330500 Velomitor Piezo-velocity Sensor

Datasheet

Cordant™

141632 Rev. V



Description

Bently Nevada™ Velomitor Piezo-velocity Sensors are designed to measure absolute (relative to free space) bearing housing, casing, or structural vibration. The 330500 is a specialized piezoelectric accelerometer that incorporates embedded integrated electronics in a solid-state design.

Because the 330500 incorporates solid-state electronics and has no moving parts, it does not suffer from mechanical degradation and wear, and can be mounted vertically, horizontally, or at any other angle of orientation

Most common machine malfunctions (unbalance, misalignment, etc.) occur on the rotor and originate as an increase (or at least a change) in rotor vibration. For any individual casing measurement to be effective for overall machine protection, the system must continually transmit a significant amount of rotor vibration to the machine casing, or mounting location of the transducer.

In addition, be careful to install the accelerometer transducer on the bearing housing or machine casing. Improper installation may decrease the transducer amplitude and frequency response and/or generate false signals that do not represent actual vibration. Refer to the appropriate instruction manuals and Application Notes.

Upon request, Bently Nevada provides engineering services that can identify the appropriate machine housing measurements and installation assistance if needed.

Baker Hughes

If you integrate the 330500 Velomitor output to measure displacement, electrical noise from interference and the transducer circuit can be amplified. The noise can degrade performance of 330500 transducers and produce inaccurate displacement data.

Specifications

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

> Operating the transducer outside the specified limits may result in false readings or loss of machine monitoring.

Electrical

Sensitivity	3.94 mV/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.
Output Bias Voltage	-12 ±3.0 V_{DC}, over temperature referenced to Pin A.
Dynamic Output Impedance	Less than 2400 Ω
Broadband Noise Floor (4.5 Hz to 5 kHz)	0.004 mm/s (160 µin/s) rms, nominal
Grounding	Case isolated
Maximum Cable Length	305 m (1,000 ft) of cable, part number 02173006, with no degradation of signal.

Environmental Limits

Operating Temperature Range	-55°C to 121°C (-67°F to 250°F)
Shock Survivability	5,000 g peak, maximum
Relative Humidity	To 100% non-submerged; case is hermetically-sealed.
Base Strain Sensitivity	0.005 in/s/mstrain.
Magnetic Field Susceptibility	<51 min/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	316L stainless steel.
Connector	2-pin Mil-C-5015 hermetically-sealed, 316L stainless steel shell.
Mounting Torque	32-46 kg cm (24-40 in-lb) max.
Polarity	When the sensor case motion is toward the connector, Pin A becomes positive with respect to pin B.
Recommended cable length (assuming max vibration of 50g, frequency 10 kHz, and cable capacitance 200 pf/m.) For longer lengths, contact Bently Nevada Tech Support.)	208 ft (63m)

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

Velomitor Piezo-velocity Sensor 330500-AA-BB

A: Mounting Thread Adaptor Option	
00	No adapter
01	1/2 - 20 UNF
02	M8 x 1
03	1/4 - 28 UNF
04	1/4 - 20 UNC
05	Unavailable for 330500.
Note: For 1/4-18 NPT mounting, order 330525.	
06	5/8 – 18 UNF
07	3/8 – 16 UNC
08	1/2 – 13 UNC
B: Agency Approval Option	
00	Not required
01	CSA/US/C
02	ATEX (European)
04	Multiple approvals (CSA, ATEX)

Interconnection Cables

Standard Cable Lengths

Feet	Meters (approximate)
6 ft	1.8 m
8 ft	2.4 m
10 ft	3.0 m
12 ft	3.6 m
15 ft	4.5 m
17 ft	5.0 m
20 ft	6.0 m
25 ft	7.6 m
30 ft	9.0 m
33 ft	10.0 m
50 ft	15.2 m
99 ft	30.0 m

Custom Cable Part Numbers

You can order custom cable lengths in increments of 1.0 ft (305 mm) at additional cost. Some cables have a minimum and maximum length.

Use 'NN' in these part numbers to specify the length (in feet) of the cable you want to order.

Part Number	Description
9571-NN	Two-conductor twisted, shielded 22 AWG cable with two-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. Min. length: 2.0 ft (0.6 m) Max. length: 99 ft (30 m)
84661-NN	Two-conductor twisted, shielded 22 AWG armored cable with two-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. Min. length: 3.0 ft (0.9 m) Max. length: 96 ft (29 m)
89477-NN	Two-conductor 18 AWG twisted, shielded cable with right angle two-socket plug at one end, terminal lugs at the other end. Used with monitors and with 21128 Velocity Transducer Housing. Min. length: 2.0 ft (0.6 m) Max. length: 99 ft (30 m)
125065-NN	Two-conductor 18 AWG twisted, shielded cable with two-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. Min. length: 2.0 ft (0.6 m) Max. length: 99 ft (30 m)

Velocity Transducer Housing Assembly

21128-AA-BB

A: Mounting Thread Option	
01	Unthreaded
02	3/4 - 14 NPT
03	1/2 - 14 NPT
04	1/2 - 12 BSP
B: Cable Exit Fitting Option	
01	1/2 - 14 NPT plug
02	1/2 -14 NPT explosion-proof
03	1/2 -14 NPT explosion-proof with cable gland seal

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-AA-BB

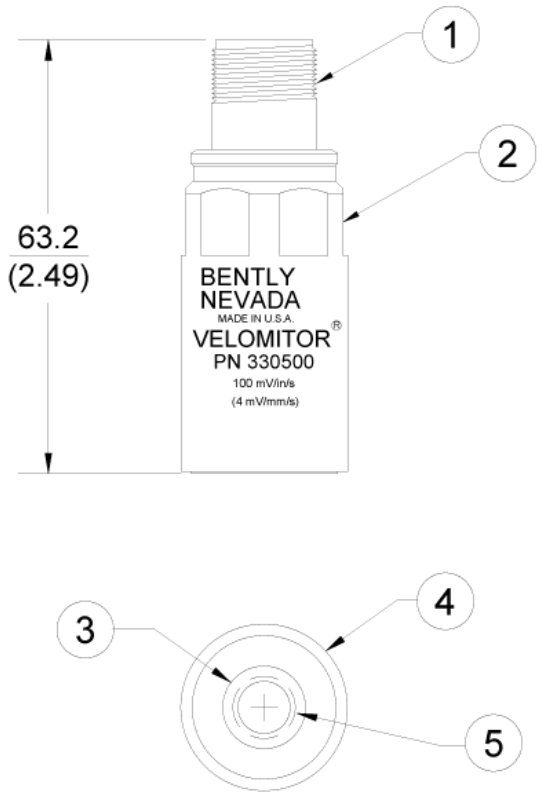
This version is a combination of the 330500 Velomitor Sensor and a 21128 Housing pre-installed at the factory. It is also rated for CENELEC Zone 1, Group IIC hazardous area applications.

A: Mounting Thread Option	
01	Unthreaded
02	3/4 - 14 NPT
03	1/2 - 14 NPT
04	1/2 - 14 BSP
B: Cable Exit Fitting Option	
01	1/2 - 14 NPT plug

Accessories

Part number	Description
100076	330500 Velomitor Sensor and Velomitor XA Sensor User Guide
02173006	Bulk cable; 2 conductor 18 AWG twisted, shielded cable without connectors or terminal lugs. Specify number of feet.
46000-01	Magnetic Base for temporary mounting of Velomitor Sensors. Used with 1/4 - 28 UNF mounting thread adapters.
46122-01	Quick Connect for semi-permanent mounting of Velomitor Sensors. Used with 1/2 - 20 UNF mounting thread adapters.
89409-01	Individual 1/2 - 20 UNF mounting adapter.
89410-01	Individual M8 x 1 mounting adapter.
89411-01	Individual 1/4 - 28 UNF mounting adapter.
89412-01	Individual 1/4 - 20 UNC mounting adapter.
89413-01	Individual 1/4 - 18 NPT mounting adapter. Spares only. For new installations, order 330525 velometer.
04300015	Individual 5/8 - 18 UNF mounting adapter.
165025-01	Individual 3/8-16 UNC mounting adapter.
161191	Individual 1/2 - 13 UNC mounting adapter. The Velomitor Sensor is shipped with an adapter. Individual adapters are available as spares.

Graphs and Figures



1. 2-pin, MIL-C-5015 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 Piezo-Velocity Sensor Dimensional Drawing