



This document illustrates the main steps involved in the installation of VibroSystM equipment.

Keep in mind that only a general overview is presented, as this document is intended for planning purposes only. Concerns about safety issues or specific installation considerations are not included.

For safe operation and to ensure that your system functions at its optimum capability, the installation and adjustment process should be handled only by VibroSystM trained service specialists.



797V Piezoelectric Velocity Sensor

Installation Manual

(Product # : 9400-09M2A-103)

This manual divides into the following sections:

Section 1: Installation of the 797V Piezoelectric Velocity Sensor and Cable

Section 2: Datasheet:

- Model 797V PiezoVelocity Transducer



1. INSTALLATION OF THE 797V PIEZOELECTRIC VELOCITY SENSOR

1.1 Preliminary considerations



- The 797V piezoelectric velocity sensor is a solid-state device with an isolated piezoceramic sensing element capable of detecting high-level displacements in the same axis as the mounting hole on medium speed machines. It contains no moving parts and can be oriented in any direction.
- Operates under most harsh environmental conditions.
- Unaffected by dirt, oil, and most chemical atmospheres.
- The piezoelectric membrane minimizes the effects of transverse motion, base strain, and thermal transients.
- The flat frequency response is from 4 Hz to 1 kHz.

- The mounting location must be chosen according to application. Absolute shaft vibration measurement applications requires that the velocity sensor be mounted on the same support structure and in the same axis as the proximity probe.
- The 797V piezoelectric velocity sensor is shipped with a captive screw for stud mounting. In selecting mounting location, pay attention to accessibility.
- The velocity sensor must in most cases directly contact the machine surface.



If the velocity sensor is installed on an insulated bearing, a nonconductive mounting support must be used to preserve the integrity of insulation.

- The closer the contact is between the velocity sensor and the machine, the better the ability to couple and measure high frequency signals. Best efforts must be made to provide a flat, smooth, and even mounting surface by spot facing the location. The tapped hole must be perpendicular within 1° to the mounting surface.
- Avoid mounting the sensor on thin sections or vibration-free areas.
- Excessive mechanical shock from hard impacts can destroy the internal electronic components or fracture the piezoelectric crystal. **Avoid dropping the velocity sensor.**



1.2 SENSOR INSTALLATION



1.2.1 Supplies needed:

- Mounting screw 1/4-28 UNF or M6x1
- Loctite 222 thread adhesive

1.2.2 Tools needed

- Drill bits 7/32" or 5mm
- Tap drills 1/4-28 UNF or M6x1
- Torque screwdriver

Caution: Use great care in handling the Model 797V velocity sensor. **NEVER DROP** it or hit it against a solid object. Keep it stored in its box until you have surveyed and prepared the location suitable for installation.

1.2.3 Step 1) Preparation of the mounting area

1. Select the best mounting location according to your application (refer to preliminary considerations). Prepare the surface and mounting hole according to Figure 1a) if the screw has UNF thread or Figure 1b) if the screw has a metric thread.

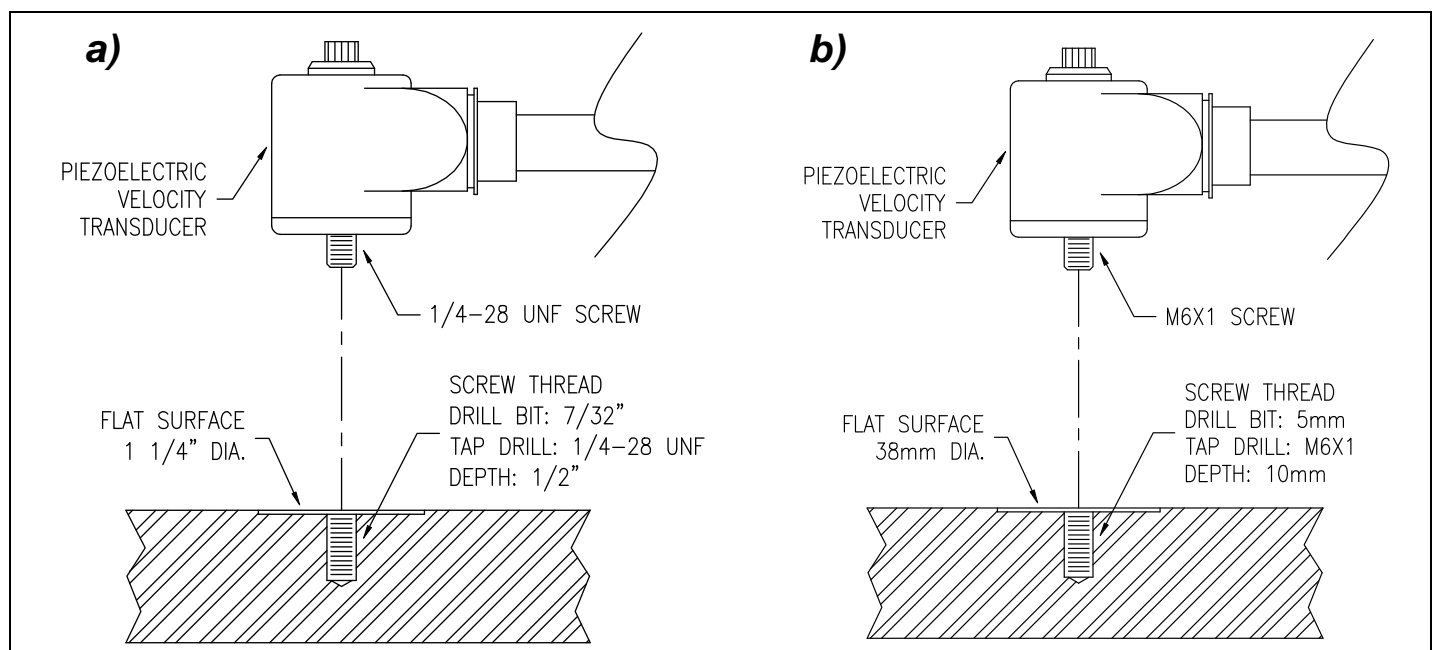


Figure 1 : Preparation of mounting area



1.2.4 Step 2) Installation of the velocity sensor

1. Mount the velocity sensor using a torque screwdriver for tightening. The supplied captive screw should be torqued to a nominal value of 3,3895 Nm (30 lb-in). Under-torquing the velocity sensor reduces the stiffness of the coupling, while over-torquing can cause permanent thread damage.

Note: Use loctite 222 thread adhesive for better results.

Installation on an insulated bearing



If the sensor is installed on an insulated bearing, special care must be taken to preserve the insulation of the bearing.

The most widely recommended mounting method consists in placing a 0.063 in. thick mica sheet between mounting bracket and bearing, and using non-metallic screws.



E251105A

1. Shown here is an alternate mounting method. The sensor is installed on an insulating block.



E251105B

2. Glue is applied on the block and insulated surface.



3. The sensor is held in place until the glue has set. The sensor can be mounted vertically or horizontally.

1.3 CABLE INSTALLATION

1.3.1 Preliminary considerations



- This twisted pair, shielded, yellow teflon cable is 5 m (16 ft.) long and will run between the piezoelectric velocity sensor and the acquisition/monitoring unit.
- In applications of 1 kHz maximum frequency such as the ones this sensor is designed for, the cable capacitance of 30 pF per foot allows the cable to run over a total length of 100 m (330 ft.). For applications involving cable longer than 5 m (16 ft.), a tapping box is needed.
- The cable should be enclosed in a protective conduit.

1.3.2 Step 1) Installation of the cable

1. Determine the run of the cable, keeping in mind that its maximum length is 100 m (330 ft.).
2. Unroll the protective conduit following the planned course of the cable. Cut the conduit to desired length.
3. With a fish tape, carefully pull the cable into the conduit. The socket connector must be placed on the velocity sensor side.
4. Connect the cable to the sensor.

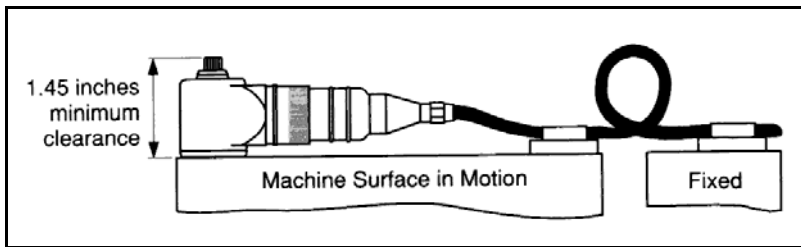


Figure 2 : Securing the cable

5. Anchor the cable to reduce stress at the cable terminations. When securing the cable, leave enough slack to allow free movement of the velocity sensor as shown in Figure 2.

1.3.3 Step 2) Connection of the power and output cable

1. Connect the wires according to the following designation:

PIN #	WIRE COLOR	DESIGNATION
A	White	Power/signal
Shell	Shield	Ground
B	Black	Common

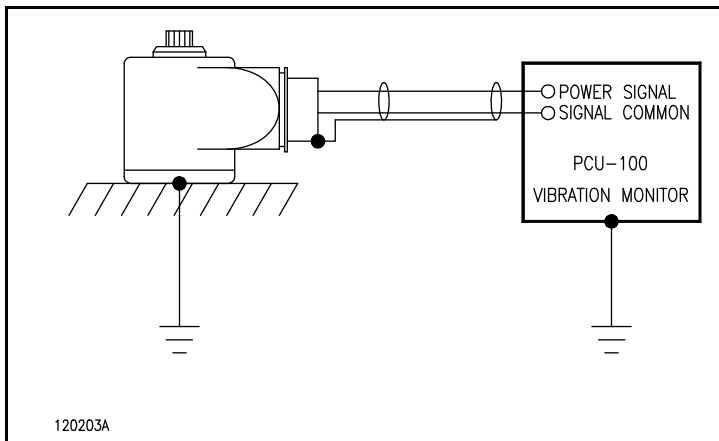


Figure 3 : Uninsulated bearing

a) Uninsulated bearing

The housing of the velocity sensor is connected to ground: do not connect the cable shield-to-ground at the monitored end.

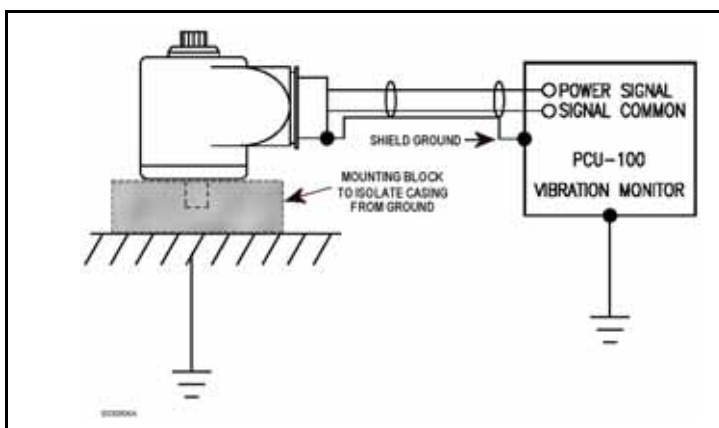


Figure 4 : Insulated bearing

b) Insulated bearing

The housing of the velocity sensor is isolated from ground: connect the cable shield-to-ground at the monitored end.



1.3.4 Step 3) Verification

1. Verify that the 797V piezoelectric velocity sensor is functioning well: measure the voltage at the output of the velocity sensor (e.g. between black and white wires, at input of the acquisition/monitoring unit). Note that the warm-up time is about two minutes. The bias voltage (or voltage at rest) should be about $10 V_{DC}$ ($\pm 1V$).
2. Much lower or higher DC bias voltages indicate internal problems and the velocity sensor should be carefully packed and returned to the factory for repair.

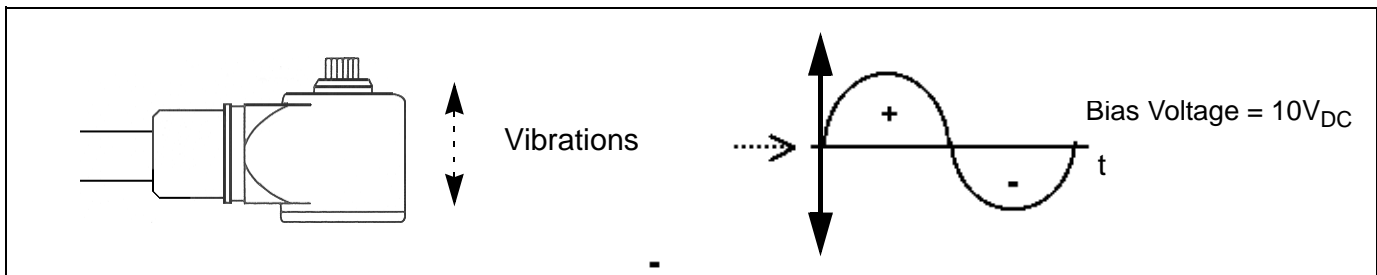


Figure 5 : Vibrations to bias voltage



Premium, PiezoVelocity® Transducer



Sensitivity, $\pm 10\%$, 25°C	100 mV/in/sec
Velocity Range	50 in/sec peak
Amplitude Nonlinearity	1%
Frequency Response:	
$\pm 10\%$	2.0 - 3,500 Hz
$\pm 3\text{ dB}$	1.6 - 7,000 Hz
Resonance Frequency	18 kHz
Transverse Sensitivity, max	5% of axial
Temperature Response	-50°C -15% $+120^{\circ}\text{C}$ $+10\%$

ELECTRICAL

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 10 mA
Electrical Noise, equiv. in/sec:		
Broadband	2.5 Hz to 25 kHz	100 μ in/sec
Spectral	10 Hz	10 μ in/sec
	100 Hz	0.8 μ in/sec
	1000 Hz	0.1 μ in/sec
Output Impedance, 4mA supply, the greater of		5,000/f or 200 Ω
Bias Output Voltage		10 VDC
Grounding		case isolated, internally shielded

ENVIRONMENTAL

Temperature Range	-50 to 120°C
Vibration Limit	250 g peak
Shock Limit	2,500 g peak
Electromagnetic Sensitivity, equiv. in/sec	50 μ in/sec/gauss
Sealing	Hermetic
Base Strain Sensitivity	0.004 in/sec/ μ strain

PHYSICAL

Sensing Element Design	PZT ceramic / shear
Weight	148 grams
Case Material	316L stainless steel
Mounting	1/4-28 captive socket head screw
Output Connector	2 pin, MIL-C-5015 style
Mating Connector	R6 type
Recommended Cable	J9T2A

CONNECTOR PIN	FUNCTION
SHELL	ground
A	power/ signal
B	common

#12105-01captive socket head (International customers specify mounting requirements); Calibration data (level 3).

OPTIONS: Intrinsic Safety certifications.



FEATURES:

- Rugged design
- Internally integrated to velocity
- Eliminates distortion caused by high frequency signals
- Corrosion resistant
- ESD protection
- Miswiring protection
- Mounts in any orientation

