

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

330500 AND 330525 PIEZO-VELOCITY SENSOR

## 9571-20

SHIELDED SENSOR INTERCONNECT CABLE

Used with the applicable Bently Nevada accelerometer systems configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Bently Nevada official manufacturer documentation

# 200350 and 200355 Accelerometers

## Datasheet

**Cordant™**

164804 Rev. T

Card, part number 149811-02 and the Seismic Direct Input Card, part number 164746-01.

The 200350 and 200355 Accelerometers are contained within a hermetically sealed, stainless steel case. The design provides an extremely rugged transducer, well suited for harsh industrial environments. Each transducer's top mounted, 2-pin connector (MIL-C-5015) allows for easy installation and removal of the interconnecting signal cable. A ¼-28 threaded hole on the bottom of the casing accommodates multiple mounting options.

The 200350 and 200355 Accelerometers contain a piezoelectric sensing device, which generates charge when subjected to vibration. This charge is then converted electronically to a differential voltage signal, which is proportional to the acceleration that is parallel to the sensitive axis of the transducer.



## 1.1 Description

The 200350 and 200355 Accelerometers are general purpose, case-mounted seismic transducers designed

for use with Trendmaster Pro  
Constant Current Direct Input



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.



Do not use sensor part number 200350 for negative excitation voltage (-Vex).

## Electrical

|                                      | 200350                                              | 200355                                            |
|--------------------------------------|-----------------------------------------------------|---------------------------------------------------|
| Sensitivity                          | 100 mV/g<br>±20%<br>(10.2 mV/m/s <sup>2</sup> ±20%) | 100 mV/g<br>±5%<br>(10.2 mV/m/s <sup>2</sup> ±5%) |
| Frequency Range<br>(±3 dB)           | 30-600,000 cpm (0.5-10,000 Hz)                      | 12-600,000 cpm (0.2-10,000 Hz)                    |
| Measurement Range                    | ± 50 g                                              |                                                   |
| Transverse Sensitivity               | ≤ 7%                                                | ≤ 5%                                              |
| Amplitude Linearity                  | ± 1%                                                |                                                   |
| Mounted Resonant Frequency           | 1500 kcpm (25 kHz)                                  | 1250 kcpm (20.8 kHz)                              |
| Broadband Electrical Noise (1-10kHz) | 350 µg<br>(3,434 µm/s <sup>2</sup> )                | 50 µg<br>(491 µm/s <sup>2</sup> )                 |
| Output Bias Voltage                  | 8 to 12 VDC                                         |                                                   |
| Excitation Voltage                   | 18 to 28 VDC                                        |                                                   |
| Constant Current Excitation          | 2 to 20 mA                                          |                                                   |

## 1.2 Specifications

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



### Safety Caution



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

|                                      |                |                |
|--------------------------------------|----------------|----------------|
| Settling Time<br>(within 1% of bias) | $\leq 2.0$ sec | $\leq 5.0$ sec |
| Output Impedance                     | $< 150$ ohms   | $< 100$ ohms   |
| Discharge Time Constant              | $\geq 0.3$ sec | $\geq 0.8$ sec |
| Electrical Isolation<br>(Case)       | $> 10^8$ ohms  |                |

## Environmental

|                             |                                          |
|-----------------------------|------------------------------------------|
| Operating Temperature Range | -65°F to +250 °F<br>(-54°C to +121 °C)   |
| Shock Survivability         | 5,000 g pk                               |
| Relative Humidity           | 100% relative, condensing, non-submerged |
| Enclosure Rating            | IP68                                     |

## Physical

|                              | 200350                           | 200355               |
|------------------------------|----------------------------------|----------------------|
| Hex Size                     | 11/16"<br>(18 mm)                | 7/8"<br>(22mm)       |
| Height                       | 1.65"<br>(42.4 mm)               | 2.06"<br>(52.3 mm)   |
| Weight                       | 1.8 oz<br>(51 grams)             | 3.3 oz<br>(94 grams) |
| Mounting Thread              | 1/4-28 Female                    |                      |
| Mounting Torque<br>(Maximum) | 2 to 5 ft-lb<br>(2.7 to 6.8 N-m) |                      |

|                                                                                                                                                                                       |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Sensing Element                                                                                                                                                                       | Ceramic          |
| Sensing Geometry                                                                                                                                                                      | Shear            |
| Housing Material                                                                                                                                                                      | Stainless Steel  |
| Sealing                                                                                                                                                                               | Welded Hermetic  |
| Electrical Connector                                                                                                                                                                  | 2-Pin Mil-C-5015 |
| Electrical Connection Position                                                                                                                                                        | Top              |
| Recommended cable length (assuming max vibration of 50g, frequency 10 kHz, and cable capacitance 200 pf/m.) For longer lengths, contact <a href="#">Bently Nevada Tech Support.</a> ) | 104 ft (31 m)    |

## 1.3 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

### ATEX

60079-01

60079-07

60079-11

60079-15

ATEX Directive 2014/34/EU

## 1.4 Hazardous Area Approvals



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](http://bntechsupport.com) and access the Bently Nevada Media Library.

## CSA/NRTL/C

For **200350**:

|                                      |                                                                                                                                                                                                                                                                                        |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intrinsically Safe                   | Ex ia IIC T4<br>Class I, Division 1, Groups A, B, C, D<br><br>AEx ia IIC T4<br>Class I, Division 1, Groups A, B, C and D<br><br>T4 @ $-54^{\circ}\text{C} \leq T_a \leq +121^{\circ}\text{C}$<br>( $-65.2^{\circ}\text{F} \leq T_a \leq 249.8^{\circ}\text{F}$ )<br>Per drawing 175825 |
| Intrinsically Safe and Non-Incendive | Ex nL IIC T4<br>Class I, Division 2, Groups A, B, C, D<br><br>AEx nA T4<br>Class I, Division 2, Groups A, B, C and D<br><br>T4 @ $-54^{\circ}\text{C} \leq T_a \leq +121^{\circ}\text{C}$ ( $-65.2^{\circ}\text{F} \leq T_a \leq +249.8^{\circ}\text{F}$ ) per drawing 17582           |

## ATEX/IECEx

For **200350**:

 II 1 G  
Ex ia IIC T4 Ga

 II 3 G  
Ex nA IIC T4 Gc  
Ex ec IIC T4 Gc

T4@  $T_a = -54^{\circ}\text{C}$  to  $121^{\circ}\text{C}$

### Entity Parameters:

| Zone 0/1   | Zone 2    |
|------------|-----------|
| Ui= 28V    | Ui= 28V   |
| Ii= 200mA  | Ii= 200mA |
| Pi= 1W     | Pi= 1W    |
| Ci=16.2 nF |           |
| Li= 0      |           |

## 1.5 Hazardous Area Conditions of Safe Use

### ATEX/IECEx

#### **Zone 0/1:**

Equipment must be connected to equipment, which meets the above listed 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.

## 2.1 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](http://bntechsupport.com) and access the Bently Nevada Media Library.

### 200350 Accelerometer

#### 200350 – AA – BB – CC

##### A: Mounting Stud

|    |                                   |
|----|-----------------------------------|
| 00 | ¼-28 SS w/ Brass tip, 0.5"        |
| 01 | ¼-28 to M6 x 1.00 Stainless Steel |
| 02 | ¼-28 to M8 x 1.25 Stainless Steel |
| 09 | No mounting stud                  |
| 10 | 1/4 -28 Adhesive Stud Mount       |
| 11 | M6x1 Adhesive Stud Mount          |
| 12 | M8x1.25 Adhesive Stud Mount       |
| 13 | Magnetic Base Kit                 |

##### B: Tolerance

|    |                                                |
|----|------------------------------------------------|
| 00 | 100 mV/g ± 20% (10.2 mV/m/s <sup>2</sup> ±20%) |
|----|------------------------------------------------|

##### C: Approvals

|    |                  |
|----|------------------|
| 00 | No Approvals     |
| 01 | CSA, ATEX, IECEx |

### 200355 Accelerometer

#### 200355 – AA – BB – CC

##### A: Mounting Stud

|    |                              |
|----|------------------------------|
| 00 | ¼-28 SS w/ Brass tip, 0.5"   |
| 01 | ¼-28 to M6 x 1.00 BeCu       |
| 02 | ¼-28 to M8 x 1.25 BeCu       |
| 09 | No mounting stud             |
| 10 | 1/4 - 28 Adhesive Stud Mount |
| 11 | M6x1 Adhesive Stud Mount     |
| 12 | M8x1.25 Adhesive Stud Mount  |
| 13 | Magnetic Base Kit            |

##### B: Tolerance

|    |                                              |
|----|----------------------------------------------|
| 00 | 100 mV/g ± 5% (10.2 mV/m/s <sup>2</sup> ±5%) |
|----|----------------------------------------------|

##### C: Approvals

|    |              |
|----|--------------|
| 00 | No Approvals |
|----|--------------|

## 2.2 Accessories

|        |                                            |
|--------|--------------------------------------------|
| 168303 | 200350 and 200355 Accelerometer User Guide |
| 162411 | Trendmaster Pro System User Guide          |
| 149831 | Trendmaster DSM Datasheet                  |
| 149823 | Trendmaster DSM User Guide                 |

### Mounting Studs

Dimensional diagrams of all available mounting studs are shown in [Graphs and Figures](#)

|        |                       |
|--------|-----------------------|
| 164373 | ¼-28 Mounting Stud    |
| 164372 | M6x1 Mounting Stud    |
| 167559 | M8X1.25 Mounting Stud |

## Adhesive Mounting Kits

Adhesive studs are sold in kits containing two threaded studs and two mounting pads. Also in the kit is a packet of acrylic adhesive and materials to mix its two components. A scouring pad and alcohol wipe are provided for preparing the mounting surface.

|                   |                                       |
|-------------------|---------------------------------------|
| Temperature Range | -67°F to +250 °F<br>(-55°C to 121 °C) |
| Cure Time         | 24 hours                              |

## Magnetic Base Kit

The magnetic base has a pull of 35 lbf and it is suitable for placement on both curved surfaces and flat surfaces. The magnet comes supplied with a ¼-28 mounting stud. A dimensional diagram of the magnetic base is shown in [Graphs and Figures](#)

|        |                                |
|--------|--------------------------------|
| 286244 | Magnetic Base w/ Mounting Stud |
|--------|--------------------------------|

## Cables

The Splash proof cable is not recommended for the model 200350 accelerometer.

The standard cables are 22 AWG 2-conductor twisted shielded pairs with 2-socket moisture-resistant female connector at one end, terminal lugs at the other end. Cable length is optional and comes in increments of 1 ft between the stated maximum and minimum lengths.

## Splash Proof Cable

### CB2W100 – AAA

| A: Length  |        |
|------------|--------|
| <b>015</b> | 15 ft. |
| <b>032</b> | 32 ft. |
| <b>064</b> | 64 ft. |

|            |         |
|------------|---------|
| <b>112</b> | 112 ft. |
| <b>125</b> | 125 ft. |
| <b>150</b> | 150 ft. |
| <b>200</b> | 200 ft. |
| <b>250</b> | 250 ft. |

## Standard Cable, No Armor

### 9571 – AA

| A: Length |                        |
|-----------|------------------------|
| <b>02</b> | Minimum length, 2 ft.  |
| <b>99</b> | Maximum length, 99 ft. |
| <b>XX</b> | Desired length in ft.  |

The following are standard lengths

| Feet | Meters (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              |
| 30   | 9.0              |
| 33   | 10.0             |
| 50   | 15.2             |
| 99   | 30.0             |



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

## Standard Cable, Armored

### 84661 – AA

#### A: Length

|           |                        |
|-----------|------------------------|
| <b>03</b> | Minimum length, 3 ft.  |
| <b>99</b> | Maximum length, 99 ft. |
| <b>XX</b> | Desired length in ft.  |

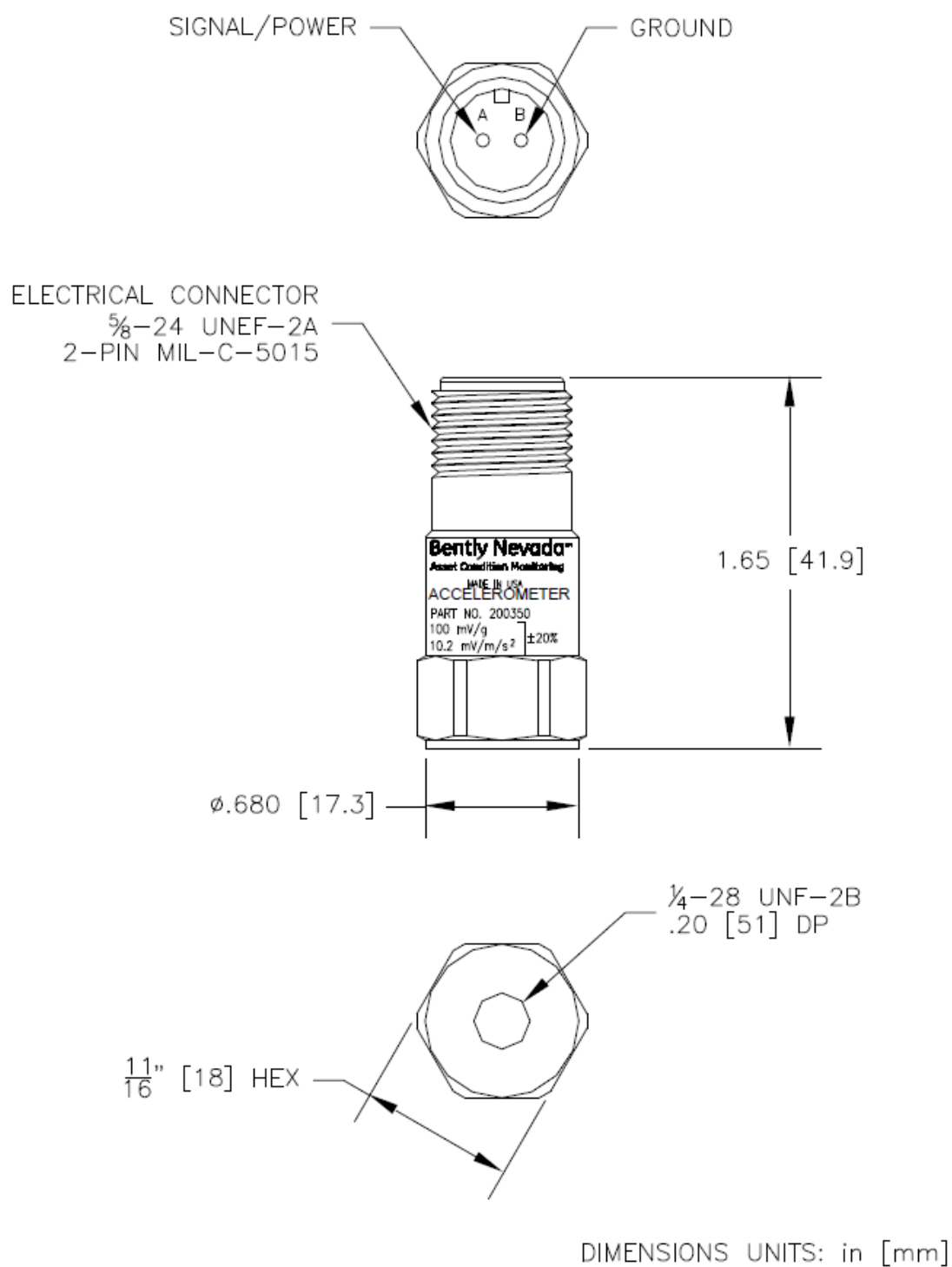
The following are standard lengths

| Feet | Meters (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              |
| 30   | 9.0              |
| 33   | 10.0             |
| 50   | 15.2             |
| 99   | 30.0             |

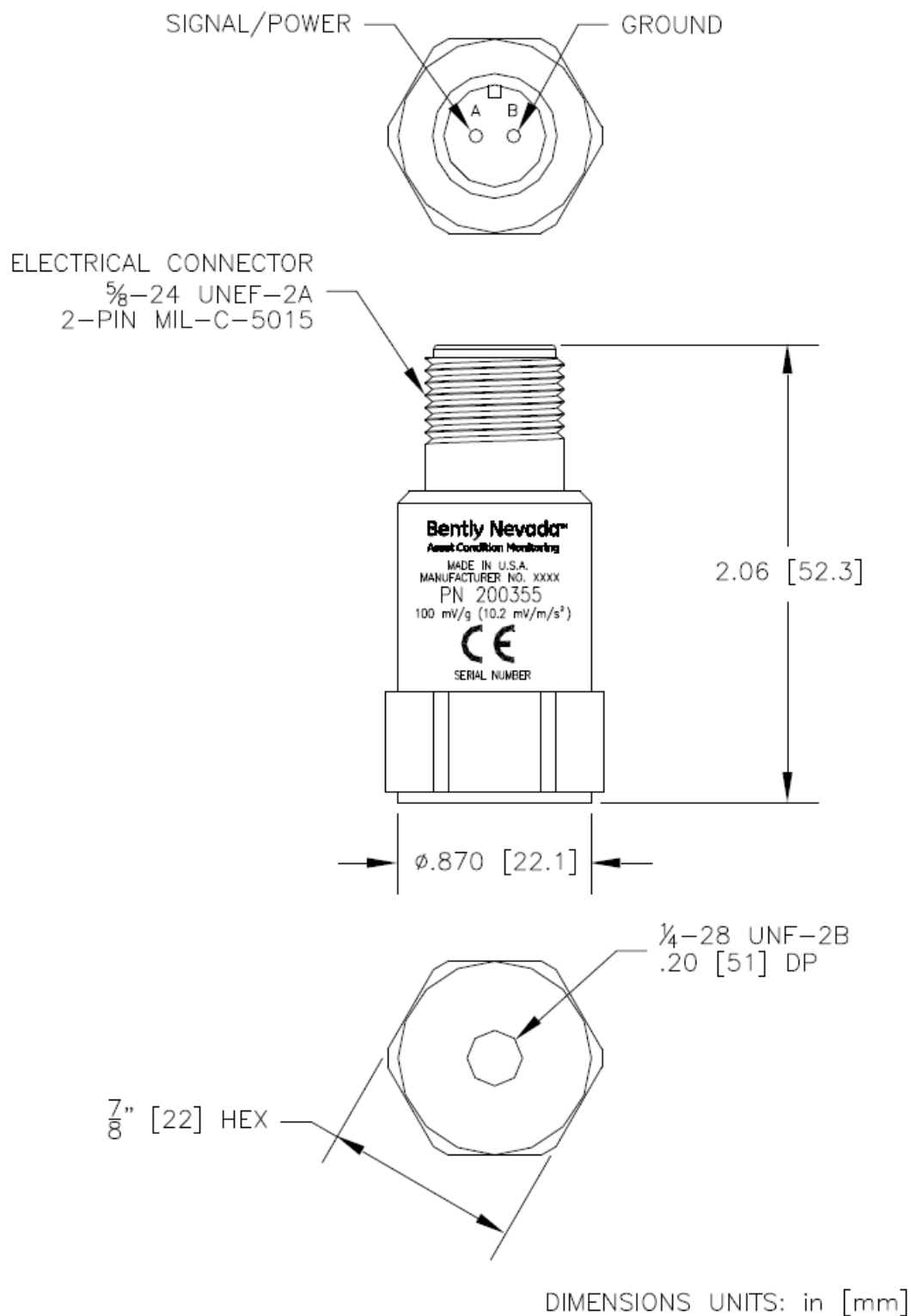


Non-standard/custom lengths can also be ordered at additional cost

### 3. Graphs and Figures



**Figure 3 - 1: 200350 Accelerometer Dimensional Drawing**



**Figure 3 - 2: 200355 Accelerometer Dimensional Drawing**

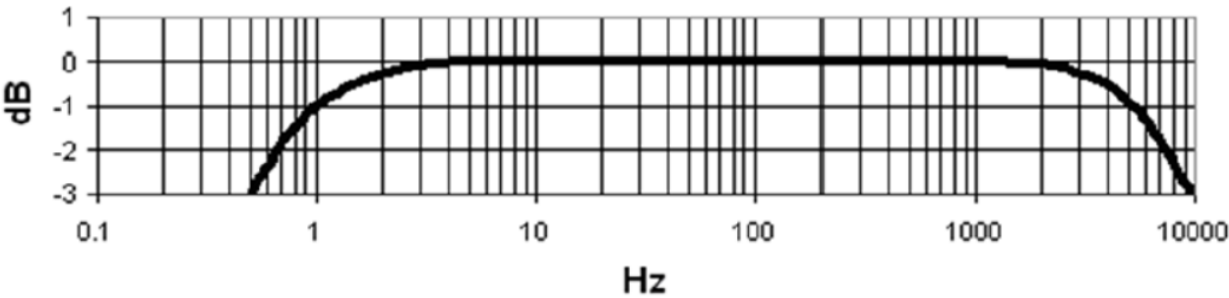


Figure 3 - 3: 200350 Accelerometer Frequency Response

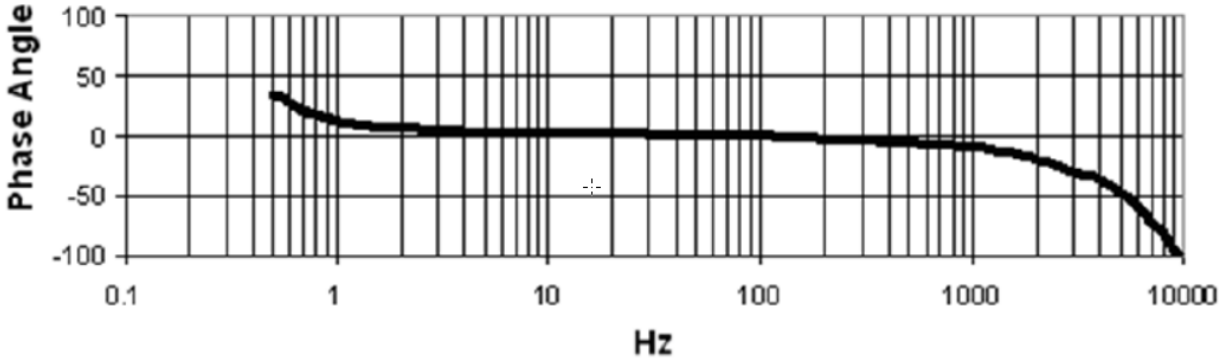


Figure 3 - 4: 200350 Accelerometer Phase

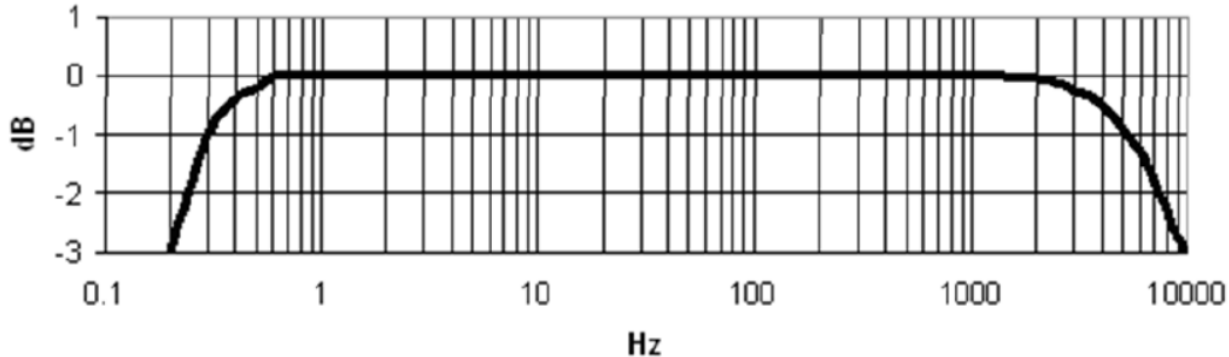


Figure 3 - 5: 200355 Accelerometer Frequency Response

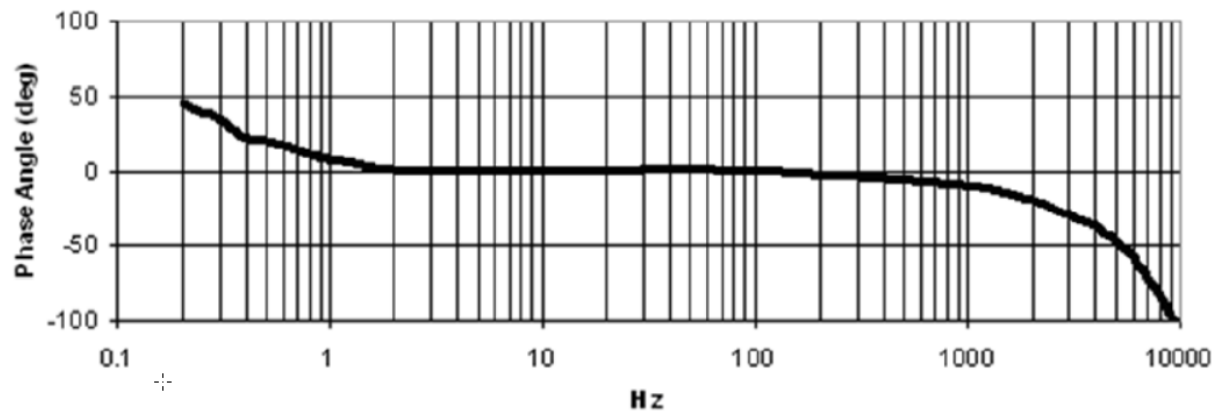


Figure 3 - 6: 200355 Accelerometer Phase

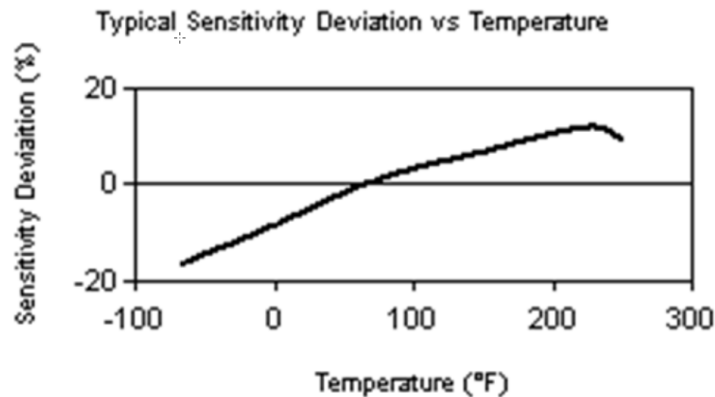
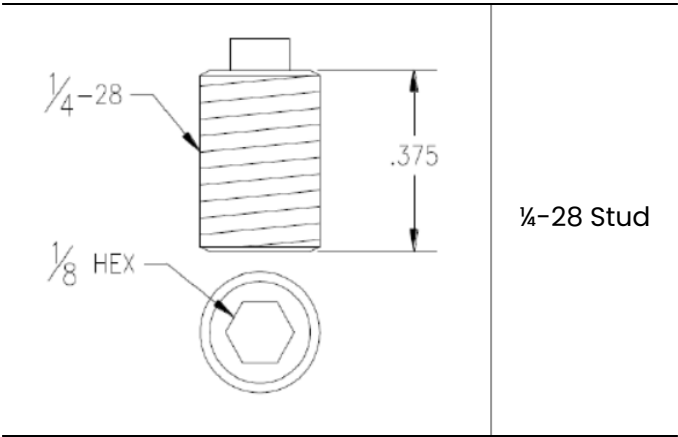


Figure 3 - 7: Temperature Sensitivity Curve



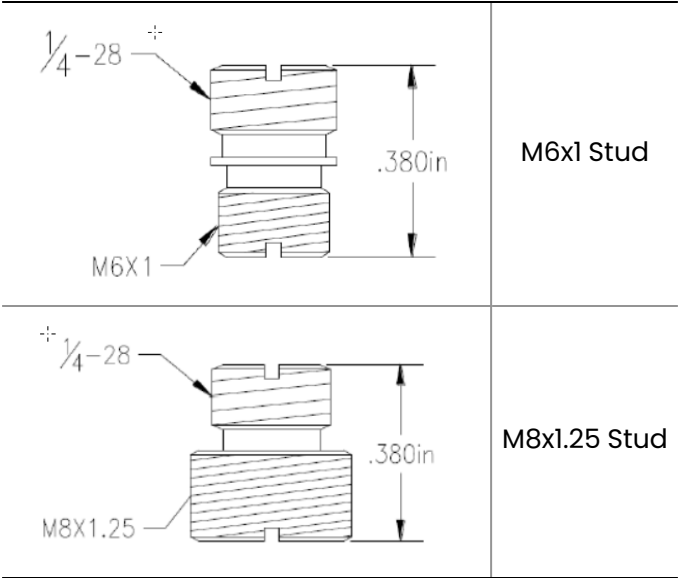


Figure 3 - 8: Mounting Stud Dimensional Drawings

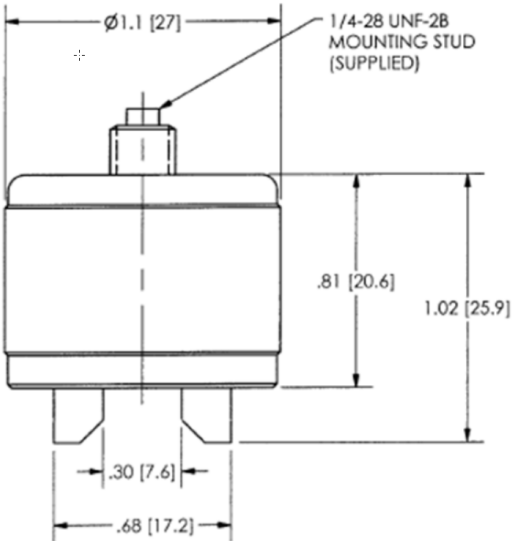


Figure 3 - 9: Magnetic Base Dimensional Drawing

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