drill and Tap: ¼-28 UNF or M6x1.0

Depending on your order information, the bolt inside the sensor is either ¼-28 or M6. While it is recommended to create a flat surface with a diameter of 0.75 inches (20mm), this step is optional. The flat bottom tapped hole should be 0.20 inch (5mm) deep. Blue (breakable) Loctite should be used when fastening the bolt into any threaded hole.

### ¼-28 UNF



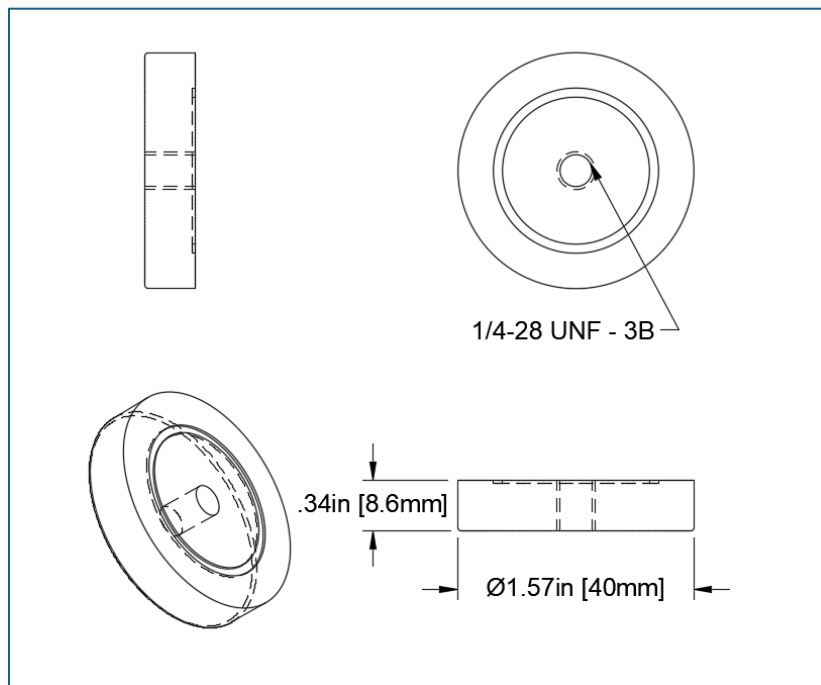
M6x1.0



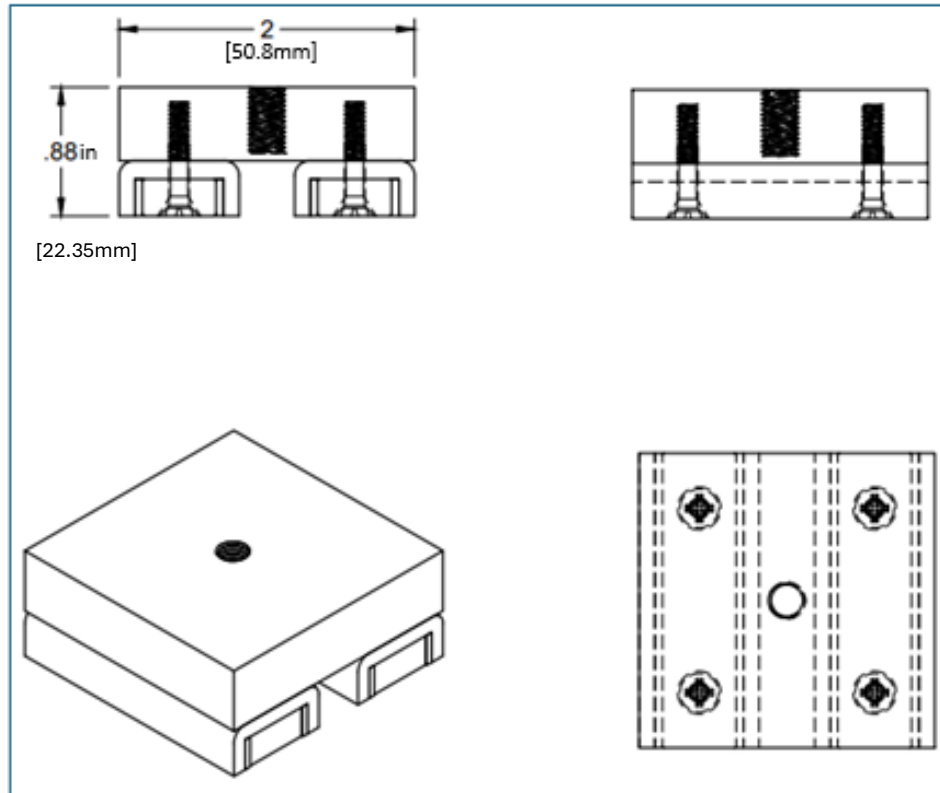
## Magnetic Mounting Options

Your cable management kit comes with a small hard plastic wedge that can be used to stabilize the magnet if the ideal magnet and sensor mounting location are not flat. Cut wedges as needed.

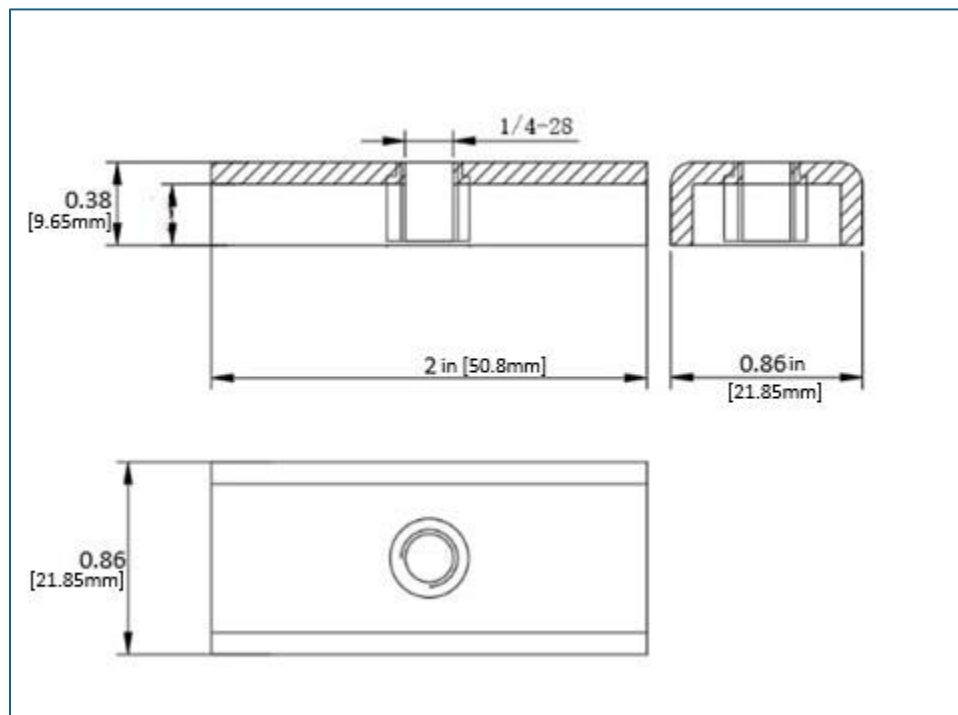
Mounting Magnet (Standard) 150°C, 65kg (143lb) hold strength



## Mounting Magnet (Heavy Duty), 54kg (120lb) hold strength

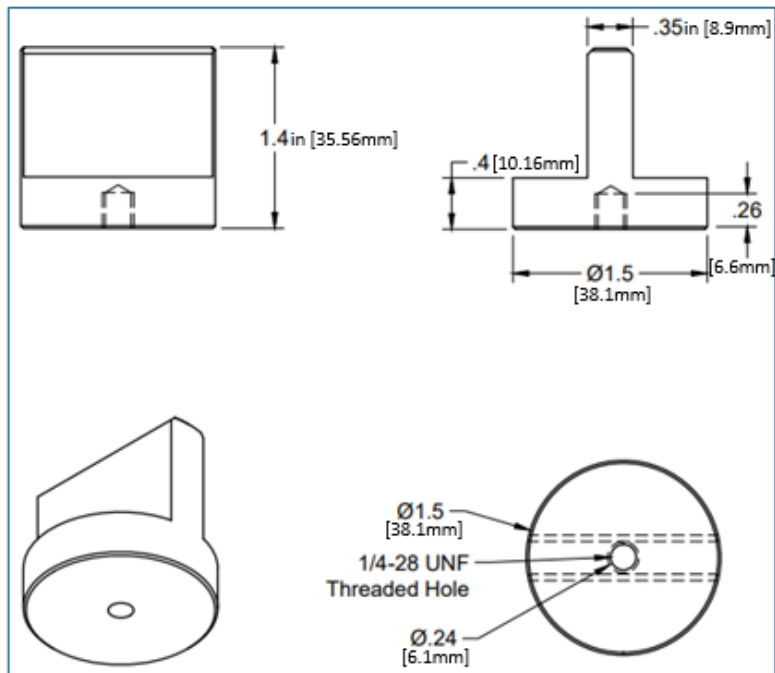


## Mounting Magnet (Curved Surfaces) 120°C, 55kg (121lb) hold strength

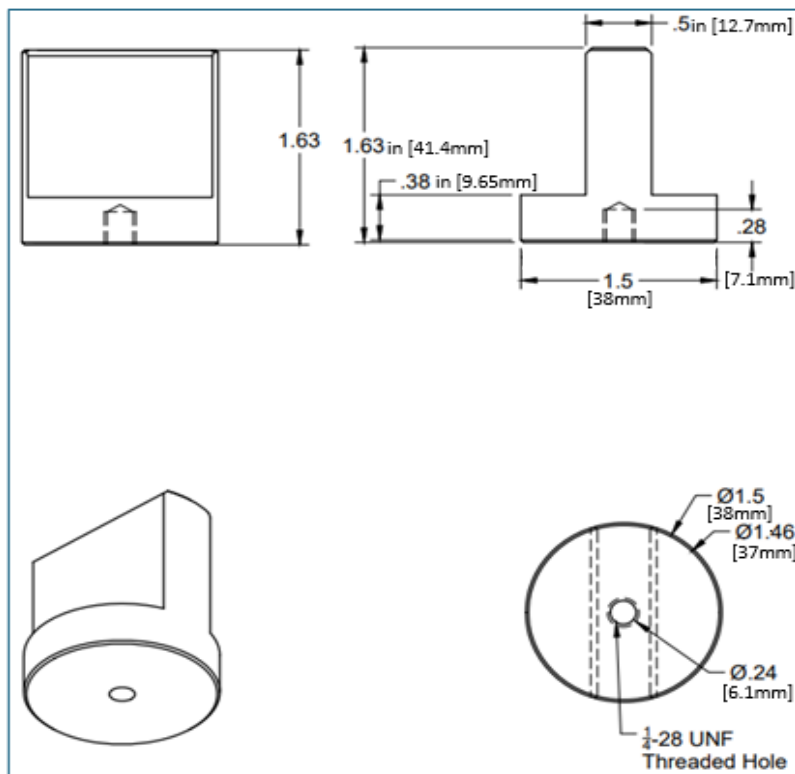


# Motor Fin A.K.A. "Shark Tooth" (option not included in standard kit)

## Small Fin

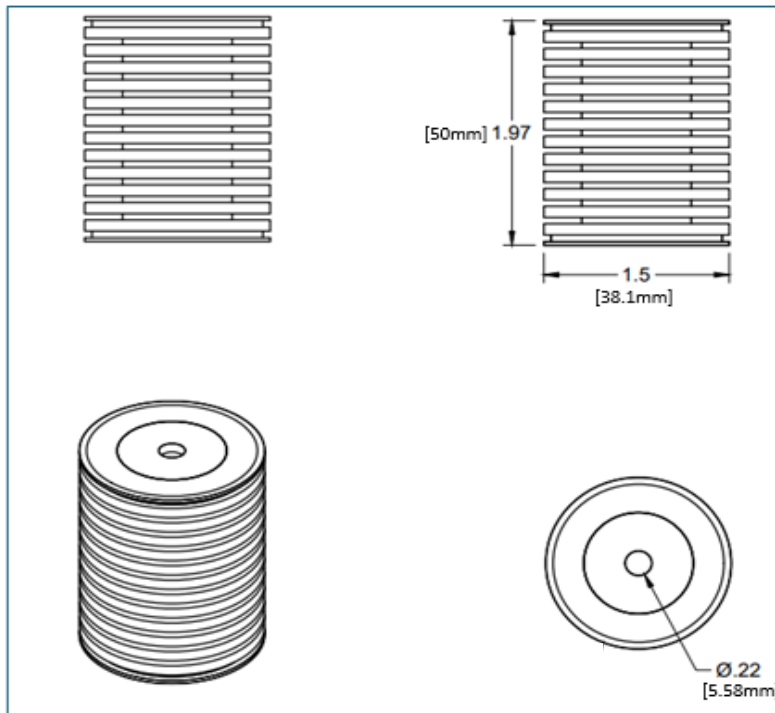


## Big Fin

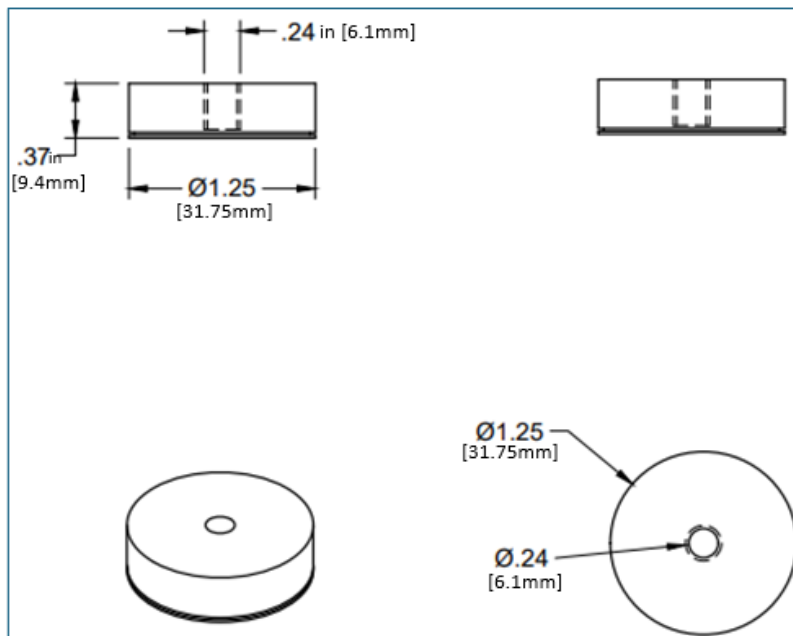


## High Temperature Heat-Resistant Mounting Pad (option not included in standard kit):

High machine skin temperature. Exceeding 100 degrees Celsius.

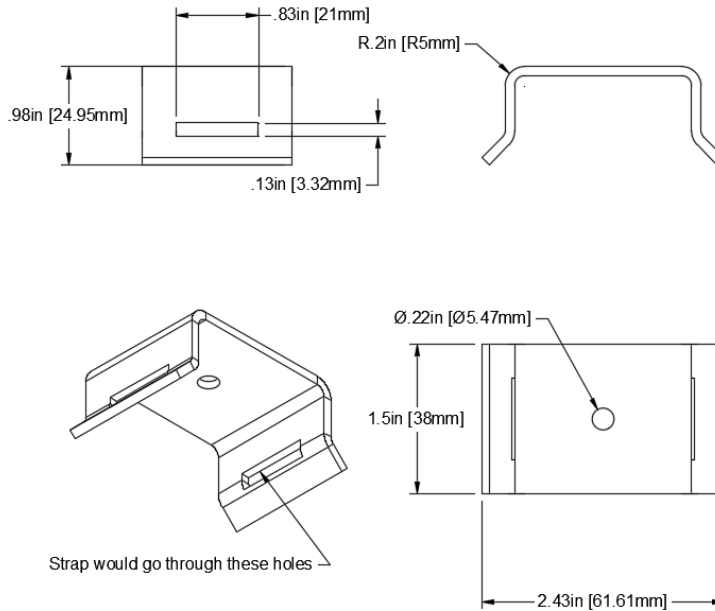


## Epoxy Mounting Pad (option not included in standard kit):



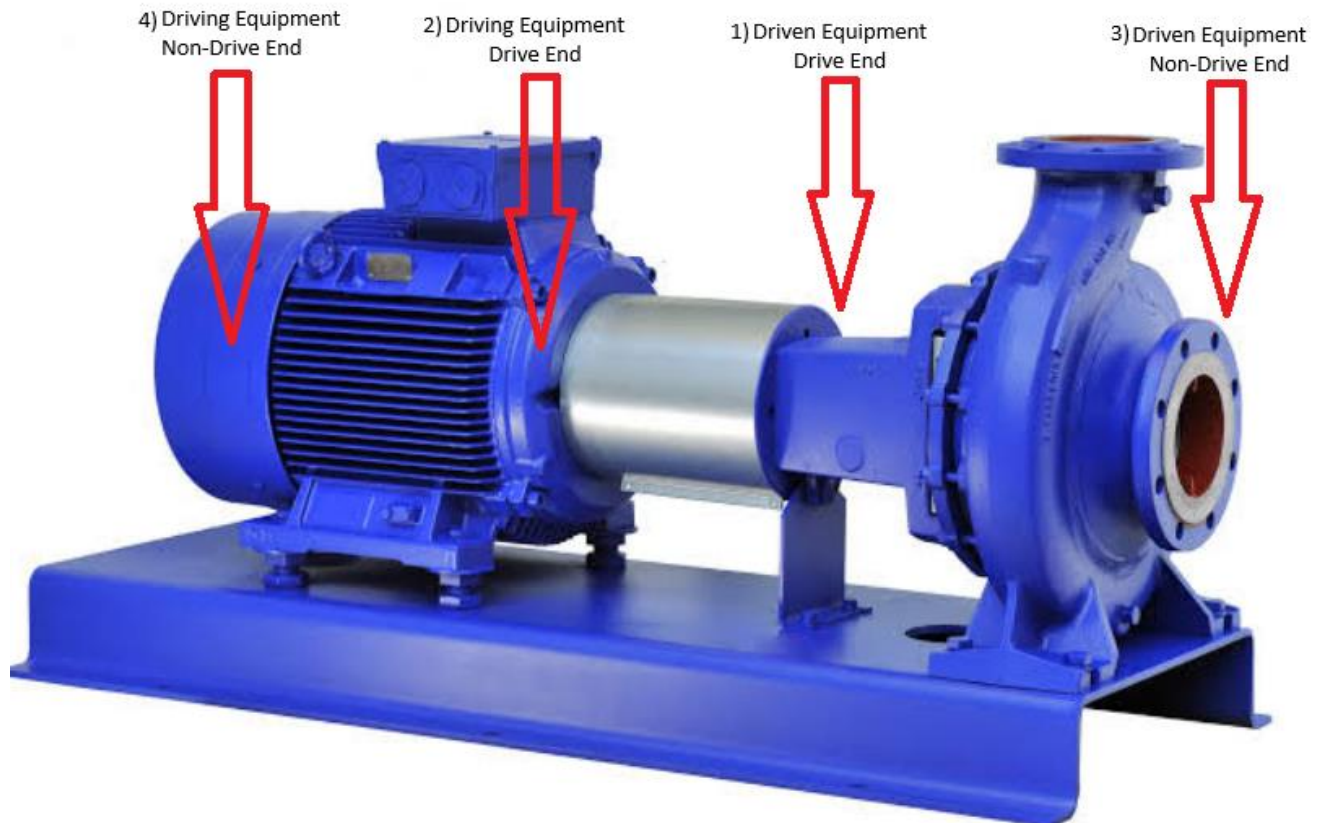
## Pipe Mounting Bracket:

The VSM will be mounted onto this bracket. A strap will pass through the holes in the bracket, then wrap around a pipe to secure it.



## Machine Train Accelerometer Placement

In a machine train (such as a motor-pump system in the example below), the proper placement of accelerometers is critical for monitoring vibration and diagnosing potential issues. The prioritization of mounting positions depends on factors such as proximity to critical components (e.g., bearings, couplings, gears, etc...), potential failure points, and the likelihood of detecting problems.



The prioritization of accelerometer positions on a machine train is based on several important factors related to vibration analysis and machine health monitoring. Let's break down the reasoning behind this specific order:

1. Driven Equipment on the Drive End: This position is given top priority because:
  - It's closest to where the power is transmitted from the driving equipment to the driven equipment.
  - Most mechanical issues (like misalignment, unbalance, or bearing problems) will manifest strongly at this point.

- It's typically subjected to the highest loads and stresses in the system.
2. Driving Equipment on the Drive End: This is the second priority because:
    - It's the source of power for the entire machine train.
    - Issues originating in the driving equipment (like motor electrical problems or gear mesh issues) will be most evident here.
    - It complements the data from the first position, allowing for comparison and more comprehensive analysis.
  3. Driven Equipment on the Non-Drive End: Third in priority because:
    - It provides additional data on the driven equipment's condition.
    - It can help identify issues that might not be as apparent at the drive end (like misalignment or shaft bow).
    - It allows for a more complete picture of the driven equipment's behavior.
  4. Driving Equipment on the Non-Drive End: Last in priority because:
    - While still valuable, issues at this end are often less critical or less likely to occur.
    - It provides a complete view of the driving equipment's condition when combined with the drive end measurement.

This prioritization allows for a strategic approach to condition monitoring:

1. With one sensor, you capture the most critical point of power transmission and likely failure point.
2. With two sensors, you monitor both sides of the power transmission interface.
3. With three sensors, you get a more complete picture of the driven equipment.
4. With four sensors, you have comprehensive coverage of the entire machine train.

This approach ensures that even with limited resources, the most critical points for detecting potential issues are monitored, maximizing the effectiveness of the condition monitoring program.

## Mounting Orientation

Mount the vibration sensor in a horizontal plane, with the cable exit pointing down, perpendicular to the shaft centerline. Alternatively, the sensor could also be mounted on top of or under the machine bearing.

## Mounting the Vibration Sensor Module (VSM)

Follow these directions carefully to ensure optimal AirVibe performance.

- Clean and dry the mounting surface.
- Use the provided hardware to securely attach the sensor to the machinery.
- The sensor may be mounted on top of the bearing, bottom of the bearing or the side of the bearing. Our recommendation is to mount the sensor on the side of the bearing with the cable pointing down toward the ground.
- Ensure that the sensor is perpendicular to the shaft centerline of the equipment as near as possible to the bearing of interest. This means that the mounting bolt of the sensor should be pointing directly at the shaft centerline. If the sensor mounting bolt (axis 2) is not pointing directly at the shaft centerline some error may occur in the amplitude of the vibration output relative to the real vibration amplitude.

The instructions for the remaining steps of installation differ slightly depending on your selected mounting method for the VSM.

### Drill and Tap Instructions (1/4-28 UNF or M6X1.0)

- Drill and tap a 1/4-28 UNF in a hole 0.20 – 0.25 inches deep in the bearing housing.
- If you purchased the M6X1.0 mounting bolt you may drill and tap a M6X1 in a hole 5mm-6mm deep in the bearing housing.
- Verify that the threads are straight after tapping the hole.
- Clean the hole of any debris.
- Add a small amount of blue (breakable) Loctite to the threads of the mounting bolt.
- Fasten down the fastener using the appropriate size torque Allen wrench.  
2 – 3 ft. pounds (3-4 N-m) of torque should be applied to the fastener.  
**DO NOT OVER OR UNDER TIGHTEN.**

### Epoxy Mounting Pad (Standard, Motor Fin, or High Temperature)

- Another mounting method is to use a mounting pad with a 1/4-28 or M6 threaded hole and epoxy the mounting pad to the bearing housing using an industrial epoxy such as Parker LORD® 403-19 Modified Acrylic Adhesive epoxy or similar. Then thread the sensor into the threaded hole in the mounting pad.
- Mounting pads have two types (1) a flat piece of metal and (2) a T-shaped mounting pad (shark tooth) designed to be epoxied in between motor cooling fins. (Show pic of shark tooth mounting pad)

- Fasten down the mounting bolt to the mounting pad using the appropriate size torque Allen wrench.  
2 – 3 ft. pounds (3-4 N-m) of torque should be applied to the fastener.  
DO NOT OVER OR UNDER TIGHTEN.

### Magnetic Mounting (Standard, Heavy Duty or Curved)

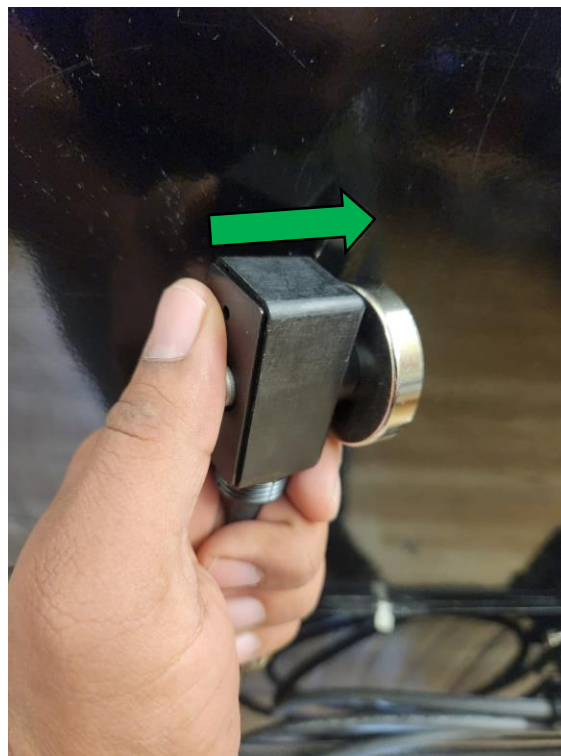
- Add a small amount of blue (breakable) Loctite to the threads of the mounting bolt.
- Fasten down the mounting bolt to the magnet using the appropriate size torque Allen wrench.  
2 – 3 ft. pounds (3-4 N-m) of torque should be applied to the fastener.  
DO NOT OVER OR UNDER TIGHTEN.
- Some AirVibe sensors come with a cup magnet mounting pad. This magnet is powerful so use precaution.

**The edge of the magnet should be placed on the machine mounting location and then slowly rotated onto the surface.**

**DO NOT abruptly slap the magnet on the machine surface via the magnet pull force** as this abrupt slap on the machine can create acceleration energy of 10000 g and damage the sensor.

Begin by gently touching the edge of the magnet to the machine surface.

Then, gradually bring the rest of the magnet into contact with the surface as shown in the figure below.



## Mounting the Transmitter and Power Module (TPM)

The TPM section includes the NEMA4X enclosure, D-Cell battery or +24VDC connection, antenna and the LoRa transmitter or the cellular 4G/5G/LTE transmitter.

The TPM is typically mounted in a cool location away from the machine and process heat. Two 24-pound magnets are provided to attach the transmitter to the machine frame. The magnets may be removed, and the mounting tabs may be used to secure the module to the base (or skid) of the machine away from extreme heat or cold.

Machine friction and machine processes typically are warm or hot and batteries last longer when used closer to 25°C (77°F) so, if possible, choose a location that may have a more moderate temperature. The most common place to mount the transmitter module is at the base of the machine on the skid. While line-of-site is not required for LoRa we recommend moving the transmitter around to be sure the antenna inside the module is at an optimum location, so the transmitter has the best connection to the receiver. You may need to rotate the module 90 degrees, 180 degrees or move it to the opposite side of the machine train. Check this transmission function before making the transmitter mounting permanent.

When installing the D-cell battery or power:

1. Always carefully observe the + and – battery polarity and battery cradle markings and match the battery poles before inserting the battery.
2. Never energize or deenergize the circuit when hazardous gases or a dangerous situation may be present.

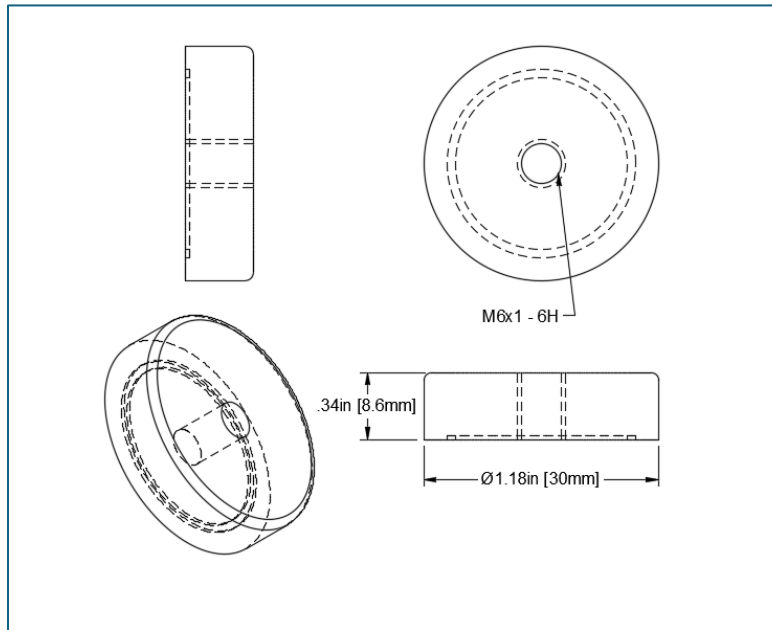
Make sure the lid gasket is flat and installed correctly and make sure all four fasteners on the lid are secure and snug with 2 ft. lbs (3 N-m) torque to prevent water ingress.

## Cable Management Kit

Place one magnet very close to the sensor, within 6 to 12 inches, to eliminate any cable resonance. One additional magnet is provided for every meter thereafter. Three heavy-duty, UV resistant cable tie wraps are included to coil up any excess cable near the AirVibe Transmitter and Power Module.

Your cable management kit comes with a small hard plastic wedge that can be used to stabilize the magnet if the ideal magnet and sensor mounting location are not flat. Cut the wedges as needed.

## Cable Management Magnet 120°C, 30kg (66lb) hold strength

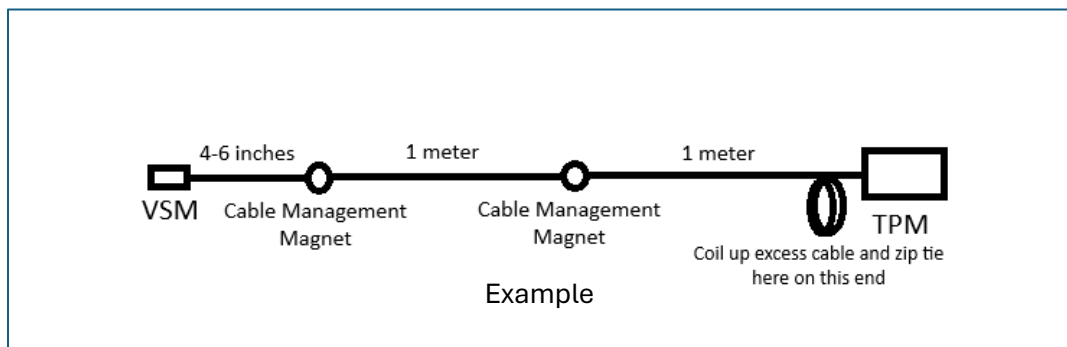


### Integral Cable Routing and Management

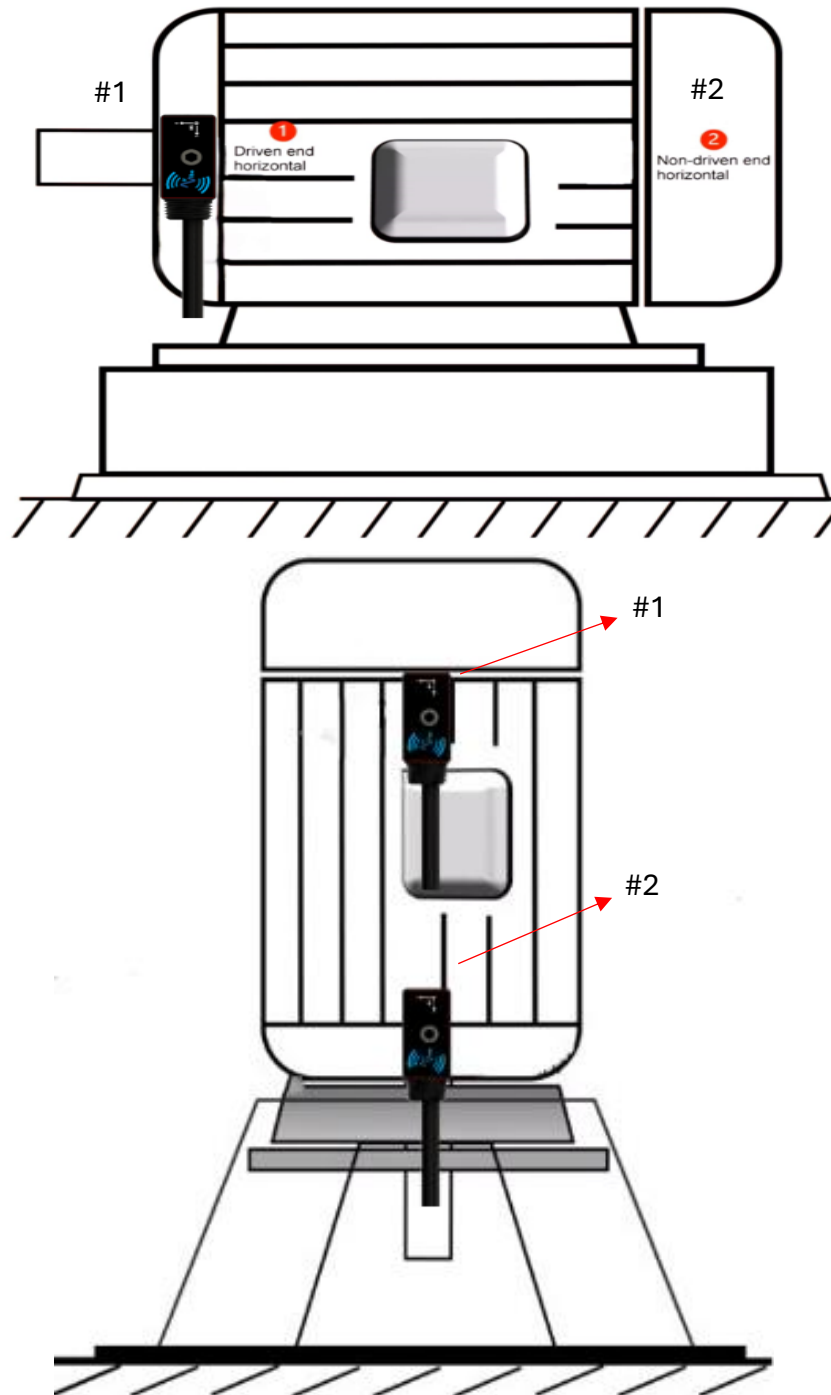
You should make sure that the cable management kit is being used to attach the cable route to the machine or machine frame/skid.

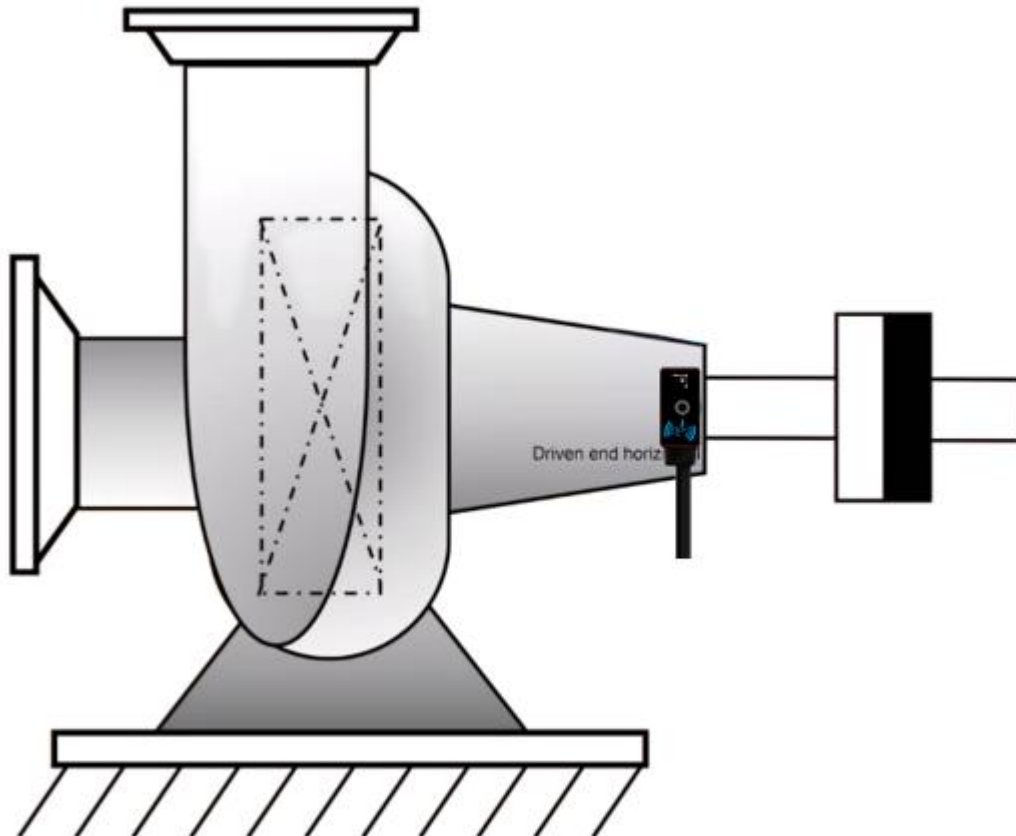
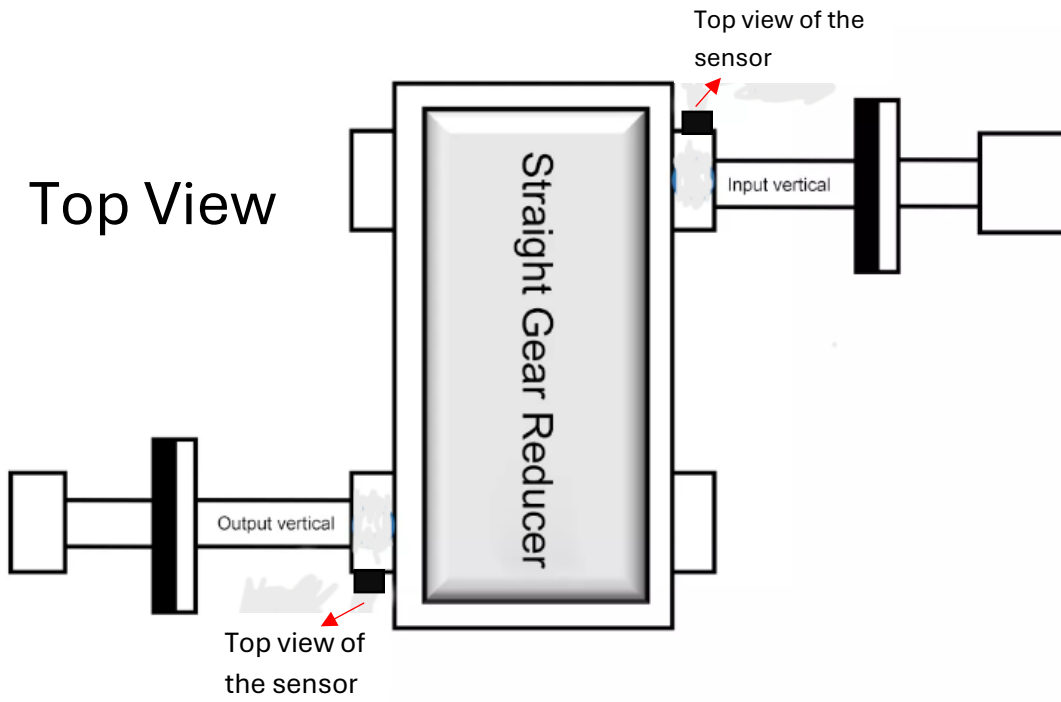
If the routing path is a non-magnetic metal, you may remove the provided magnets attached to the integral cable and use the M6x1.0 bolts and cable clamps to secure the cable to the machine frame/skid.

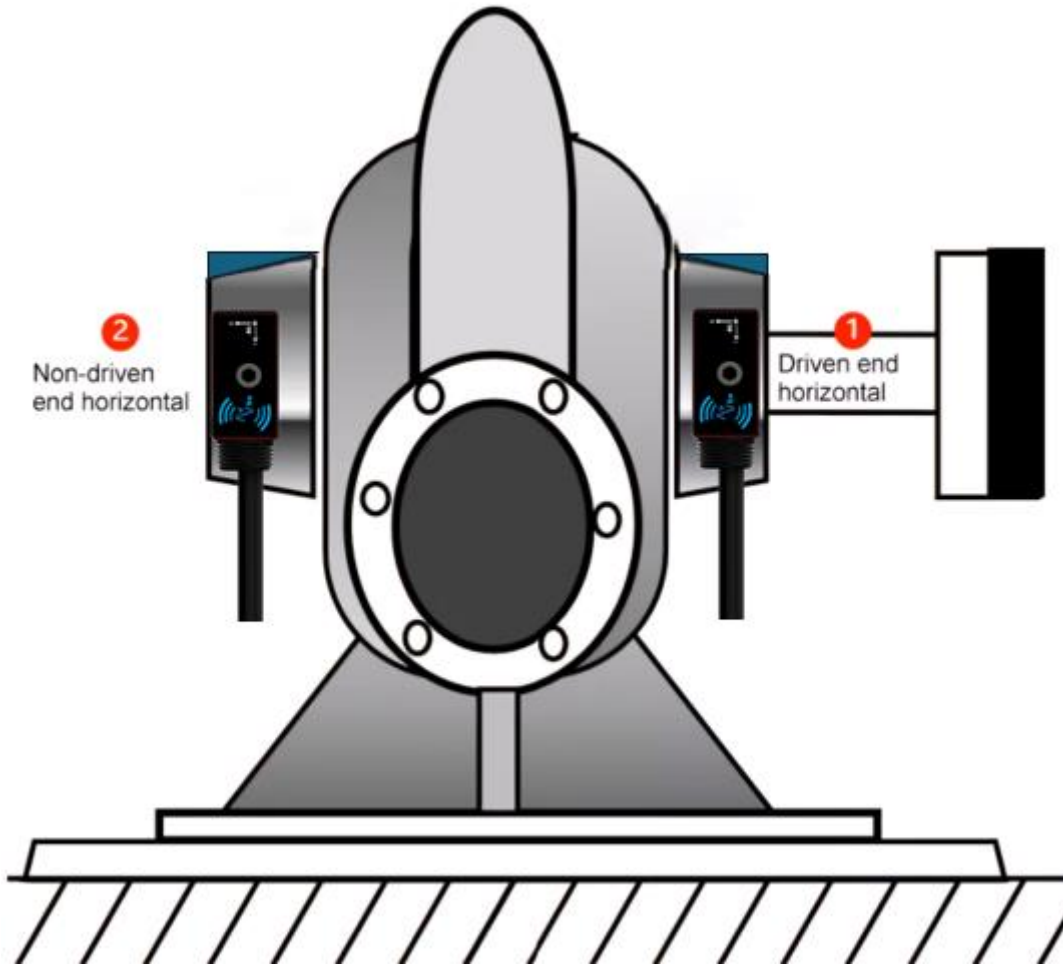
**IMPORTANT** - The cable exiting the VSM must be secured to the machine surface as close to the vibration sensor as possible typically 4-6 inches (10-15cm) and not more than 12 inches (30cm). Thereafter, secure the cable at least every 39 inches (1m). Heavy duty and UV ruggedized zip/cable ties are provided with your AirVibe for this purpose. Any excess cable should be looped up and secured on the TPM end and not the VSM end. We do not suggest modifying the cable length in the field, just coil up and secure the excess at the TPM side with the zip ties provided.



## Ideal Mounting Locations







## How To Properly Install The AirVibe Mounting Magnets

After selecting the best place to install the VS sensor magnet (view section - Ideal Mounting Locations). Determine if this mounting location (1) has enough space (2) is relatively flat and (3) ensure the mounting location is a ferromagnetic surface.

For the round sensor magnet you will need at least 1.6 inch (40mm) circumference of available space for the round sensor magnet.

If the best mounting location has a curved surface we suggest the rectangular bar magnet which is suitable for a curved surface when installed correctly.

This magnet designed for a curve surface requires a free space approximately 2 inches (50mm) X 0.8 inches (20mm). The long side of the magnet should be along the radius of the curve surface.

Remember to always place the corner of the magnet on the machine first before slowly lowering the magnet to the machine surface. The magnet is powerful so **please use caution when lowering the magnet to the machine surface.**

The cable management magnets need 1.2 inches (30mm) of free ferromagnetic surface for mounting. The first cable management magnet should be placed 4 inches (10cm) to 8 inches (20cm) from the VS vibration sensor. **Mounting this first cable management magnet near the VS sensor is important to prevent any chance for cable resonance.** After that every meter for a cable management magnet is suitable. For more magnets contact [service@machinesaver.net](mailto:service@machinesaver.net)

Wiggle the sensor a little to be sure it is secure to the machine surface and not rocking or moving. If the magnet and sensor can move you may (a) try attaching a small piece of plastic wedge available from Machine Saver to the edge of the magnet or (b) move the sensor and magnet to a more suitable location (c) remove the magnet and attach the sensor using another mounting method such as drill and tap a ¼-28 hole or epoxy pad mounting method. Consult Machine Saver services for details [service@machinesaver.NET](mailto:service@machinesaver.NET)

The sensor should be secured to the magnet with 2-3 inch pounds (0.23-0.34 Nm) of torque.

When selecting a location to mount the AirVibe Transmitter Module (TM) try to find a suitable location determine a location that will be closer to a moderate temperature of 75°F (25°C) most of the time. Avoid locations that may have more heat, more cold or excessive moisture. Typically, the base of the machine on the skid is a good location. You will need an area that is about 7 inches (18cm) X 3 inches (8cm) of free space that is relatively flat. In some applications when no ferromagnetic surface is available the magnets may be removed, and the TM mounting tabs may be used to fasten the TM to the machine area.

## Battery

The AirVibe sensor is powered by a 3.6 V primary lithium-thionyl chloride (Li-SOCl<sub>2</sub>) battery. This battery is a high-power, D-size spiral cell designed for demanding applications. It provides a stable voltage response, ensuring consistent performance throughout its lifetime. The battery also has a high drain/pulse capability, offering superior performance compared to standard D-cell batteries. Additionally, it has a wide operating temperature range, making it suitable for various environments and locations.

### Battery Features

- Pre-installed for convenience
- Long-lasting, low-power consumption design
- Easy replacement process, see installation instruction for information about battery replacement

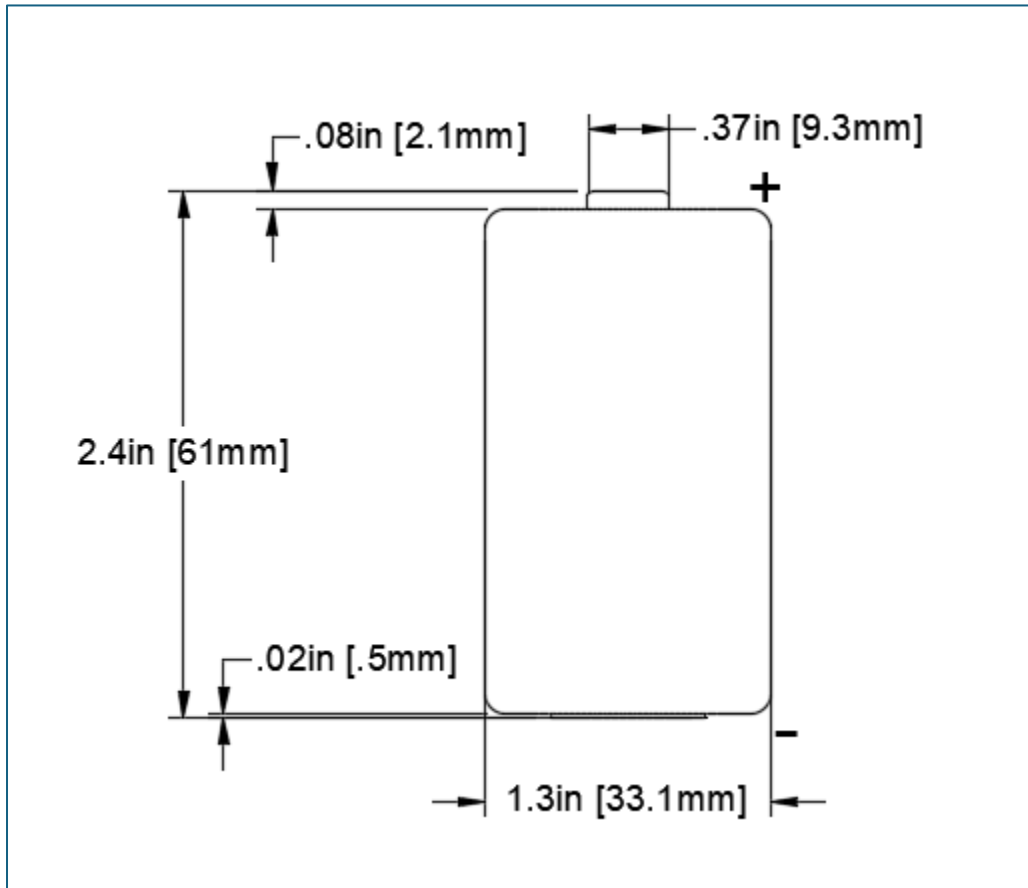
### Battery Specifications

Voltage Range: 3.2VDC (minimum) to 3.6 VDC (maximum)

Maximum Current Draw: 150mA

AirVibe Transmitter and Power Module Temperature Range: -40°C to +85°C

## Battery Dimensional Drawing



Machine Saver understands our technical and customer support are critical to your success and ours so reach out to us at [service@machinesaver.net](mailto:service@machinesaver.net) or visit us at our website <https://machinesaver.com> for additional support resources. Your machine up and running and beautiful actionable vibration data are what we strive for.

## MachineGate Gateway

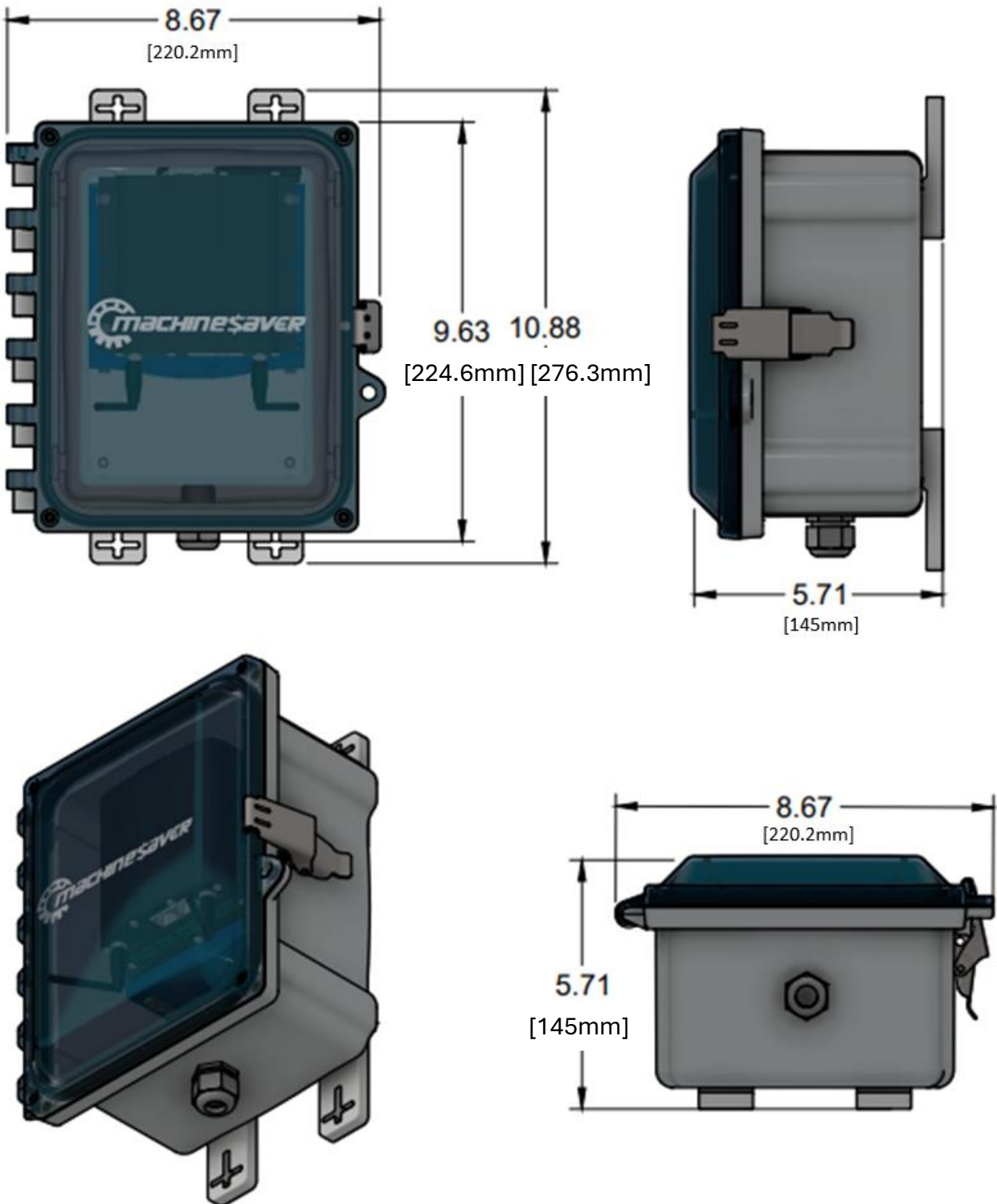
The MachineGate cellular gateway is an advanced, reliable device designed to seamlessly connect AirVibe sensors to the cloud. Engineered for efficiency and robust performance, MachineGate ensures continuous, secure data transmission from your AirVibe sensors, facilitating real-time monitoring and analysis. Whether for industrial applications, environmental monitoring, or smart city initiatives, the MachineGate Cellular Gateway is the ideal solution for reliable, secure, and efficient sensor data management.

### MachineGate Features

- **Seamless Integration:** MachineGate effortlessly interfaces with Machine Saver products, including AirVibe sensors, ensuring a hassle-free setup and operation.
- **Reliable Connectivity:** Leveraging cellular, ethernet, LoRa technology, MachineGate provides a stable, and consistent connection, even in remote or challenging environments.
- **Secure Data Transmission:** Employing advanced encryption protocols, MachineGate ensures that your data is transmitted securely to the cloud, protecting it from potential threats.
- **Cloud Compatibility:** Designed for modern IoT ecosystems, MachineGate is compatible with various cloud platforms, allowing for flexible data storage, processing, and analysis.
- **Sensor Expansion:** MachineGate also has the capability to connect with BACnet, OPCUA, Modbus and other common industrial devices and sensors through its various inputs and outputs.



## MachineGate Dimensional Drawing



## High Gain Antenna 8dBi

The High Gain Antenna 8dBi provides a larger view of your devices over the standard antenna in MachineGate.



Total length of the Antenna - 3Feet

Option 1: High Gain Antenna & 25ft coaxial extension cable.

Option 2: High Gain Antenna & 6ft coaxial extension cable.

## Technical Specifications of High Gain Antenna

TECHNICAL SPECIFICATIONS	
Frequency range	• 860 - 930 MHz
Bandwidth	• 70 Mhz
Input Impedance	• 50 Ohm
VSWR	• ≤1.5
Gain	• 8+/-0.3 dBi
Polarization type	• Vertical
Radiation direction	• All directions
Half-power beamwidth	• Horizontal: 360°, Elevation: +/- 8°
Max input power	• 100 W
Antenna size	• Φ 23 x 1100mm (0.9 inches x 43.3 inches)
Antenna weight	• 520g (18.3 ounces)
Antenna cover color	• White
Antenna cover material	• Glass fibre
Antenna connector	• N male
Operating temp	• -20° to +85°C
Storage temp	• -40° to +85°C
Mounting	• Pole (Φ 25 to 50mm) with U-bracket
Pole dimension	• 25 to 50mm (1 to 2 inches)
Lighting protection	• DC grounding
Wind resistance	• 60m/s

## NanoWipom Software Suite

The AirVibe Web Portal, also known as NanoWipom, is a cutting-edge platform designed for comprehensive monitoring and management of AirVibe sensor data. The NanoWipom Software Suite located at the following url: <https://nanowipom.com/>. NanoWipom offers unparalleled user experience with enhanced features and intuitive design.

### Key Features

- **Advanced Analytics:** Harness the power of advanced analytics to gain deeper insight into your sensor data. The AirVibe Web Portal provides detailed trend analysis, predictive maintenance alerts, and custom reporting tools.
- **User-Friendly Interface:** Navigate through your data effortlessly with a clean, intuitive interface. The portal is designed for both beginners and experts, ensuring that you can find and interpret the information you need with ease.
- **Custom Dashboards:** Tailor your experience with customizable dashboards that allow you to monitor the specific metrics that matter most to you. Create multiple views for different projects, teams, or use cases.
- **Real-Time Data Visualization:** Stay on top of your sensor data with real-time visualizations. The AirVibe Web Portal offers dynamic charts, graphs, and maps that update live as new data comes in.
- **Seamless Integration:** Connect the AirVibe Web Portal with other IoT devices and platforms effortlessly.
- **Robust Security:** Protect your data with industry-leading security measures. The AirVibe Web Portal employs encryption, role-based access control, and regular security audits to ensure your data remains safe and confidential.
- **Automated Alerts and Notifications:** Receive instant alerts and notifications via email, SMS, or in-app messaging for critical events. Set custom thresholds to be informed about specific conditions and potential issues immediately.

Experience the next level of sensor data management with the AirVibe Web Portal, where superior functionality meets user-friendly design. Elevate your monitoring and analysis capabilities beyond the competition and unlock the full potential of your AirVibe sensors.

## Battery Installation / Battery Replacement

Regularly inspect the sensor for physical damage.

Replace the battery every 4-8 years or as needed.

Use caution when installing or removing the battery from this device.

Always use the proper local safety protocol to ensure your safety such as hot work permits and inspections to ensure no hazardous gases are present.

Alternatively, you may relocate this device to a safe area, remove and replace the battery then reinstall this device in the hazardous area.

The bottom edge of the board next to the D cell battery cradle have a white (+) and a white (-) to ensure proper battery orientation. Observe battery polarity and battery cradle markings and match before inserting the battery.

Use only Machine Saver approved industrial batteries when replacing.

Approved Battery Model: ER34615M

Approved Battery Model: LSH20

**For questions or spare batteries contact Machine Saver Inc.**

After installing the new battery, ensure the gasket is installed properly in the lid edge and the (4) lid fasteners are tightened so the lid and the base are secure and tight to prevent moisture ingress.

## Configuration

AirVibe can be configured via LoRaWAN. The configuration includes settings for communication, measurement, event triggers, and data processing. Information on how these configurations can be encoded and sent to the AirVibe device can be found in the section on NanoWipom Software Suite.

## Connecting AirVibe to the Cloudgate

Power the gateway using local power and, if not a cellularly enabled Cloudgate, connect to your network via ethernet.

Place the AirVibe sensor within range of the gateway.

The AirVibe TPM should chirp 3 times to indicate that it has connected to Cloudgate (or other configured LoRaWAN network).

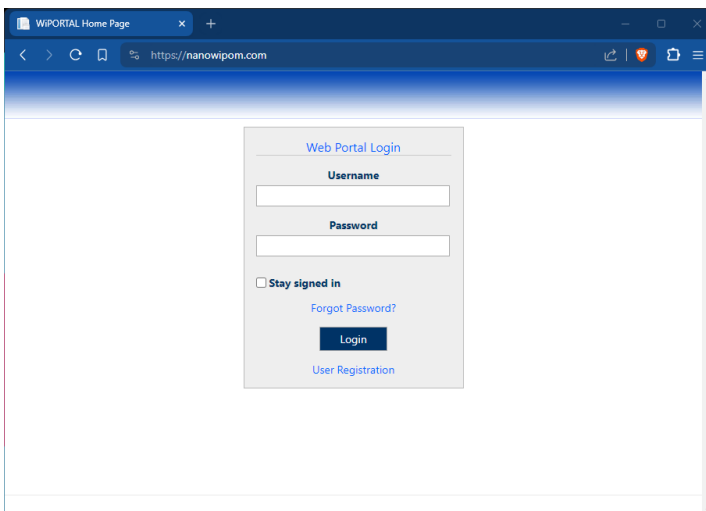
If the TPM does not chirp 3 times to indicate that it has successfully connected, you may use the battery reset, 24V reset or the reed switch reset method to cycle power to the AirVibe.

## Sensor Activation

Use the NanoWipom software to register the sensor and link it to the gateway.  
Configure the data transmission settings (e.g., transmission intervals).

## Data Monitoring and Analysis

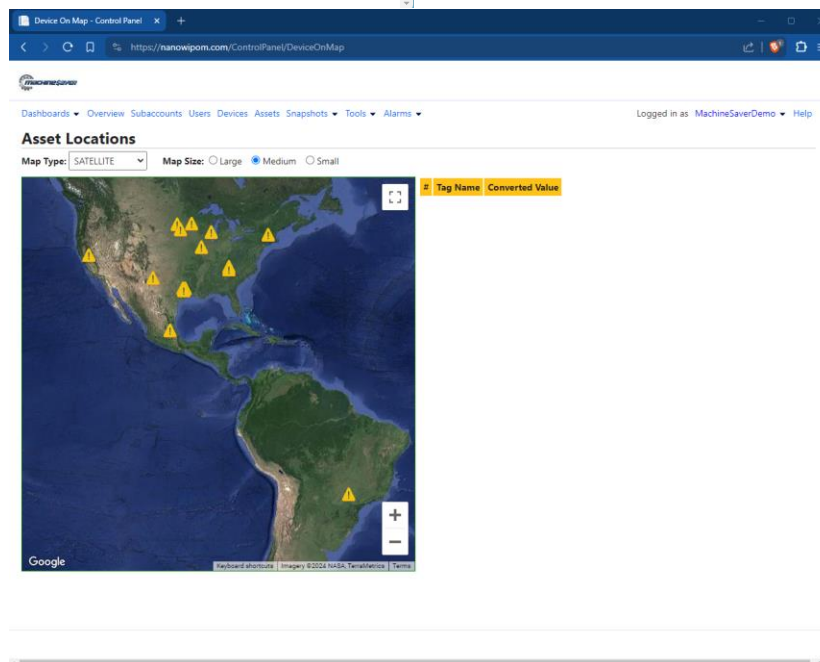
Access real-time data and historical trends using NanoWipom software.  
Analyze high-resolution waveform data to detect early signs of machinery issues.  
Enter the Username and Password provided by Machine Saver Inc.



If you have not been provided with a Username and Password, please contact Machine Saver, Inc.

**Phone:** +1 (832) 581-9908

**Email:** [service@machinesaver.net](mailto:service@machinesaver.net)



# Troubleshooting

If you encounter issues with your AirVibe Vibration Sensor system, follow these troubleshooting steps to identify and resolve common problems:

## Sensor Not Powering On

- **Check Battery Installation:** Ensure the battery is correctly installed with the proper orientation.
- **Inspect Battery Contacts:** Verify that the battery contacts are clean and free of corrosion.
- **Replace Battery:** If the battery is depleted, replace it with a new 3.6 V Li-SOCl<sub>2</sub> battery.

## No Data Transmission

- **Verify LoRaWAN Connection:** Ensure the sensor is within range of a LoRaWAN gateway and that the network is operational.
- **Check Antenna Connection:** Ensure the antenna (if external) is securely connected and positioned correctly.
- **Restart Sensor:** Power off the sensor, wait a few seconds, and then power it back on to re-establish the connection.
- **Confirm Network Configuration:** Verify that the sensor is correctly configured to communicate with the LoRaWAN network.

## Inconsistent or Erratic Data

- **Secure Mounting:** Ensure the sensor is firmly mounted and not subject to excessive movement or vibration from the environment.
- **Interference Check:** Identify and eliminate any sources of electromagnetic interference that could affect the sensor's performance.
- **Calibration:** Perform a calibration of the sensor according to the user manual to ensure accurate readings.

## Low Battery Life

- **Power Consumption Settings:** Check the sensor's configuration for power consumption settings and adjust to optimize battery life.
- **Reduce Data Transmission Frequency:** If possible, reduce the frequency of data transmissions to conserve battery power.
- **Inspect for Damage:** Check the sensor and battery for any signs of physical damage that could cause increased power draw.

## Temperature Readings Inaccurate

- **Placement Check:** Ensure the sensor is not placed near heat sources that could affect temperature readings.
- **Calibration:** Recalibrate the temperature sensor following the instructions in the user manual.
- **Environmental Factors:** Consider environmental factors such as direct sunlight or airflow that might influence the readings.

## Sensor Not Responding to Configuration Changes

- **Connection Verification:** Ensure the sensor is properly connected to the configuration tool (e.g., via a configuration cable or wireless interface).
- **Restart and Retry:** Restart the sensor and attempt to apply the configuration changes again.
- **Firmware Update:** Check for and apply any available firmware updates that might resolve configuration issues.

## Noisy or Spurious Vibration Data

- **Secure Installation:** Double-check that the sensor is securely installed on a stable part of the machinery to avoid extraneous vibrations.
- **Environmental Check:** Identify and mitigate any environmental factors that could cause excessive noise in the data, such as nearby machinery or equipment.
- **Filter Settings:** Adjust the sensor's data filtering settings to reduce noise in the vibration data.

If these troubleshooting steps do not resolve the issue, consult the user manual for more detailed instructions or contact Machine Saver's customer support for further assistance.

## Technical Support

If you experience any issues with our product, please contact our technical support team for assistance. Our dedicated support team is available to help you with any questions or problems you may have.

### Contact Information

**Email:** [service@machinesaver.net](mailto:service@machinesaver.net)

**Phone:** +1(832) 581-9908

**Website:** [www.machinesaver.com](http://www.machinesaver.com)

### Support Hours

24/7 Phone Support

### Support Options

**Email Support:** Send an email to our support team at [service@machinesaver.net](mailto:service@machinesaver.net) with a detailed description of your issue. Our team will respond within 24 hours during business days.

**Phone Support:** Call us at **+1(832)581-9908** during our support hours for immediate assistance.

**Knowledge Base:** Access our online knowledge base at [www.machinesaver.com](http://www.machinesaver.com) for self-help articles, FAQs, and troubleshooting guides.

## Warranty Information

Our products come with a comprehensive warranty to ensure your satisfaction and peace of mind. Please read the following warranty terms carefully.

### Warranty Period

**Standard Warranty:** 1 year from the date of purchase.

**Extended Warranty:** Available for an additional fee. Contact us for more details.

### What is Covered

**Defects in materials and workmanship:** We will repair or replace any part of the product that proves to be defective under normal use and maintenance.

### What is Not Covered

**Accidental damage:** Damage caused by accidents, misuse, or abuse.

**Unauthorized modifications:** Any modifications or repairs performed by anyone other than our authorized service providers.

**Normal wear and tear:** Natural degradation of components over time.

**Loss or theft:** Replacement of lost or stolen products.

### Warranty Claim Process

1. **Contact Support:** Reach out to our technical support team to report the issue and initiate a warranty claim.
2. **Provide Proof of Purchase:** You will need to provide a copy of the original purchase receipt or proof of purchase.
3. **Assessment:** Our team will assess the issue and determine if it is covered under the warranty.
4. **Repair or Replacement:** If the issue is covered, we will repair or replace the defective product or component. If a replacement is necessary, it will be of the same model or a similar model of equal value.

### Important Notes

Contact [service@machinesaver.net](mailto:service@machinesaver.net) to obtain a return material authorization (RMA) prior to returning any components or orders.

**Shipping Costs:** The customer is responsible for shipping costs to return the product to our service center. We will cover the cost of shipping the repaired or replaced product back to the customer.

**Turnaround Time:** We aim to process warranty claims as quickly as possible. However, the turnaround time may vary based on the nature of the issue and product availability.

## Extended Warranty

For additional peace of mind, consider purchasing an extended warranty plan. Our extended warranty offers additional coverage beyond the standard warranty period. Contact our sales team at [sales@machinesaver.net](mailto:sales@machinesaver.net) or visit our website for more information.



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Thank you for choosing our product. We are committed to providing you with the best possible support and service. If you have any further questions or need assistance, please do not hesitate to contact us.

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**Company Name:** Machine Saver, Inc.

**Mailing Address:** PO BOX 420416, Houston, TX, USA 77242

**Physical Address:** 9788 Clarewood Dr. Suite 302, Houston, TX, USA 77036

**Customer Service:** +1(832) 581-9908

**Website:** [www.machinesaver.com](http://www.machinesaver.com)