

Wireless Vibration Sensor Installation Procedure EZDP-2146 Rev B

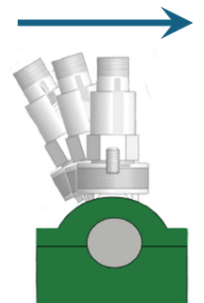
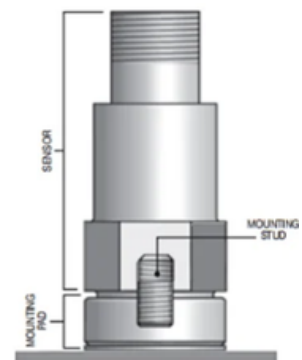


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Patents

Please send patent information requests to patents@cutsforth.com.

Safety Information

Safety Information [English]

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Safety Conventions



NOTE:

Additional information.



ELECTRICAL DANGER

Indicates an action or specific equipment area that can result in personal injury or death from an electrical hazard if proper precautions are not taken.



CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury or equipment damage.



WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



ROTATING PART CAUTION

Indicates possible injury from rotating parts.



DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

General Safety Instructions



ELECTRICAL DANGER

Only qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid injury should work with Cutsforth products. Among the many considerations are the following:

- Avoid contact with energized circuits.
- Avoid contact with rotating parts.
- Never install any component that appears not to be functioning in a normal manner.



ROTATING PART CAUTION

High-voltage and rotating parts can cause serious or fatal injury. Installation, operation, and maintenance of this product must be performed only by qualified personnel, in accordance with all applicable safety regulations and guidelines.

Consignes de Sécurité [Français]

Les informations qui suivent sont essentielles afin d'assurer la sécurité de l'utilisateur lors de l'installation et de l'opération de l'équipement. Assurez-vous de bien lire et de comprendre tous les avertissements et mises en garde qui suivent.

Conventions de Sécurité



NOTE:

Informations supplémentaires.



RISQUES DE CHOC ÉLECTRIQUE

Indique que l'action ou la partie de l'équipement concernée peut mener à des blessures par électrisation ou à la mort par électrocution si les précautions adéquates ne sont pas prises.



MISE EN GARDE

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures mineures à modérées ou à des dommages matériels.



AVERTISSEMENT

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures sévères ou à la mort.



MISE EN GARDE : PIÈCE ROTATIVE

Indique la présence de pièces d'équipement rotatives pouvant causer des blessures.



DANGER

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures sévères ou à la mort.

Consignes de Sécurité Générales



RISQUES DE CHOC ÉLECTRIQUE

L'utilisation des produits Cutsforth n'est recommandée qu'aux professionnels qualifiés qui savent comment reconnaître la présence de risques de choc électrique ainsi que les consignes de sécurité à suivre pour éviter les blessures liées à ces risques. Lesdites consignes de sécurité incluent, sans s'y limiter :

- Éviter tout contact avec des circuits alimentés;
- Éviter tout contact avec des pièces d'équipement rotatives;
- Ne jamais installer de composante ne paraissant pas fonctionner normalement;



MISE EN GARDE : PIÈCE ROTATIVE

Les pièces d'équipement rotatives et sous haute tension peuvent causer des blessures sévères ou fatales. L'installation, l'opération et la manutention de ce produit ne doivent être faites que par des professionnels qualifiés et en respectant toutes les règles et consignes de sécurité applicables.

1. Wireless Accelerometer Mounting and Installation Guide

1.1. Introduction

This document focuses on wireless accelerometer installation techniques. It includes stud mounting, adhesive mounting, and magnetic mounting. The document describes the tools and materials required, and best practices for sensor location.

There are four objectives when mounting accelerometers:

- Minimize the mass (weight) added to the machine
- Maximize the surface area contact between the accelerometer and the machine
- Maximize stiffness of the mount
- Locate the sensor mount close to the source of vibration (bearing housing)

Stud mounting and adhesive mounting provide the best repeatability of vibration data collection. Both techniques provide higher frequency ranges, often to the full useful range of the sensor. However, adhesive and stud mounting require more time and care compared to magnetic mounting.

Proper permanent installation of vibration sensors will maximize frequency response, maximize data quality, and ensure long-term adhesion to the machine. To ensure long-term, it is necessary to use proper surface preparation and use materials compatible with the machinery environment.

1.2. Choosing Accelerometer Mounting Location

Vibration sensors should be mounted on the bearing housing, or as closely as possible and oriented in a horizontal, vertical, or axial direction. The top-dead-center position is preferred for permanent online monitoring. Locations with high temperature variations or significant air flow velocities should be avoided if possible. See [Figure 1](#) for location orientation. For triaxial accelerometers, the vertical position is preferred.

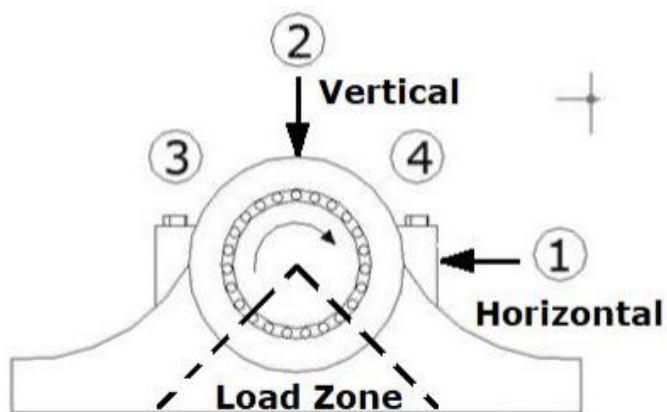


Figure 1. Mounting location priority (image courtesy of STI Vibration Monitoring)



Figure 2. Triaxial sensors mounted in the horizontal position of a horizontally oriented motor and vertically on a vertically oriented motor

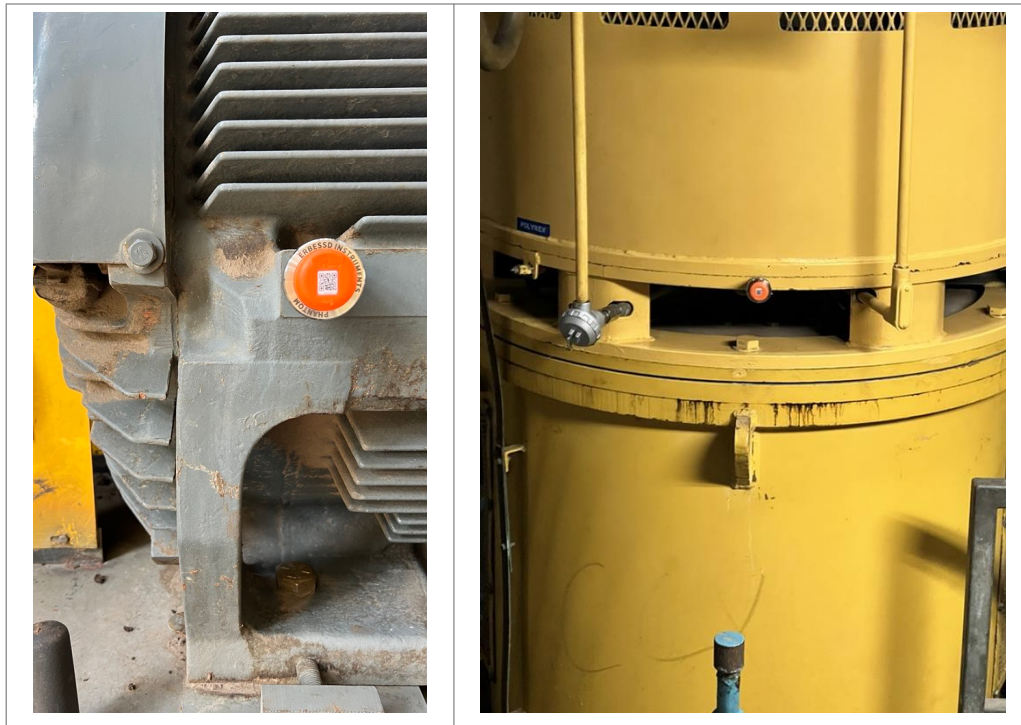


Figure 3. Triaxial sensors mounted in the vertical position of the motor and input bearing of the pump

1.3. Common Tools for Accelerometer Mounting

Figure 4 depicts common tools used for accelerometer mounting.

For adhesive mounting, a spot facing tool, file, and wire brush are useful along with (not shown) fine-grit sandpaper (e.g., 400–600 grit) or a Scotch-Brite pad to lightly abrade the surface. Additionally, lint-free cloth soaked in a solvent like isopropyl alcohol (IPA) or acetone to remove oils and grease.

When stud mounting, additional tools are used including a pilot drill bit, taps, tap handle, and center punch. Stud mounting is the preferred method.

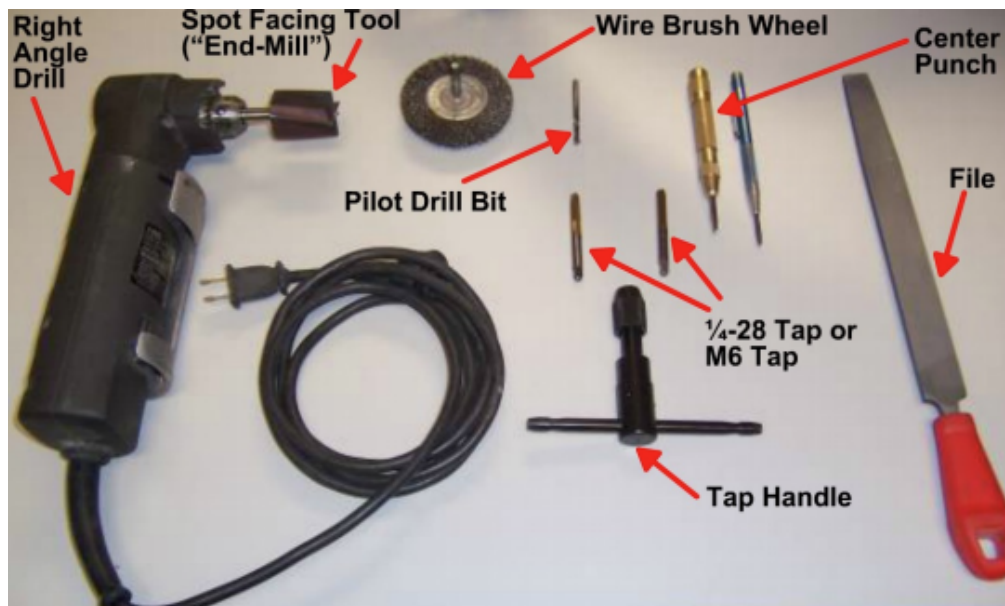


Figure 4. Common Tools for accelerometer mounting (image used courtesy of Connection Technology Center, Inc.)

2. Stud mount

Whenever possible, it is best to drill a hole in the object and fix the sensor to the device under test (DUT) with a screw.

Stud mounting provides a stiff mechanical connection and is capable of transferring the high-frequency vibrations of the object to the sensor.

Stud mounting best meets intrinsically safe requirements since the case of the sensor is grounded to the machinery.



Figure 5. An example of a stud-mounted piezoelectric accelerometer (image used courtesy of PCB Electronics)

2.1. Part Numbers for Stud Mount

- MH108-4B — 1/4-28 Mounting Stud, Stainless Steel, 0.5" (13 mm) Length



Mounting stud is not needed with Erbesd Phantom wireless because Erbesd Phantom sensors are shipped with a stud installed

2.2. Stud Mounting Procedure

1. Recommend using an ultrasonic thickness gauge. Recommended minimum thickness of 0.250" to 0.300".
2. Choose a spot face diameter that has the same diameter as the surface of the sensor.
3. Choose the tap that matches the sensor mounting stud. Choose an appropriate pilot hole diameter, allowing the tap to create threads for the mounting stud.
4. Create a flat spot on the surface of the machinery. Apply even pressure to insure flatness. Surface should be 0.001 inches or better. Surface finish should be 65 or better.
5. Drill a pilot hole in the center of the flat spot that is slightly deeper than the length of the mounting stud. The pilot hole is to be perpendicular to the machine surface. Ensure a stop collar is installed on the pilot bit, to ensure the bit does not penetrate through the housing.
6. Tap the pilot hole with the appropriate tap set. Start using the "starter tap". Finish using the "bottom tap" which will cut threads to the bottom of the hole.
7. Clean the surface of the mounting location.
 - Initial Cleaning:
 - Remove loose debris: Use a brush or compressed air to clear dust and particles.
 - Degrease: Wipe the surface with a lint-free cloth soaked in a solvent like isopropyl alcohol (IPA) or acetone to remove oils and grease.
8. Apply a thread locker such as Loctite 243 to the threads of the stud to prevent loosening from shock and vibration.
9. Screw and tighten the sensor in place, tightening to a range of 2 to 5 foot-pounds (2.7 to 6.8 Nm).
10. Paint any exposed metal on the surface of the machine to prevent corrosion.

3. Adhesive mount

Sometimes it is not possible to drill a hole into the structure, or the design of some accelerometers does not allow us to use stud mounting. In these cases, we can use an adhesive to secure the sensor to the monitored object.

Epoxy pads are also frequently used for permanent mounting of sensors where drilling and tapping are not permitted or possible. Properly installed epoxy pads can transmit high-frequency data (10 kHz or 600,000 CPM) very well and therefore can be used effectively for monitoring many gearbox and bearing faults. Avoid using them in cooling towers or other aggressive environments that could interfere with the bonding of the adhesive.

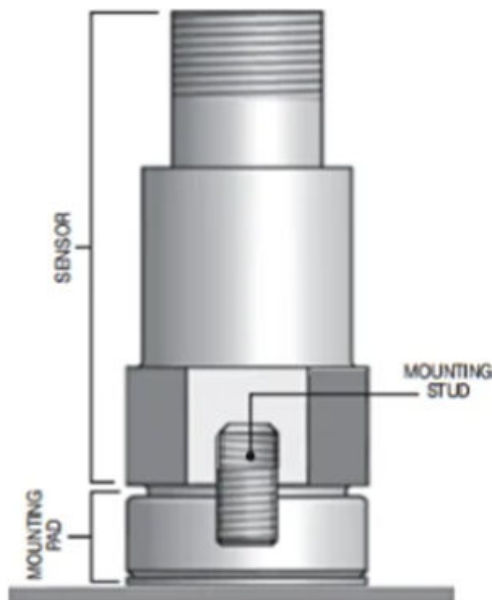


Figure 6. An example of using an adhesive mounting base to mount an accelerometer (image used courtesy of Condition Monitoring Analytics)

3.1. Part Numbers for Adhesive Mount

- MH130-1A — Mounting Disk with 1/4-28 Blind Tapped Hole, 1.0 in. (25.4 mm) Diameter — base/mounting pad that can be epoxied onto surface of the asset
- MH108-4B — 1/4-28 Mounting Stud, Stainless Steel, 0.5" (13 mm) Length



Mounting stud is not needed with Erbesd Phantom wireless because Erbesd Phantom sensors are shipped with a stud installed

- Adhesive recommendations for adhesive mount:
 - Purchased separately when ready to install
 - Epoxy: Loctite AA330
 - Activator: Loctite 7387
- The above is easy to apply, the attenuation is minimal, it is very forgiving and adheres to almost every surface. Our team has tried several other epoxies and the Loctite combo above is the best performance that the team has used.
- Industrial adhesives have a shelf life/expiration date. As with all adhesives, order what you need when you need it and be cognizant of ambient temperature for cure times.

3.2. Adhesive Mounting Procedures Milled Surface

1. Choose a spot face diameter that has the same diameter as the surface of the sensor.
2. Create a flat spot on the surface of the machinery. Apply even pressure to insure flatness. Surface should be as flat as practical.
3. Clean the surface of the mounting location.
 - Initial Cleaning:
 - Remove loose debris: Use a brush or compressed air to clear dust and particles.
 - Degrease: Wipe the surface with a lint-free cloth soaked in a solvent like isopropyl alcohol (IPA) or acetone to remove oils and grease.
 - Surface Preparation:
 - Smooth the surface: Use fine-grit sandpaper (e.g., 400–600 grit) or a Scotch-Brite pad to lightly abrade the surface. This increases surface area for better adhesion.
 - Clean again: After abrasion, clean the surface again with IPA to remove any residue or particles.
4. Apply a thin layer of Loctite 330 to the pad. Make sure the adhesive is compatible with all the environmental factors, including chemicals, moisture, and heat.
5. Spray Loctite activator to the surface the pad is being adhered to.
6. Hold the pad in place for 30 seconds.
7. Tape the pad in place until the adhesive cures (see data Loctite 330 data sheet). Consider curing times of 3 to 6 hours, with 24 hours prior to applying any weight to the pad.
8. Apply a thread locker such as Loctite 243 to the threads of the stud to prevent loosening from shock and vibration.
9. Screw and tighten the sensor in place, tightening to a range of 2 to 5 foot-pounds (2.7 to 6.8 Nm).
10. Paint any exposed metal on the surface of the machine to prevent corrosion.

4. Magnetic mount

A final (third) method for mounting an accelerometer is magnetics. Magnetic mounting can be used when the object being monitored has a ferromagnetic surface. This method is preferred for flexible temporary use.

In the case of non-magnetic or rough surfaces, you can weld or epoxy a steel pad to accept the magnetic base.



Figure 7. Example of a magnetically mounted accelerometer (image used courtesy of Wilcoxon)

4.1. Part Numbers for Magnetic Mount

- MH114-3A — recommended magnetic (mag) mount

4.2. Magnetic Mounting Procedure

1. Determine the mounting location for the accelerometer.
2. Apply a thread locker such as Loctite 243 to the threads of the stud to prevent loosening from shock and vibration.
3. Screw and tighten the sensor to the magnet, tightening to a range of 2 to 5 foot-pounds (2.7 to 6.8 Nm).
4. "Rock" the sensor/magnet combination onto the selected location as shown in [Figure 8](#).

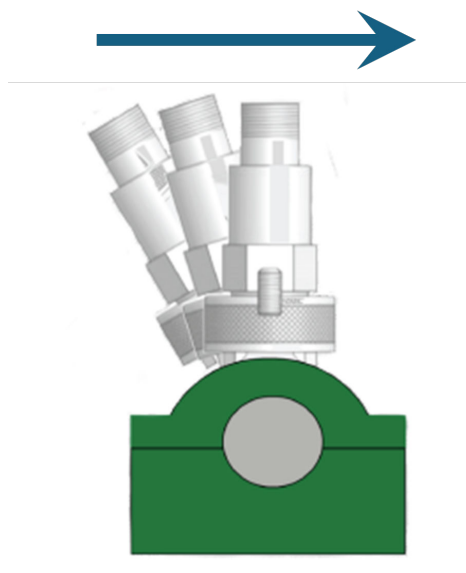


Figure 8. “Rocking” motion for magnetically mounting an accelerometer (image courtesy of Connection Technology Center)