Velomitor® Piezo-Velocity Sensor

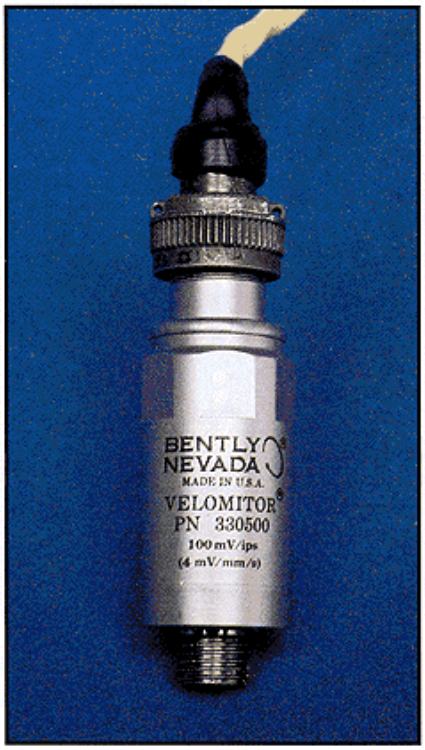
Since its introduction in 1991, the Velomitor® Piezo-Velocity Sensor has proven durable in over 1,000 industrial installations worldwide. Its primary application is for measuring bearing housing or case vibration on machines with rolling element bearings, such as pumps, compressors, motors and fans, where casing measurements are considered appropriate and are preferred. The Velomitor® is accurate and stable in these tough measurement applications.

With no moving parts, a Velomitor® can provide many years of trouble-free service. Its principle of operation is based on a piezoelectric crystal at its core connected to on-board electronics consisting of a low noise amplifier/integrator. The sensor with integral electronics is then packaged in a hermetically-sealed, stainless steel case for maximum ruggedness.

Hazardous area approvals obtained

Petroleum refining and chemical processing plants routinely process and consume flammable gases and liquids. These operations have designated hazardous (flammable) areas that require agency-approved sensors for monitoring rotating machinery. Bently Nevada recognizes the importance of complying with safety standards that are established by experts in the field of hazardous areas. We have designed the Velomitor® to comply with these stringent safety standards and have received approval certificates from the following agencies:

Canadian Standards Association - Classes I, II and III, Divisions 1 and 2, Groups A through G



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Factory Mutual Research (USA) - Classes I, II and III, Divisions 1 and 2, Groups A through G

SIRA Safety Services Ltd. (United Kingdom) - EEx ia II C T4 (Zone 0,1) certified to CENELEC standards and Ex N II T4 (Zone 2) certified to British standards

When ordering Velomitor® sensors for hazardous areas, select the desired certification from the part number's Agency Approval Option. This approval certifies that the Velomitor® can be located in specific hazardous areas when properly installed. Next, an environmentally-resistant housing should be used to protect the sensor and cable from physical abuse. To obtain the highest level of safety in all hazardous areas, we recommend using **intrinsic safety barriers** with the monitoring equipment to limit the thermal and electrical energy entering the hazardous area. Intrinsic safety is the preferred method for preventing ignition of a hazardous area and is recommended for all Velomitors located there.

Advanced Velomitor® supersedes moving-coil transducers

Many facilities currently have moving-coil velocity transducers mounted on rotating equipment. The spring-mass design of these transducers can cause them to wear out over time and require replacement. A Velomitor® can be installed **instead of** the moving-coil velocity transducer to provide the following advantages:

- No moving parts means a longer life span and higher reliability
- Less sensitivity to cross-axis vibration
- Hermetically-sealed, stainless steel case provides excellent moisture and corrosion resistance
- Mounting orientations are no longer critical; different types of sensors for vertical and horizontal are not needed
- No additional interface modules or electronic devices are needed to link the Velomitor® with a 3300 monitor
- Similar physical mounting arrangements and wiring connections as conventional velocity transducers
- Priced lower than most velocity transducers ►

Retrofit kits now available for existing installations

When you decide to replace your moving-coil velocity transducers with Velomitors, three Bently Nevada monitor types can now be upgraded. We have combined the necessary replacement parts into **two Retrofit Kits** for convenient ordering and field installation:

1) For 3300 Monitoring Systems, the **3300/55 Dual Velocity Monitor** has a Retrofit Kit available for installations that originally had moving-coil velocity transducers but now can benefit from the increased reliability and accuracy of the Velomitor®.

2) In the 7200 Series, the **72544 and 72564 Dual Probe Monitors** can both use the same Velomitor® Retrofit Kit. This kit has four options and is ordered according to which signal module is currently being used in the monitor. Velomitors used in Dual Probe applications have been field-proven and are an excellent alternative to Velocity Seismoprobes.

Each Retrofit Kit contains one of the following parts:

Velomitor® Piezo-Velocity Sensor

Velomitor® Mating Connector Kit

Velomitor® Signal Module for a specific monitor

Individual 1/2-20 UNF Mounting Adapter

Maintenance Manual with retrofit instructions

Bently Nevada is committed to advancing the technology of machinery transducers. We conduct our own research and development at Bently Rotor Dynamics Research Corporation (BRDRC) and at our test laboratories in Minden, Nevada and Houston, Texas. We then apply this knowledge toward the development of high quality transducers that make accurate measurements in a reliable and cost-effective manner. For more information on the Velomitor®, request data sheet L5032 or contact your nearest Bently Nevada sales representative. ■

Back-to-Basics

Why Should You Use XY Probes?

Shaft radial vibration amplitude, phase and shaft radial position are primary indicators of the overall mechanical condition of rotating machinery. Many machine malfunctions, including rotor imbalance, misalignment, bearing wear, shaft cracks, fluid instabilities and rubs can be detected with these measurements.

With few exceptions, most of the dynamic motion of the shaft in machines with fluid film (sleeve) bearings is seen as shaft-to-bearing relative vibration. By directly observing the shaft, a proximity probe transducer indicates the dynamic motion of the shaft relative to the bearing. The resulting peak-to-peak displacement measurement can be directly related to internal clearances within the machine's bearings and seals.

For such fluid film bearing machines, two probes should be installed per bearing, mounted radially at 90 degrees in an XY configuration. Throughout the machine train, it is desirable to laterally mount XY probe sets in the same radial plane to simplify comparative measurements from plane to plane. Several important benefits are derived from the XY arrangement:

- It is possible to have vibration primarily in one plane. Use of a single probe does not guarantee the measurement of vibration that may be occurring only in one plane.
- The XY probe arrangement with Keyphasor® allows the generation of Orbit displays which represent the dynamic path of the shaft centerline displacement motion as it vibrates during shaft rotation. Orbit displays are an important tool for machinery diagnostics.
- Any set of XY probes along a machine train will provide the motion of the rotor at a specific location. By utilizing an extra set of XY probes located inboard and/or outboard of normal bearing monitoring points and adjacent to couplings, more information about the mode shape of the rotor itself is available. In this application, the XY probes are also known as Mode Identification (MI) probes. Knowledge of mode shape allows closer estimates of the internal clearances between the rotor and stator elements, identification of the nodal (zero-motion) points along the rotor shaft and provides vital information for balancing and diagnostics.
- Relative radial shaft position within the bearing clearance as represented by the average (dc) proximity probe signal can only be determined by the XY arrangement. The ability of the XY probes to provide this measurement is a definite advantage since certain machine malfunction mechanisms cause a significant change in shaft average position either before, or instead of, a change in shaft vibration. In addition, shaft position can provide a relative measurement of bearing wear.

For proximity probe transducer applications, the XY arrangement offers the most complete operating information available, which is the basic reason for monitoring your machines. ■