

Velomitor® Piezo-velocity Sensor



Description

Velomitor® Piezo-velocity Sensors measure absolute (relative to free space) bearing housing, casing, or structural vibration. Unlike moving-coil velocity transducers, such as Bently Nevada's Seismoprobe® family of velocity transducers, Velomitor® Piezo-velocity Sensors incorporate a solid-state design, and are specialized piezoelectric accelerometers with embedded integration electronics. Because they incorporate solid-state electronics with no moving parts, they do not suffer from mechanical degradation and wear, and can be mounted vertically, horizontally, or at any other angle of orientation.

Application Advisory

If you plan to make housing measurements for overall machine protection, consider the usefulness of the measurement for each application. Most common machine malfunctions (imbalance, misalignment, etc.) originate at the rotor and cause an increase (or at least a change) in rotor vibration. For any housing measurement to be effective for overall machine protection, the machine must faithfully transmit a significant amount of rotor vibration to the bearing housing or machine casing, or more specifically, to the mounting location of the transducer.

In addition, you should exercise care in the physical installation of the transducer. Improper installation can degrade the transducer's performance, and/or generate signals that do not represent actual machine vibration. Integration of the output to displacement can make this worse. Exercise extreme caution if integrating to displacement *in any case*.

Upon request, Bently Nevada can provide engineering services to determine the appropriateness of housing measurements for the machine in question and/or to provide installation assistance.



Specifications

Parameters are specified from +20 °C to +30 °C (+68 °F to +86 °F) and at 100 Hz unless otherwise indicated.

Note: Operation outside the specified limits may result in false readings or loss of machine monitoring.

Electrical

Sensitivity

3.94mV/mm/s (100 mV/in/s) ±5%.

Frequency Response

4.5 Hz to 5 kHz (270 cpm to 300 kcpm) ±3.0 dB.

6.0 Hz to 2.5 kHz (360 cpm to 150 kcpm) ±0.9 dB.

Temperature Sensitivity

-14% to +7.5% typical over the operating temperature range.

Velocity Range

1270 mm/s (50 in/s) peak.

Transverse Sensitivity

Less than 5% of sensitivity.

Amplitude Linearity

±2% to 152 mm/s (6 in/s) peak.

Mounted Resonant Frequency

Greater than 12 kHz.

Broadband Noise Floor (4.5 Hz to 5 kHz)

0.004 mm/s (160 µin/s) rms, nominal

Maximum Cable Length

305 metres (1,000 feet) of cable, BNC part number 02173006, with no degradation of signal.

Hazardous Area Approvals

Multiple approvals for hazardous areas certified by Canadian Standards Association (CSA/NRTL/C) in North America and by LCIE in Europe.

North America

Ex ia/AEx ia for Class I Zone 0 IIC T4 or Division 1, Groups A,B,C,D, when installed with an approved zener barrier or galvanic isolator per BN drawing 167537.

Ex nL/AEx nL Class I Zone 2 IIC T4 or Division 2 when installed without barriers per drawing 167537.

Approvals pending for Class II and Class III. T4 @ Ta = 100 °C (212 °F).

European/ CENELEC

EEx ia IIC T4 for Zones 0, 1, and 2, Group IIC, EC certificate number LCIE04, ATEX 6042X, when installed with intrinsically safe zener barriers or galvanic isolators. T4 @ Ta = 100°C (212 °F).

EEx nL for Class I, Zone 2, Group IIC, EC certificate number LCIE04, ATEX 6041X.

Environmental Limits

Operating Temperature Range

- 55 °C to + 121 °C (- 67 °F to + 250 °F).

Shock Survivability

5000 g peak, maximum

Relative Humidity

To 100% non-submerged; case is hermetically-sealed.

Base Strain Sensitivity

0.005 in/s/µstrain.

Magnetic Field Susceptibility

<51 µin/s/gauss (50 gauss, 50-60Hz).

Physical

Weight

142 grams (5.0 oz), typical.

Diameter

25.3 mm (0.995 in).

Height

63.2 mm (2.49 in).

Case Material

304L stainless steel.

Connector

2-pin Mil-C-5015 hermetically-sealed, 304 stainless steel shell.

Mounting Torque

46 kg cm (40 in-lb) max.

Polarity

Pin A goes positive with respect to pin B when the sensor case motion is toward the connector.

Used with monitors. Not for use with 21128 Velocity Transducer Housing. Minimum length of 3.0 ft (0.9 m), maximum length of 96 ft (29 m).

Ordering Information

Velomitor® Piezo-velocity Sensor 330500-AXX-BXX

A: Mounting Thread Adapter Option

- 0 0** No adapter
- 0 1** 1/2 - 20 UNF
- 0 2** M8 x 1
- 0 3** 1/4 - 28 UNF
- 0 4** 1/4 - 20 UNC
- 0 5** 1/4 - 18 NPT
- 0 6** 5/8 - 18 UNF
- 0 7** 3/8 - 16 UNC
- 0 8** 1/2 - 13 UNC

C: Agency Approval Option

- 0 0** Not required
- 0 1** CSA/NRTL/C
- 0 2** SIRA/CENELEC
- 0 4** Multiple approvals

Interconnect Cables

AXX

A: Cable length Option in feet

For the cables listed below, order in increments of 1.0 ft (305 mm).

- Example: **0 9** = 9 ft
1 2 = 12 ft

9571

2-conductor twisted, shielded 22 AWG cable with 2-socket moisture-resistant female connector at one end, terminal lugs at the other end.

Used with monitors. Not for use with 21128 Velocity Transducer Housing. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m).

84661

2-conductor twisted, shielded 22 AWG armored cable with 2-socket moisture-resistant female connector at one end, terminal lugs at the other end.

89477

2-conductor 18 AWG twisted, shielded cable with right angle 2-socket plug at one end, terminal lugs at the other end.

Used with monitors and with 21128 Velocity Transducer Housing. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m).

125065

2-conductor 18 AWG twisted, shielded cable with 2-socket plug and fluorosilicone elastomer boot at one end, terminal lugs at the other.

Used with monitors. Not for use with 21128 Velocity Transducer Housing. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m).

Velocity Transducer Housing Assembly

21128-AXX-BXX

A: Mounting Thread Option

- 0 1** Unthreaded
- 0 2** 3/4 - 14 NPT
- 0 3** 1/2 - 14 NPT
- 0 4** 1/2 - 12 BSP

B: Cable Exit Fitting Option

- 0 1** 1/2 - 14 NPT plug
- 0 2** 1/2 -14 NPT explosion-proof
- 0 3** 1/2 -14 NPT explosion-proof with cable gland seal

Note: When using the 21128 housing, cable part number 89477-AA is necessary to connect the Velomitor® Sensor to a monitor.

Velocity Transducer Housing – CENELEC approved

107770-AXX-BXX

This version is a combination of the 330500 Velomitor® Sensor and a 21128 Housing **pre-installed** at the factory. It is also rated for CENELEC Zone 1, Group IIC hazardous area applications.

A: Mounting Thread Option

- 0 1** Unthreaded
- 0 2** 3/4 - 14 NPT
- 0 3** 1/2 - 14 NPT
- 0 4** 1/2 - 14 BSP

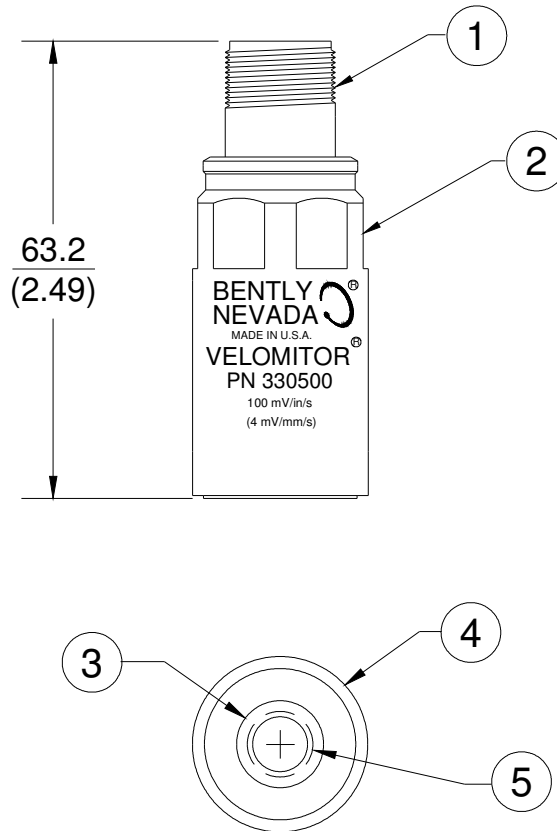
B: Cable Exit Fitting Option			Individual M8 x 1 mounting adapter
	0 1	1/2 - 14 NPT plug	89411-01
	0 2	1/2 - 14 NPT explosion-proof	Individual 1/4 - 28 UNF mounting adapter
	0 3	1/2 - 14 NPT explosion-proof with cable gland seal	89412-01

Accessories

100076-01		330500 Velomitor® Sensor and Velomitor® XA Sensor Manual.	89413-01	Individual 1/4 - 20 UNC mounting adapter
02173006		Bulk cable; 2 conductor 18 AWG twisted, shielded cable without connectors or terminal lugs. Specify number of feet.	04300015	Individual 1/4 - 18 NPT mounting adapter
46000-01		Magnetic Base for temporary mounting of Velomitor® Sensors. Used with 1/4 - 28 UNF mounting thread adapters.	161191	Individual 5/8 - 18 UNF mounting adapter.
46122-01		Quick Connect for semi-permanent mounting of Velomitor® Sensors. Used with 1/2 - 20 UNF mounting thread adapters.	101212-01	Individual 1/2 - 13 UNC mounting adapter
89409-01		Individual 1/2 - 20 UNF mounting adapter.	123135-01	Note: The Velomitor® Sensor is shipped with an adapter. Individual adapters are available as spares.
89410-01				Velomitor® Sensor connector kit. Used with housings and retrofits
				Velomitor® Sensor Power Module

Dimensional Drawing

Note: All dimensions are in millimetres (inches) except as noted.



1. 2-pin, MIL-C-2015 receptacle
2. 15/16 inch hexagonal
3. 12.7 (0.500) diameter, 0.8 (0.030) deep counterbore
4. 25.3 (0.995) diameter
5. 3/8-24 UNF-2B, 6.4 (0.250) minimum threaded depth, 14.0 (0.550) maximum drill depth

Figure 1: Velomitor Piexo-velocity Sensor Dimensional Drawing

Frequency Response Graphs

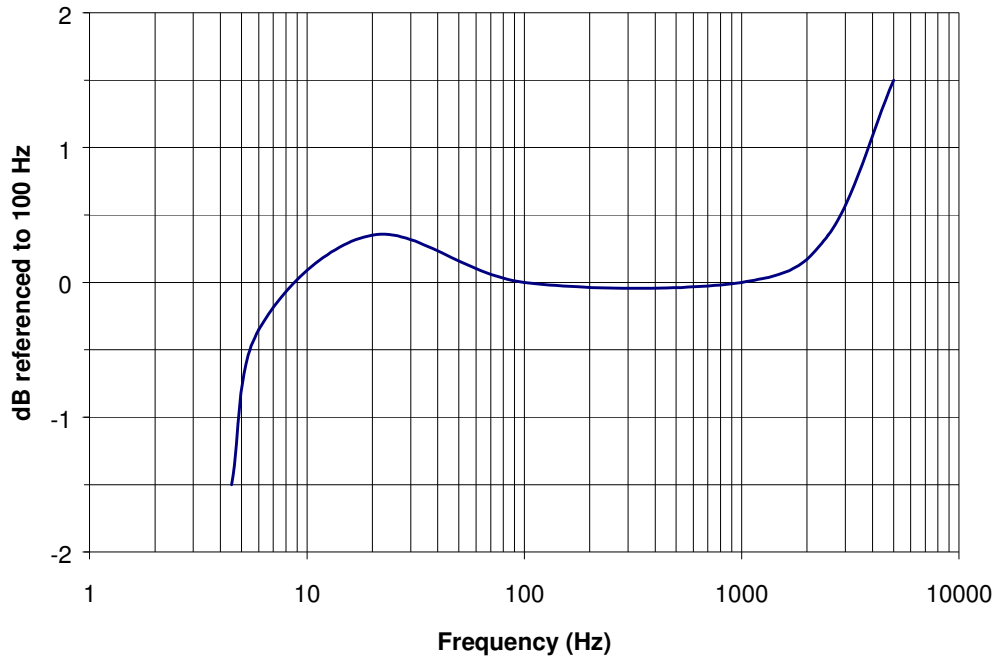


Figure 2: Typical Amplitude Response

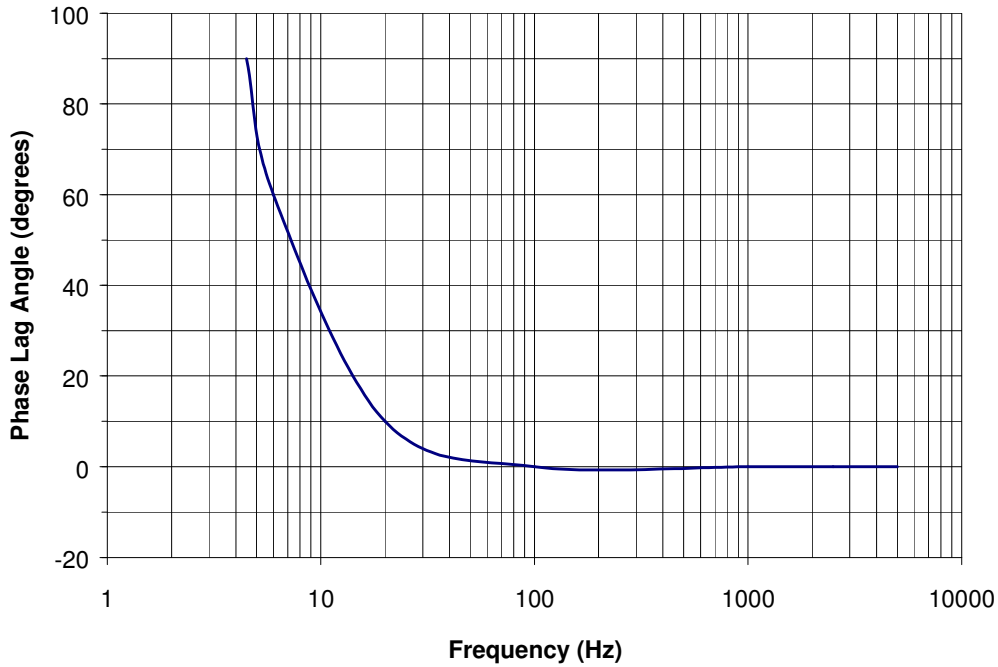


Figure 3: Typical Phase Response

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