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Quick Installation Guide - NS002

Introduction

This guide is your essential companion to successfully installing and activating Nanoprecise's advanced sensor technology, engineered to monitor critical rotating equipment across a wide range of industrial environments.

Whether you're installing a single sensor or deploying at scale, this manual offers clear, step-by-step instructions to help you mount, configure, and connect each sensor with confidence. From hardware setup and power options to connectivity and data sync, every aspect is covered to ensure a smooth and efficient deployment.

Designed with maintenance teams and plant technicians in mind, this guide is accessible for both seasoned professionals and first-time users. By following the detailed procedures and best practices outlined here, you'll be equipped to unlock the full potential of Nanoprecise's predictive maintenance ecosystem.

Let's get started on enabling meaningful insights — right from the edge.

Need more information or assistance? Reach out to us at customer-success@nanoprecise.io or click the ⓘbutton in your dashboard for setup guidance or troubleshooting tips.

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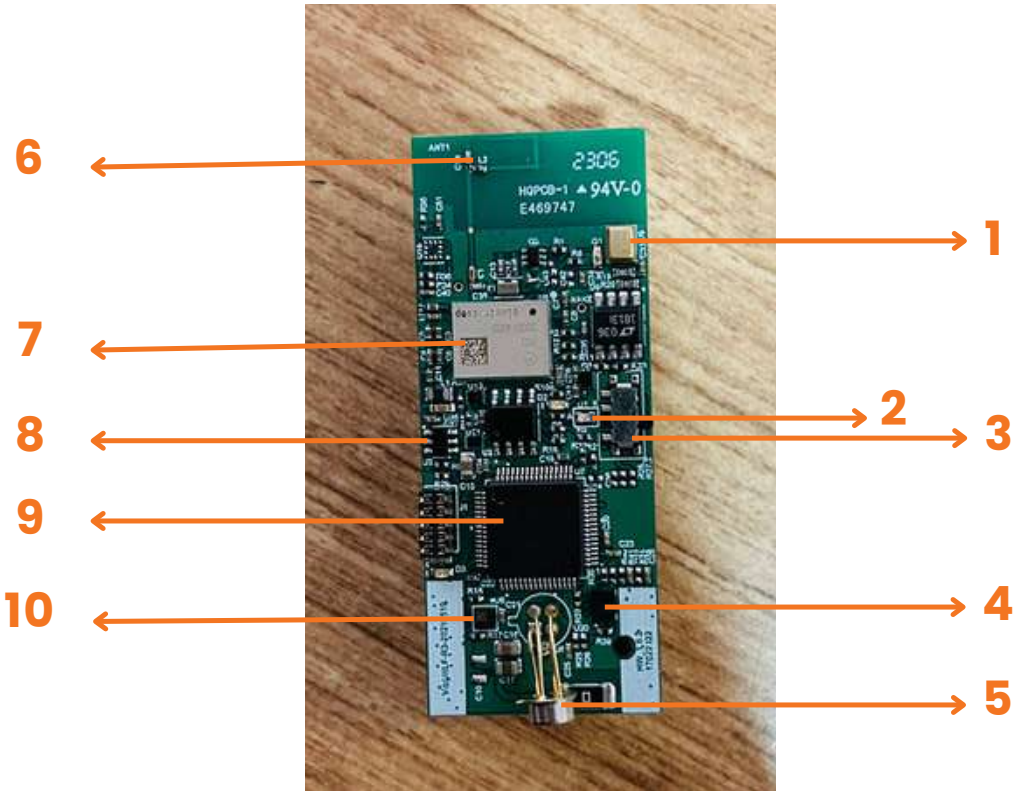
Installation Guide

Wireless Sensor

The image below details the various parts of the NS002 sensor board.

1. Acoustic emission sensor.
2. Main board LED (Red, Amber, Green).
3. Power On – Off switch.
4. Analogue Accelerometer (F-max at 8kHz (X,Y) , and 5.1kHz (Z)).
5. IR Temperature sensor.
6. Wi-Fi Antenna.
7. Wi-Fi + Imp003 module allowing for 2.4GHz Wi-Fi connectivity.
8. Magnetic flux sensor.
9. STM32 Microprocessor (Low power microcontroller to achieve high sampling rate).
10. 10.HTS sensor (Humidity and temperature sensor)



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Wireless Sensor

- Ensure that Electrostatic Discharge gloves are worn while handling the PCB board
- If there's no risk of static electricity, just make sure your hands are completely dry before opening the sensor cap.
- Unscrew the cap in an counter clockwise motion.
- Ensure that sensor is blinked up to correct Wi-Fi credentials (see DIY app manual blink-up), and that the Wi-Fi is operational and at an acceptable range for the sensor to receive the Wi-Fi signal (refer to "IoT Network Strength Check NS002 with Customer Wi-Fi" for requirements and instructions)
- Switch the sensor on, by turning the power switch upwards. Note the various blinking patterns that the main board LED will display.

Please review the image below for sensor light patterns and what they mean.

Sensor Light Pattern

- Sensor will blink red for a couple of seconds as soon as it is switched on.
- Sensor will start blinking red for a short period of time (250ms) then amber for a short period of time (250ms), indicating it has found the network and is gathering IP address information.
- Sensor will blink green, indicating a successful Wi-Fi connection.

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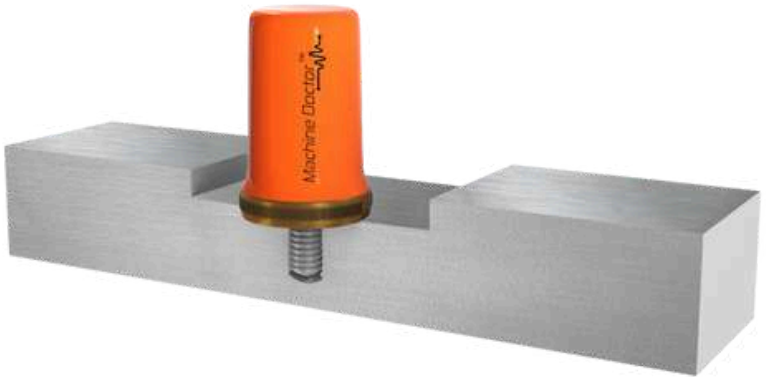
Best Practices for Sensor Mounting

- **Secure Mounting is Critical:** Always ensure the sensor is mounted firmly and does not wobble or shift over time. A loose sensor can introduce noise, reduce accuracy, and compromise diagnostics. Whether using a stud or magnetic mount, the base must be fully secured with appropriate fastening methods.
- **Avoid Obstructions**: Do not place the sensor under covers, guards, or any enclosures that may shield it from vibrations or expose it to unnecessary interference. Ensure that the sensor has a clear path to detect and transmit accurate signals.
- **Mind the Environment**: Mount the sensor in a location where it is not likely to be bumped, knocked off, or accidentally moved during routine operations. Avoid placing it near moving parts or areas that are frequently serviced or adjusted.
- **Mount in Consistent, Logical Locations**: To ensure consistency across installations and simplify troubleshooting, avoid mounting sensors in arbitrary or hard-to-reach locations. Document sensor placement relative to the equipment being monitored to assist future maintenance or auditing.
- **Clean Mounting Surface**: The surface where the sensor is mounted should be clean, dry, and free of debris, rust, or paint chips. This improves adhesion and accuracy, especially in the case of magnet + epoxy or adhesive mounts.
- **Document Equipment Details**: Take note of the equipment make, model, mounting surface type, and location. This is especially useful for large facilities or when multiple teams are involved in maintenance and monitoring.
- **Ensure Connectivity**: For wireless sensors, verify that the location offers reliable signal strength and network access. Avoid areas with known connectivity issues or electromagnetic interference from surrounding equipment.

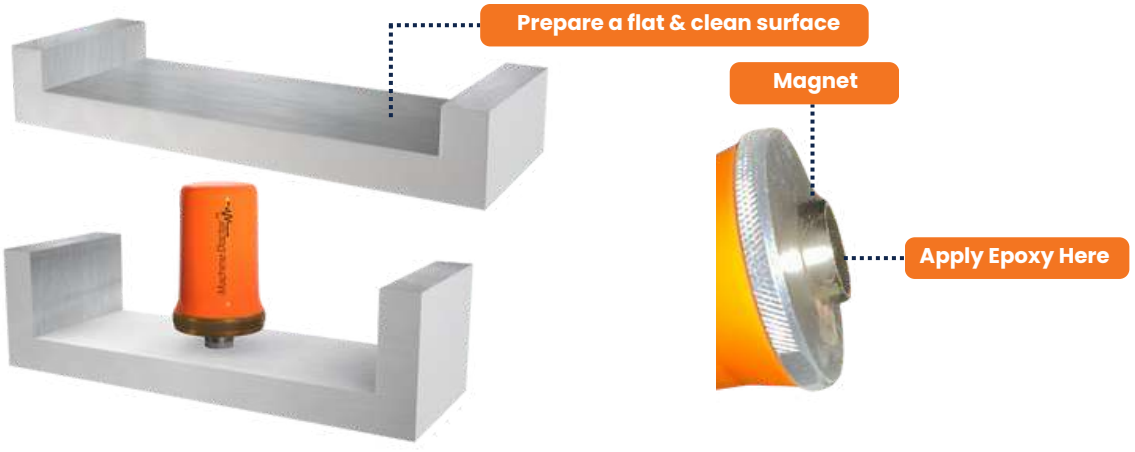
Sensor Mounting Options

The most reliable way to mount the sensor is via stud mount using a ¼"-28 stud, directly into a pre-threaded hole on the equipment with thread locker applied.

See the other "Mounting Methods" section on the following pages for more details on each approach and how to select the right one based on your application.



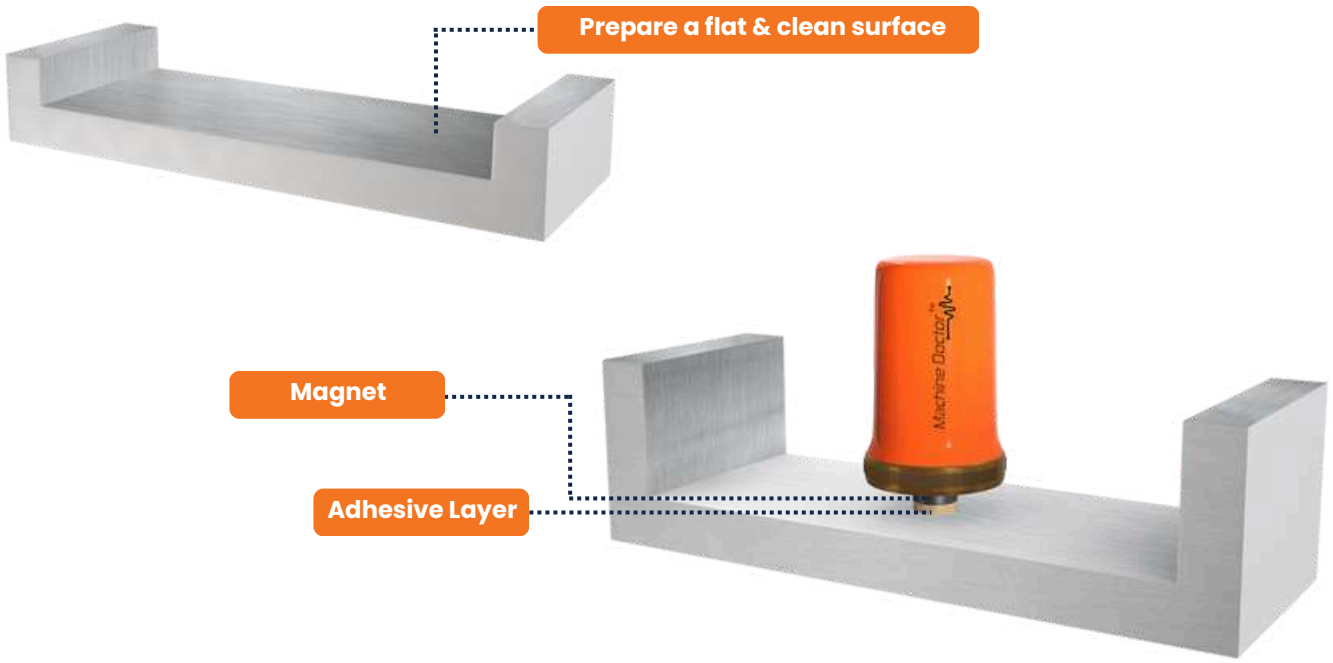
If a pre-threaded hole is not available, the next best option to mount the sensor on the equipment is to apply epoxy at the bottom of the magnet and place it on the equipment. The combination of magnet + epoxy ensures solid bond between the sensors and the equipment.



Adhesive/Magnet Mounting Installation

Option 1:

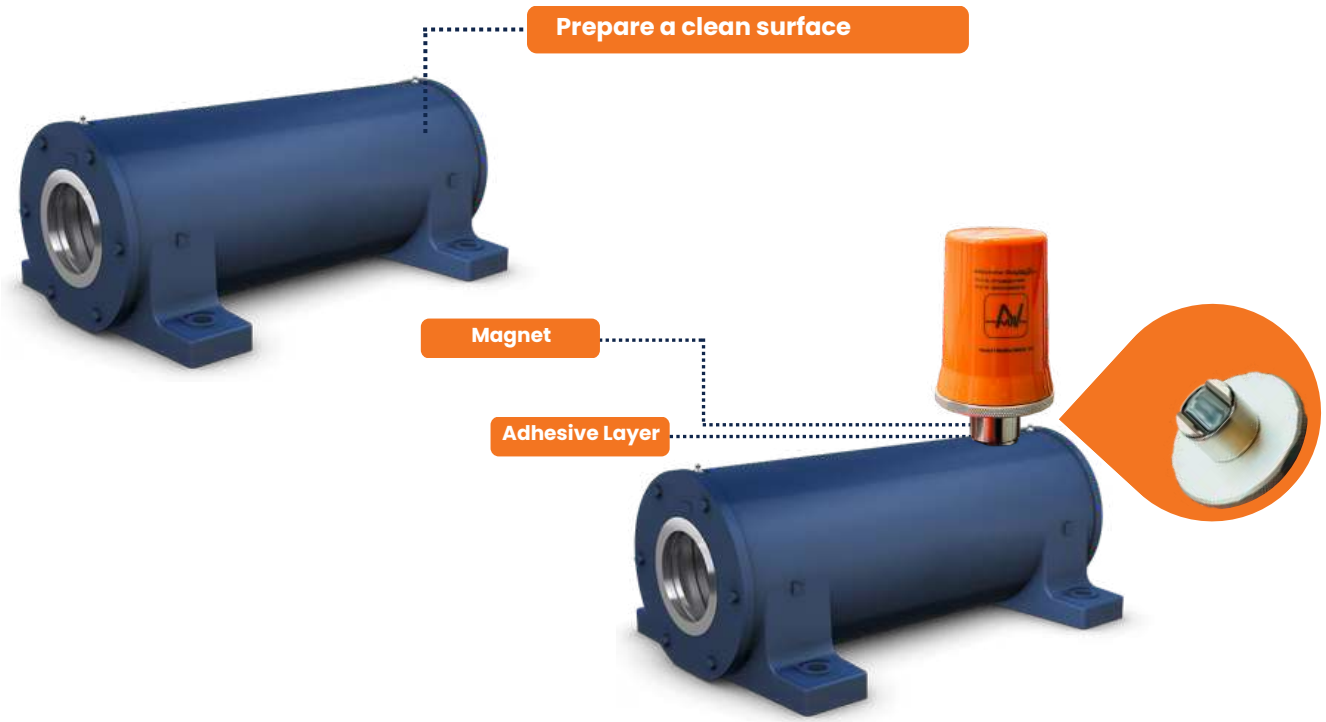
- Ensure a clean, residue-free mounting surface by removing any paint or debris.
- Achieve a smooth, flat surface through milling or grinding.
- Apply a small amount of adhesive to the underside of the mounting base (magnet).
- Press the housing and magnet firmly onto the mounting area, allowing adhesive to emerge from under the mounting base (magnet).
- Hold the sensor housing in place for about 30 seconds until the adhesive can support the MachineDoctor sensor's weight, preventing any movement.
- Allow the adhesive to fully cure.



Curved Magnet Mounting Installation

Option 2:

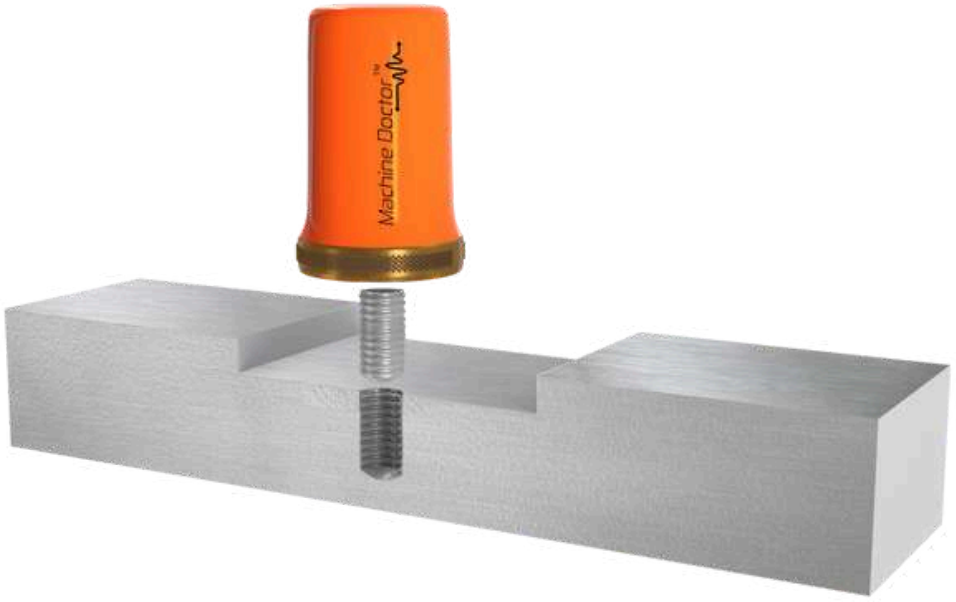
- Ensure a clean, residue-free mounting surface by removing any paint or debris.
- Achieve a smooth surface through milling or grinding.
- Apply a small amount of adhesive to the underside of the mounting base (magnet).
- Press the housing and magnet firmly onto the mounting area, allowing adhesive to emerge from under the mounting base (magnet).
- Hold the sensor housing in place for about 30 seconds until the adhesive can support the MachineDoctor sensor's weight, preventing any movement.
- Allow the adhesive to fully cure.



Sensor Installation onto Mounting Hardware/Stud Mounting

Option 3:

- Prepare flat surface using a spot face tool and drill pilot hole for tapping
- The mounting surface should be clean and free from any residue or paint
- Tap for desired threading (1/4" - 28UNF)
- Add thread locker to stud before installing sensor
- Hand-tighten the sensor to the mounting disk properly
- The mounting torque is important to the frequency response of the sensor for the following reasons:
  - If the sensor is not tight enough, proper coupling between the base of the sensor and the mounting disk will not be achieved'
  - If the sensor is over tightened, stud failure may occur

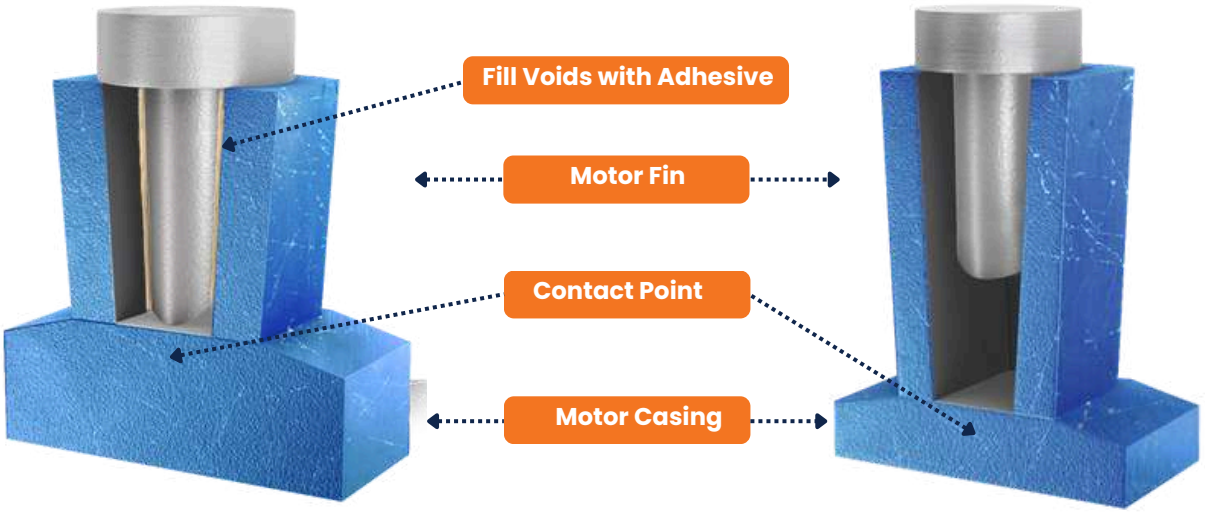


Motor Fin Mount Probe/ Pad Installation

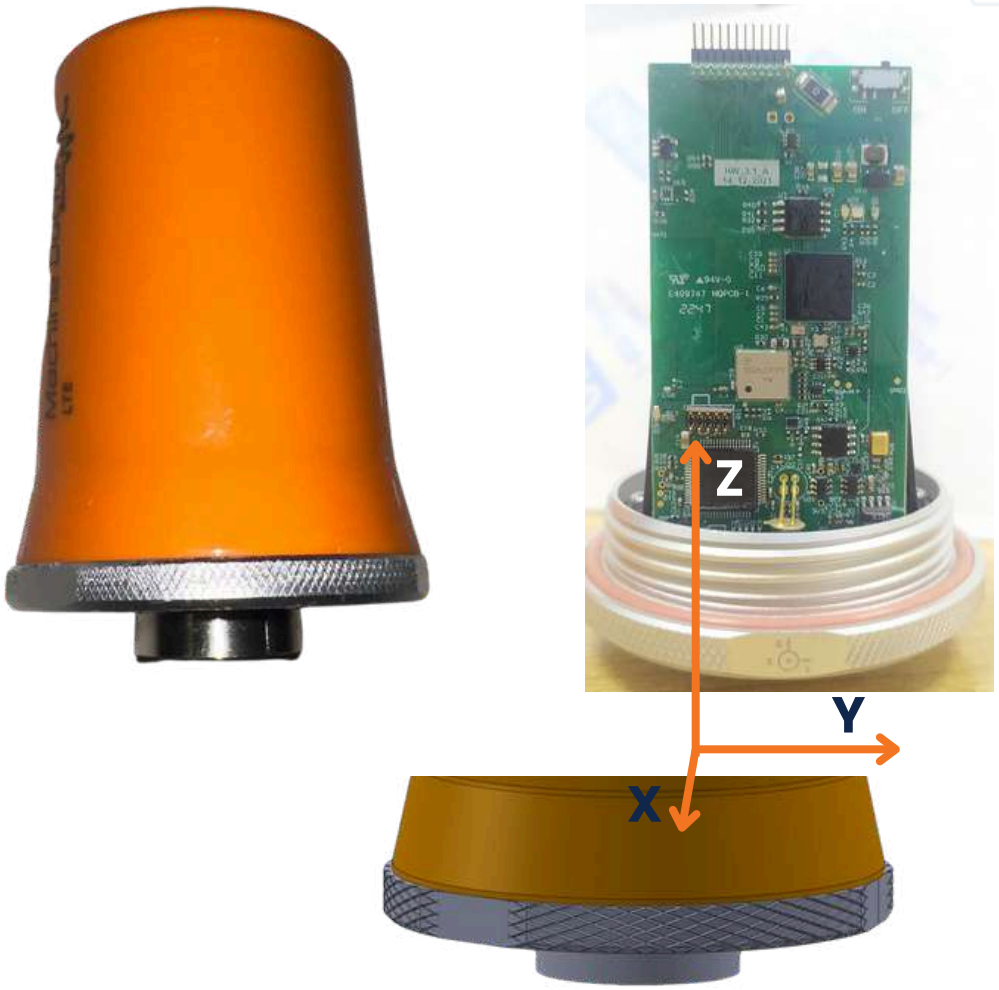
Option 4:

- Prepare cooling fins on motor for mounting by scraping or grinding any paint or debris between cooling fins
- Clean mounting area with a spray degreaser that will not leave a thin film lubricating residue
- Apply adhesive to the sides and the bottom of the probe portion of the motor fin mount probe/pad (Please note: the area is roughened to enhance the bonding area)
- Place the motor fin mount probe/pad between the motor fins at the desired location
    - The probe must fit in between the motor fins and the bottom of the probe must contact the motor casing
    - For motors that have a space greater than ½" between each fin, motor fin mount probe pads with a thickness of ½" are available and will reduce the amount of adhesive needed
- Firmly press the motor fin mount probe/pad into place, ensuring that the bottom of the motor fin mount probe/pad is touching the motor casing (this contact area is where the vibration is transferred from the motor to the sensor)
    - The tip of the motor fin mount probe/pad should be as flat against the motor casing as possible
    - The motor fin mount probe/pad should not be resting on the top of the fins

- Use a spatula to redirect any epoxy that has been displaced from the mounting area when pushing the fin mount probe/pad into place
- Fill in any remaining voids with adhesive to ensure that the motor fin will be fixed in place
- Allow full cure for the adhesive
- Add thread locker to stud before installing the sensor



Sensor Orientation

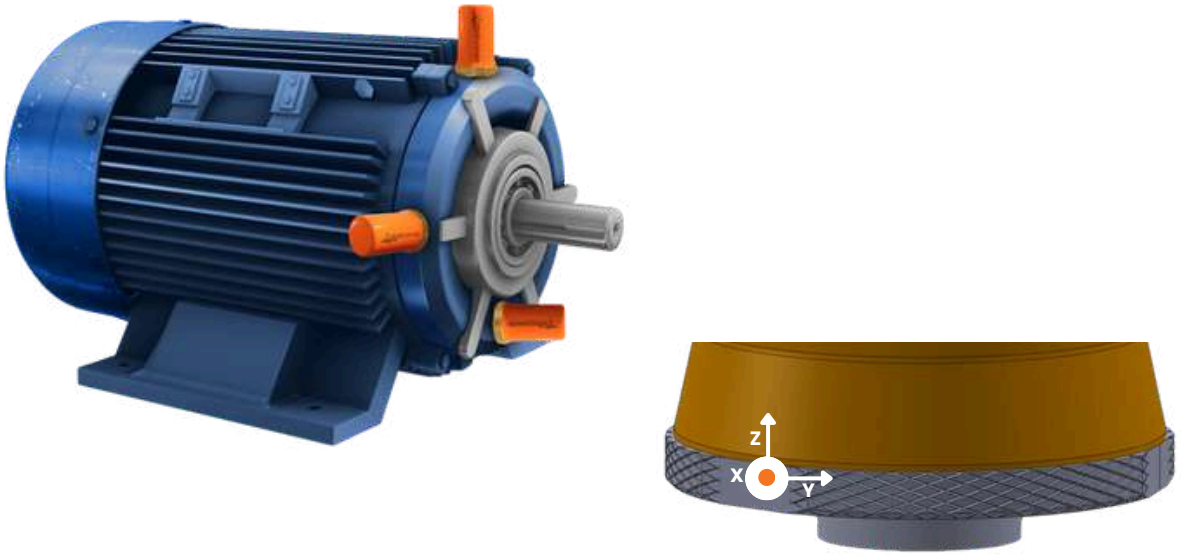


Z-Axis: Horizontal plane (In line with sensor axis)

Y-Axis: Vertical plane (Parallel with PCB)

X-Axis: Out of the plane (Perpendicular to the PCB face)

Mounting Location – Horizontal Equipment



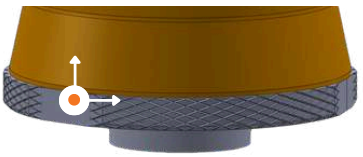
Horizontal Asset

A) 1: Vertical mount, shaft aligned with Sensor X
2: Vertical mount, shaft aligned with Sensor Y

B) 1: Horizontal mount, shaft aligned with Sensor X
2: Horizontal mount, shaft aligned with Sensor Y

C) 1: Axial mount, Vertical (gravity) direction aligned with Sensor Y
2: Axial mount, Vertical (gravity) direction aligned with Sensor X

Mounting Location – Vertical Equipment



Vertical Asset

A/B) 1: Radial mount, shaft aligned with Sensor Y
2: Radial mount, shaft aligned with Sensor X

C) 1: Axial mount (X radial, Y, Radial)

Note:
Choosing the correct mounting orientation is essential to ensure the sensor captures accurate vibration signals relative to the machine's axis of rotation. Refer to the image above for axis alignment guidance. For non-standard or specialized equipment where sensor placement is unclear (e.g., large gearboxes, vertical turbines, custom enclosures), please reach out to our team. We're happy to provide guidance based on your asset layout.

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Real-World Mounting Examples