PCB PIEZOTRONICS
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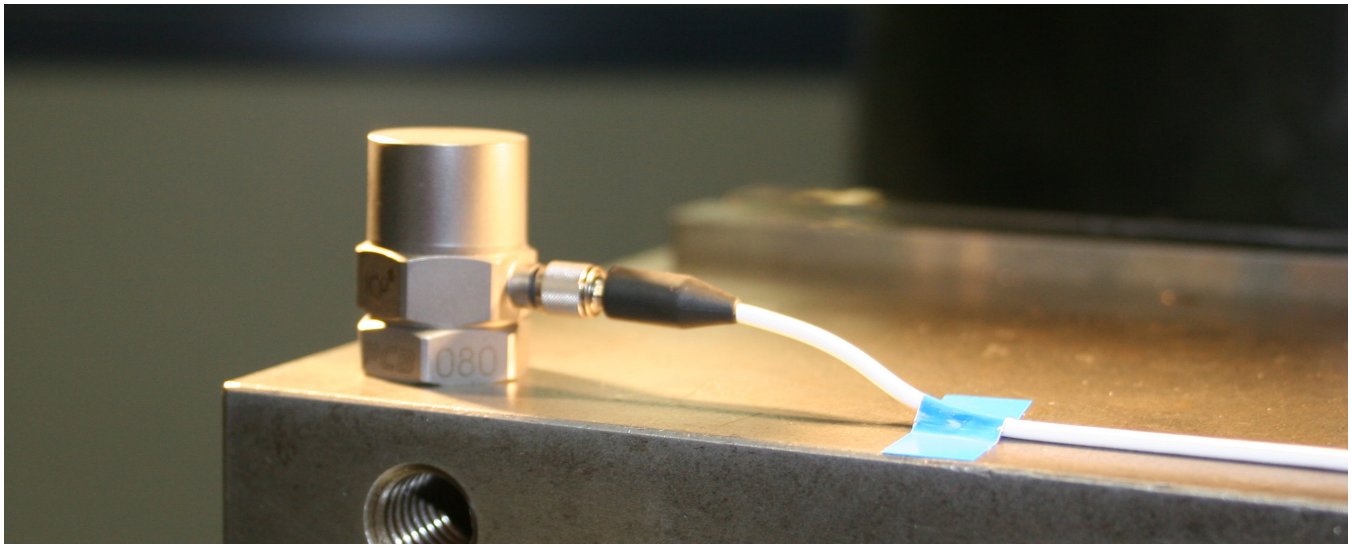


TN-5

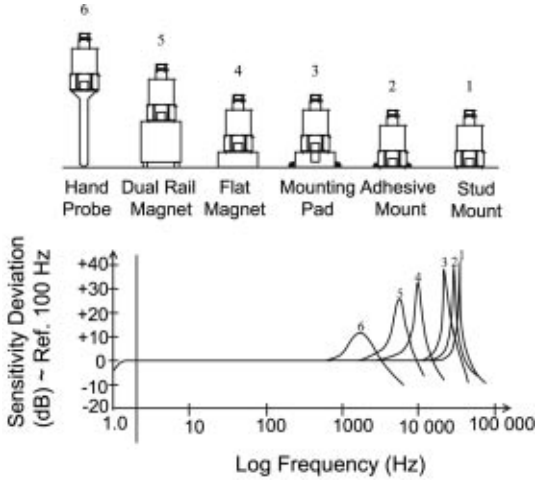
Mounting Techniques

MOUNTING TECHNIQUES

1.0 Installation Overview

When choosing a mounting method, both the advantages and disadvantages of each technique should be closely considered. Characteristics such as location, ruggedness, amplitude range, accessibility, temperature and portability may be extremely critical. However, often times the most important and overlooked consideration is the affect the mounting technique will have on the high frequency operating range of the accelerometer.

Shown below are six possible mounting techniques and their affect on the response of a typical piezoelectric accelerometer. (Note that not all of the mounting methods may apply to your particular sensor.) By examining the mounting configurations and corresponding graph, it can be seen that the high frequency response of the accelerometer may be compromised as mass is added to the system and/or the mounting stiffness is reduced.



Effect of mounting technique on resonant frequency

Note: The low frequency response is unaffected by the mounting technique. This roll-off behavior is typically fixed by the built-in sensor electronics. However, when operating AC coupled signal conditioners with readout devices that have an input impedance of less than 1 megohm, the low frequency range may be affected.

1.1 Stud Mount

This mounting technique requires smooth, flat contact surfaces for proper operation and is recommended for permanent and/or secure installations. Stud mounting is also recommended when testing at high frequencies.

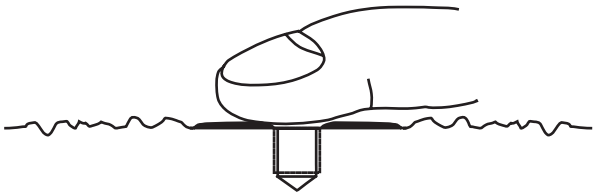
Note: Do NOT attempt mounting on curved, rough or uneven surfaces as the potential for misalignment and limited contact surface may significantly reduce the sensors upper operating frequency range.

1.1.1: First, prepare a smooth, flat mounting surface, and then drill and tap a mounting hole in the center of this area according to the sensor's installation drawing provided.

A precision machined mounting surface with a minimum finish of 63 µin (0,00016 mm) is recommended. (If it is not possible to properly prepare the machine surface, consider adhesive mounting as a possible alternative.) Be certain to inspect the area checking that there are no burrs or other foreign particles interfering with the contact surface.

1.1.2: Wipe clean the mounting surface and spread on a light film of grease, oil or similar coupling fluid prior to installation.

Adding a coupling fluid improves vibration transmissibility by filling small voids in the mounting surface. This consequently increases the mounting stiffness. For permanent mounting, substitute epoxy or other type of adhesive.



Applying a thin film of grease

1.1.3: Hand tighten the sensor/mounting stud to the machine and secure the device by applying the recommended mounting torque.

It is important to use a torque wrench during this step as under torquing the sensor may not adequately couple the device, while over torquing may result in stud failure.

Mounting Techniques

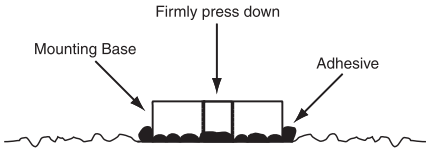
1.2 Adhesive Mount

Adhesive mounting is often used for temporary installations or where the machine surface cannot be adequately prepared for stud mounting. Adhesives such as hot glue and wax work well for temporary mounts whereas two-part epoxies and quick bonding gels provide a more permanent mount.

Note: Adhesively mounted sensors often exhibit a reduction in high frequency range. In general, smooth surfaces and stiff adhesives will provide the best frequency response. Contact the factory for recommended epoxies.

1.2.1 - Use of Separate Adhesive Mounting Base

This method involves mounting a base to the machine surface and then securing the sensor to this base. This allows for easy removal of the accelerometer.



Installation of an adhesive mounting base

1.2.1.1: Prepare a smooth, flat mounting surface. A minimum surface finish of 63 µin (0,00016 mm) generally works best.

1.2.1.2: Stud mount the sensor to the appropriate adhesive mounting base according to the guidelines set forth in '1.1.2' and '1.1.3' of the Standard Stud Mount Procedure. Clean surface thoroughly to rid of grease or oil, then place a small portion of adhesive on the under side of the sensor.

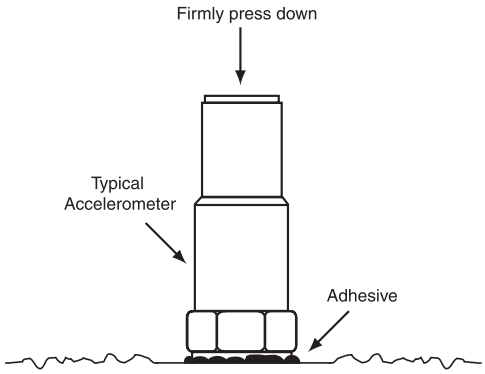
1.2.1.3: Place a small portion of adhesive on the under side of the mounting base. Then, firmly press down on the assembly to displace any extra adhesive remaining under the base.

1.2.2 - Direct Adhesive Mount

For restrictions of space, mass and/or convenience, most sensors (with the exception of integral stud models) can be directly adhesively mounted to the machine surface.

1.2.2.1: Prepare a smooth, flat mounting surface. A minimum surface finish of 63 µin (0,00016 mm) generally works best.

1.2.2.2: Clean surface thoroughly to rid of grease or oil, then place a small portion of adhesive on the under side of the sensor. Firmly press down on the top of the assembly to displace any adhesive. Be careful as excessive amounts of adhesive may make sensor removal difficult.

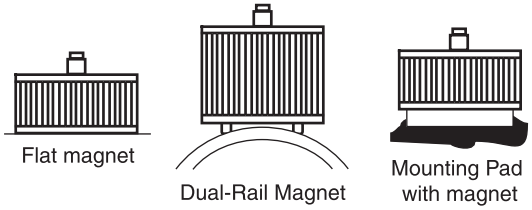


Direct adhesive mounting of a sensor

1.3 Magnetic Mount

Magnetic mounting provides a convenient method for portable measurements and is commonly used for machinery monitoring and other portable or trending applications.

Note: The correct choice of magnet and an adequately prepared mounting surface is critical for obtaining reliable measurements, especially at high frequencies. Poor installations can cause as much as a 50% drop in the sensor frequency range.



Methods of magnetically mounting

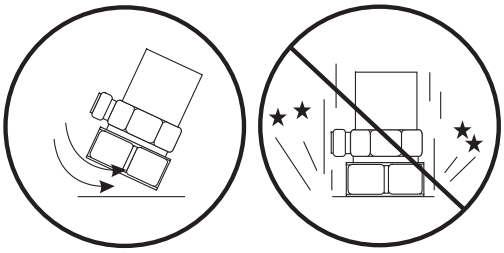
Not every magnet is suitable for all applications. For example, rare earth magnets are commonly used because of their high strength. Flat magnets work well on smooth, flat surfaces, while dual-rail magnets are required for curved surfaces. In the case of non-magnetic or rough surfaces, it is recommended to first weld, epoxy or otherwise adhere a magnetic steel mounting pad to the test surface. This will provide a smooth and repeatable location for mounting.

1.3.1: After choosing the correct magnet type, inspect the unit checking that the mounting surfaces are flat and smooth.

1.3.2: Stud mount the accelerometer to the appropriate magnet according to the guidelines set forth in 'STEP 2' and '1.1.3' of the Standard Stud Mount Procedure.

1.3.3: Prepare a smooth, flat mounting surface. A minimum surface finish of 63 μin (0,00016 mm) generally works best. Then, after cleaning the surface and checking for burrs, wipe on a light film of silicone grease, machine oil or similar type coupling fluid.

1.3.4: Mount the magnet/sensor assembly to the prepared test surface by "rocking" or "sliding" it into place.



How and how not to engage a magnetic mounted sensor

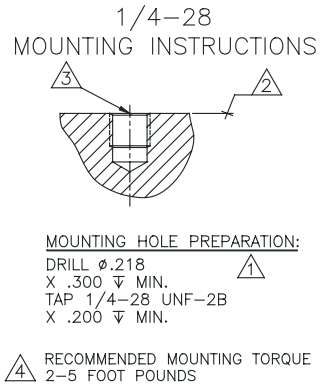
Note: Carelessly magnetically mounting accelerometers has the potential to generate very high and potentially damaging 'g' levels. To withstand this abuse, be certain the sensor has built-in shock protection. If unsure, contact IMI.

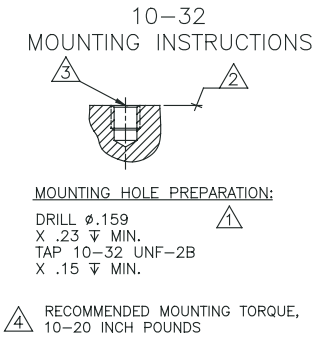
1.4 Hand-held Probe Tip

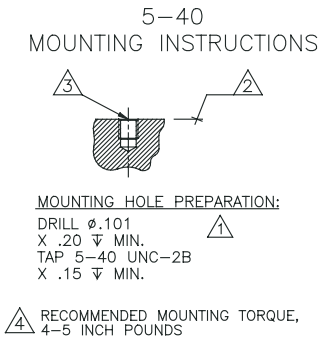
This method is NOT recommended for most applications. It is generally used only for machinery monitoring and other portable trending applications. Both the accuracy and repeatability at the low (<5Hz) and high frequency (>1000 Hz) ranges are questionable.

DRILLING AND TAPPING INSTRUCTIONS

To insure proper results, when possible, refer to the installation instructions that have been supplied for the specific sensor to be installed. The following instructions are provided as a convenience.







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