

# 330400 and 330425 Accelerometer Acceleration Transducers

## Datasheet

Bently Nevada Machinery Condition Monitoring

141638 Rev. Y



### Description

These accelerometers are intended for critical machinery applications where casing acceleration measurements are required, such as gear mesh monitoring. The 330400 is designed to address the requirements of American Petroleum Institute Standard 670 for accelerometers. It provides an amplitude range of 50 g peak and a sensitivity of 100 mV/g. The 330425 is identical except it provides a larger amplitude range (75 g peak) and a sensitivity of 25 mV/g.



If housing measurements are being made for overall protection of the machine, thought should be given to 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. In order for any housing measurement alone to be effective for overall machine protection, a significant amount of rotor vibration must be faithfully transmitted to the bearing housing or machine casing, or more specifically, to the mounting location of the transducer.

In addition, care should be exercised in the physical installation of the transducer. Improper installation can result in a degradation of the transducer's performance, and/ or the generation of signals which do not represent actual machine vibration. Integration of the output to velocity can worsen this. Extreme caution should be exercised if integrating to velocity. For high quality velocity measurements the 330500 Velomitor Sensor should be used.

Upon request, we 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 to +30 °C (+68 to +86 °F) and 100 Hz unless otherwise indicated.



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

## Electrical

### 330400

Sensitivity	10.2 mV/m/s <sup>2</sup> (100 mV/g) ±5%.
Acceleration range	490 m/s <sup>2</sup> (50 g) peak overall acceleration within the 10 Hz to 15 kHz frequency span. Vibration at frequencies above 15 kHz, especially at the transducers resonance will significantly decrease this range.
Amplitude Linearity	±1% to 490 m/s <sup>2</sup> (50 g) peak.
Broadband Noise Floor (10 Hz to 15 kHz)	0.039 m/s <sup>2</sup> (0.004 g) rms.

### 330425

Sensitivity	2.5 mV/m/s <sup>2</sup> (25 mV/g) ±5%.
Acceleration Range	735 m/s <sup>2</sup> (75 g) peak overall acceleration within the 10 Hz to 15 kHz frequency span. Vibration at frequencies above 15 kHz, especially at the transducer's resonance, will significantly decrease this range.
Amplitude Linearity	±1% to 735 m/s <sup>2</sup> (75 g) peak.
Broadband Noise Floor (10 Hz to 15 kHz)	0.098 m/s <sup>2</sup> (0.01 g) rms.

## Both Units

Frequency Response	10 Hz to 15 kHz  (600 cpm to 900,000 cpm) ±3dB;  30 Hz to 10 kHz  (1800 cpm to 600,000 cpm) ±10%
Temperature Sensitivity	-11% to +3% typical over the operating temperature range.
Transverse Sensitivity	Less than 5% of axial.
Mounted Resonant Frequency	Greater than 30 kHz.
Amplitude of Resonant Peak	20 dB maximum.
<b>Base Strain Sensitivity</b>	
For serial numbers preceded by the letter "G" (including all new sensors)	49 mm/s <sup>2</sup> /mstrain (0.005 g/mstrain)
For serial numbers NOT preceded by the letter "G" (shipped prior to April 2004)	980 mm/s <sup>2</sup> /mstrain (0.100 g/mstrain) without Mounting Base (API adapter);
	4.9 mm/s <sup>2</sup> /mstrain (0.0005 g/mstrain) with Mounting Base (API adapter) supplied with the accelerometer.
Bently Nevada recommends installing with the Mounting base to minimize base strain sensitivity for serial numbers NOT preceded by the letter "G".	
Maximum cable length	305 metres (1000 ft) with no degradation of signal.
<b>Power requirements</b>	
Input Voltage	-24 ± 0.5 Vdc.
Bias Current	2 mA nominal.
Output Bias Voltage:	-8.5 ± 0.5 Vdc.
Grounding	Case isolated.

## Environmental Limits

Operating and storage temperature	-55°C to +121°C (-67°F to +250°F)
Shock Survivability	49,050 m/s <sup>2</sup> (5000 g) peak, maximum.
Relative humidity	100% condensing, non-submerged. Case is hermetically sealed.
Magnetic Field Susceptibility	<2.21 mm/s <sup>2</sup> /gauss (225 mg/gauss) [50 gauss, 50-60Hz].
IP Rating	Equivalent to an IP 68 (Dust tight and watertight). Please note that this is for the sensor only and does not apply to the cable.

## Physical

Weight (no cable)	99 g (3.5 oz), typical
Diameter	23 mm (0.93 in).
Height	59 mm (2.3 in), including mounting stud.
Connector	3-pin MIL-C-5015 Receptacle 316L stainless steel
Mounting Surface	32 minch rms.
Mounting Torque	4.1 N·m (3.0 ft·lb).
Case Material	316L stainless steel
Weight (no cable)	100 g (3.5 oz), typical
Mounting Angle	Any orientation

## Compliance and Certifications

### FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

### EMC

EMC Directive 2014/30/EU

### RoHS

RoHS Directive 2011/65/EU

### Maritime

#### 330400 and 330425 only

ABS 2009 Steel Vessels Rules

1-1-4/7.7,4-8-3/1.11.1,4-9-7/13

## Hazardous Area Approvals



For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from [Bently.com](http://Bently.com).

### CSA/NRTL/C

#### 190501 (Agency Approval Options 01 through 04)




Intrinsically Safe	Ex ia IIC T4: Class I, Div 1, Groups A, B, C, D. Class II, Group E, F and G Class III  AEx ia IIC T4: Class I, Div 1, Groups A, B, C, D; Class II, Groups E, F, G Class III
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	Install per drawing 167536 T4 @ -40 °C ≤ Ta ≤ +100 °C (-40 °F ≤ Ta ≤ +212 °F)
Intrinsically Safe and Non-Incendive	Ex nL IIC T4 Class I, Division 2, Groups A, B, C and D  AEx nA T4 Class I, Division 2, Groups A, B, C and D  Install per drawing 167536  T4 @ -40 °C ≤ Ta ≤ +100 °C (-40 °F ≤ Ta ≤ +212 °F)
<b>330400, 330425</b>	Ex ia IIC T4 AEx ia IIC T4 Class I, Div 1 Groups A, B, C and D Class II, Groups E, F, and G Class III  T4 @ -40°C ≤ Ta ≤ 100°C Install per dwg 167538
<b>330500</b>	Ex ia IIC T4 AEx ia IIC T4 Class I, Division 1, Groups A, B, C and D Class II, Groups E, F, G Class III  Install per dwg 167537 T4 @ -40°C ≤ Ta ≤ 100°C  Ex nL IIC T4 AEx nA IIC T4 Class I, Div 2, Groups A, B, C, D  Install per dwg 167537 T4 @ -40°C ≤ Ta ≤ 100°C
<b>330525</b>	Ex ia IIC T4 AEx ia IIC T4 Class I, Division 1, Groups A, B, C and D Class II, Groups E, F, G Class III  T4 @ -40°C ≤ Ta ≤ 100°C  Ex nL IIC T4 AEx nA IIC T4 Class I, Div 2, Groups A, B, C, D  Install per dwg 167539 T4 @ -40°C ≤ Ta ≤ 100°C

### ATEX/IECEx

#### 190501, 330400, 330425, 330500, 330525

<b>190501</b>	
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<b>Entity Parameters</b>	Ex ia IIC T4 Ga   II 3 D Ex na IIC T4 Gc Ex tc III T130°C Dc  T4@ Ta = -55°C to 121°C												
	<table border="1"> <thead> <tr> <th data-bbox="375 417 565 470">Zone 0/1</th> <th data-bbox="565 417 748 470">Zone 2</th> </tr> </thead> <tbody> <tr> <td data-bbox="375 470 565 518">Ui= 30V</td> <td data-bbox="565 470 748 518">Ui= 30V</td> </tr> <tr> <td data-bbox="375 518 565 567">Ii= 200mA</td> <td data-bbox="565 518 748 567">Ii= 200mA</td> </tr> <tr> <td data-bbox="375 567 565 615">Pi= 0.75W</td> <td data-bbox="565 567 748 615">Pi= 1.14W</td> </tr> <tr> <td data-bbox="375 615 565 663">Ci=27.2nF</td> <td data-bbox="565 615 748 663"></td> </tr> <tr> <td data-bbox="375 663 565 722">Li= 0</td> <td data-bbox="565 663 748 722"></td> </tr> </tbody> </table>	Zone 0/1	Zone 2	Ui= 30V	Ui= 30V	Ii= 200mA	Ii= 200mA	Pi= 0.75W	Pi= 1.14W	Ci=27.2nF		Li= 0	
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	Ui= 28V	Ui= 28V											
	Ii= 150mA	Ii= 150mA											
	Pi= 0.84W	Pi= 1.26W											
Ci=10.8nF													
Li= 0													

## Hazardous Area Conditions of Safe Use

### ATEX/IECEX

#### Zone 0/1:

Equipment must be connected to equipment, which meets the abovelisted entity parameters.

The cables type A or B (in compliance with EN 60079-25) must respect the cable parameters listed with the entity parameters.

#### Zone 2 :

The supply electrical parameters shall not exceed the values mentioned in the tables above.

## Ordering Information



For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from [Bently.com](http://Bently.com).

### 330400 Accelerometer

### 330425 Accelerometer

#### Part Number-AA-BB

A: Mounting Thread Option	
0 1	¼-28 UNF integral stud
0 2	M8 X1 integral stud
B: Agency Approval Option	
0 0	None
0 5	Multiple approvals (CSA, ATEX, IECEx,)

#### Interconnect Cables

##### Part Number-AA

A:	Cable Length Option in feet
	For the cables listed below, order in increments of 1.0 ft (305 mm).

Examples:

1 5 = 15 ft (4.57 m)  
 2 0 = 20 ft (6.10 m)

##### The following are standard lengths

Feet	Metres (approx.)
6	1.8
8	2.4
10	3.0
12	3.6
15	4.5
17	5.0
20	6.0
25	7.6
50	15.2
99	30.0



Non-standard/custom lengths can also be ordered at additional cost.

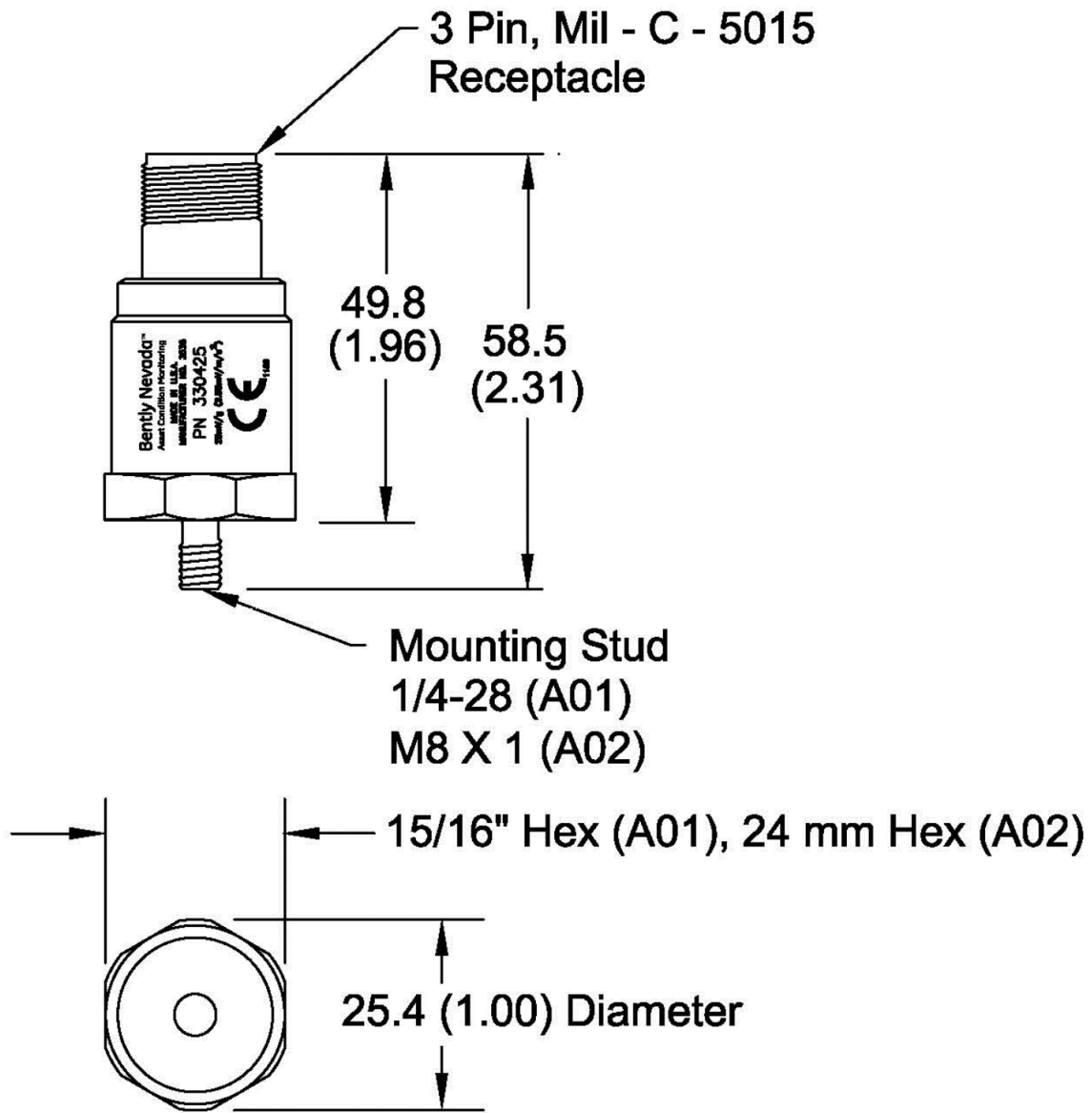
#### Cable Part Numbers

130539	3-conductor shielded 18 AWG (1.0 mm <sup>2</sup> ) cable with 3-socket plug and fluorosilicone elastomer boot at one end, terminal lugs at the other end. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m). A manual is available to assist with installation of this cable (part number 133080-01).
16925	3-conductor shielded 22 AWG (0.5 mm <sup>2</sup> ) cable with 3-socket plug at one end, terminal lugs at the other end. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m).
16710	3-conductor shielded 22 AWG (0.5 mm <sup>2</sup> ) armored cable with 3-socket plug at one end, terminal lugs at the other end. Minimum length of 3.0 ft (0.9 m), maximum length of 99 ft (30 m).

#### Accessories

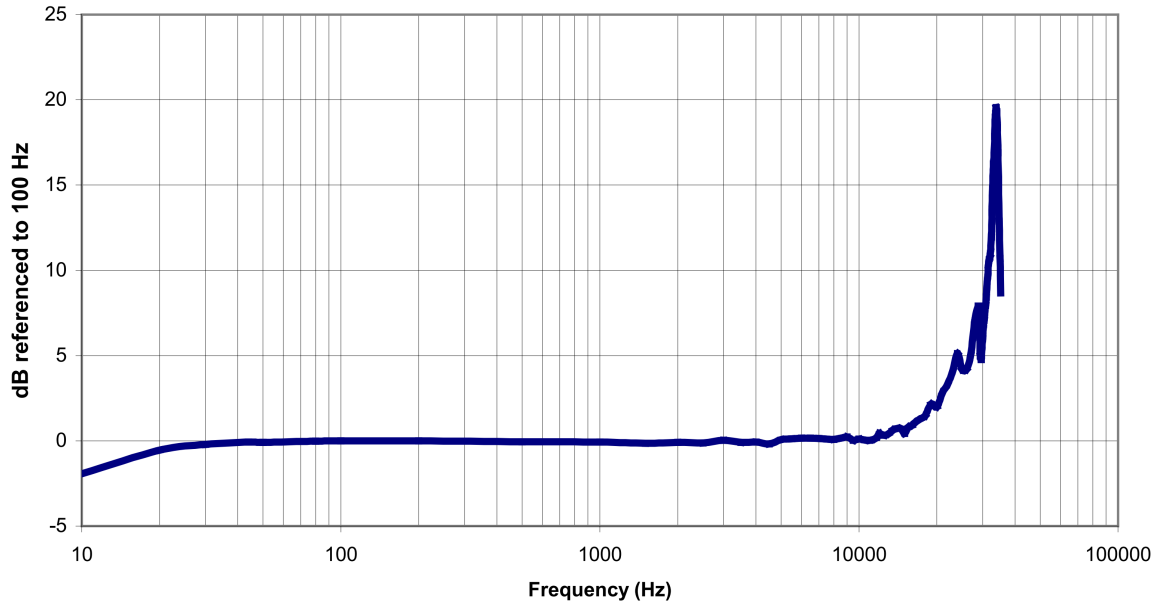
127088	330400 and 330425 Accelerometer User Guide
00531080	Mating connector for 330400 and 330425 Accelerometers.
37439-01	<b>For use with serial numbers NOT preceded with the letter "G".</b> Mounting Base, ¼-28 to ¼-28. Reduces base strain sensitivity.
37439-02	<b>For use with serial numbers NOT preceded with the letter "G".</b> Mounting Base, M8X1 to M8X1. Reduces base strain sensitivity.
43217	Accelerometer Mounting Kit used with extension part number 108576-01 and O-ring part number 04290422 to allow room for the 330400 or 330425 accelerometer. (See separate datasheet, document 141630.)

## Graphs and Figures

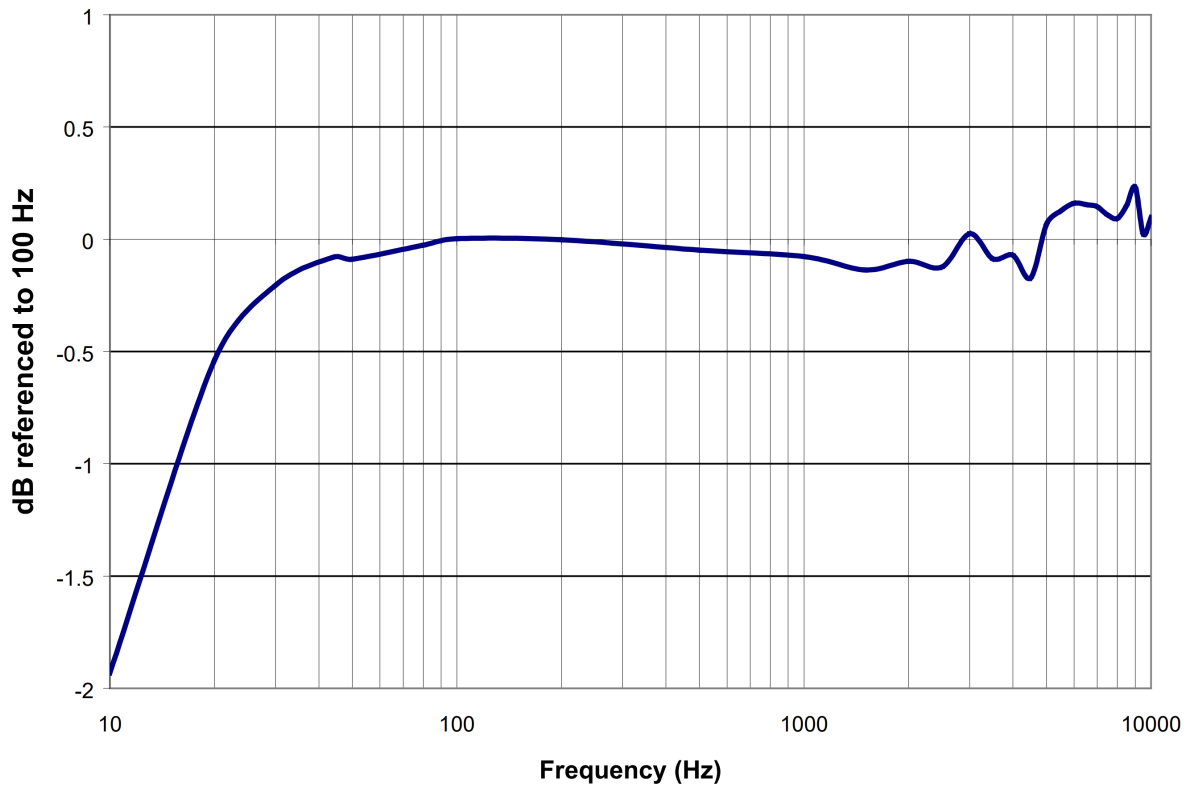


**Figure 1: Acceleration Transducer Dimensional Drawing**

Dimensions are in millimetres (inches)



**Figure 2: Typical Amplitude Response**



**Figure 3: 10 – 10,000 Hz Typical Amplitude Response Detail**



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