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Find the *GE / Bently Nevada 200150-00-05* at our website: *Click HERE*

200150, 200155 & 200157 Accelerometers

Bently Nevada* Asset Condition Monitoring



Description

The 20015x Accelerometers are general purpose, wide frequency, case-mounted seismic transducers designed for use with Trendmaster* proTIMs.

The 200150 Accelerometer also operates with the Trendmaster 2000 system. The accelerometer interfaces with the 200100 Dual Acceleration to Velocity flexiTIM* Module and the 89130-01 Acceleration-to-Velocity TIM (Transducer Interface Module), as well as the 1900/25 and 1900/27 monitors.

The 20015x Accelerometers feature a hermetically sealed, stainless steel case. This design provides an extremely rugged transducer that is well suited for harsh industrial environments. The transducer's top-mounted, 5-pin connector allows you to easily install and remove the interconnecting signal cable. A 3/8-24 threaded hole on the bottom of the sensor's casing accommodates several mounting options.

The 20015x Accelerometers contain a piezoelectric sensing device that generates a charge when it is subjected to vibration. The accelerometers electronically convert this charge to a differential voltage signal that is proportional to the acceleration that is parallel to the sensitive axis of the transducer.

Application Advisories

1. Use of the 200155 and 200157 Accelerometers with 1900 monitors or with TIMs other than those listed in Table 1 will result in false readings.
2. Operating the transducers outside their specified limits will result in false readings or loss of machine monitoring.
3. The maximum allowed cable length for use with the 200155 is 50 feet.
4. 20015x accelerometers may be installed in a Class I, Zone 0 application without a barrier, if they are being used with the wSIM.

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Table 1: 20015x Accelerometer Applications

Accelerometer	Used with ProTIM Option	Type of Application
200150	Standard Acceleration-to-Velocity channel type (-01)	General application
200155	Low Frequency Acceleration-to-Velocity channel type (-05)	Fin-Fan, slow rotating shafts
200157	Standard Acceleration-to-Velocity with Acceleration Enveloping channel type (-06)	Roller element bearing and certain types of cavitation effects

Note that the acceleration-to-velocity circuitry in the 200200 and 200250 proTIMs will attenuate frequencies above 1 kHz . Attempts to obtain higher frequency information with the 200155 or 200157 will be ineffective.

The wider frequency range of the 200155 and 200157 accelerometers may result in increased noise compared to the 200150. We recommend that you use the 200155 transducer for frequencies of interest below 10 Hz. Use the 200157 only if the application requires acceleration enveloping. Use of the 200155 or the 200157 in place of the 200150 may result in faulty readings. Refer to the proTIM datasheet for the proper frequency response of the system.

Application Advisory

If you plan to use housing measurements for overall machinery 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 the housing measurement alone to be effective for overall machine protection, the installation 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, exercise care in the physical installation of the transducer. Improper installation can degrade the transducer's performance and/or the generation of signals that do not represent actual machine vibration.

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

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Specifications

All specifications are at +25 °C (+77 °F), unless otherwise specified.

Electrical

Sensitivity @ 80 Hz (± 12%)

10.2 mV/(m/s²) (100 mV/g)

Measurement Range

See Table 2.

Table 2: Measurement Ranges

Accelerometer	Measurement Range in m/s² (g)
200150	±245 (±25)
200155	±196 (±20)
200157	±245 (±25)

Frequency Range Referenced to 80Hz (±10%)

See Table 3.

Table 3: Frequency Ranges

Accelerometer	Frequency Range in Hz (cpm)
200150	10 to 1000 (600 to 60,000)
200155	1.5 to 10,000 (90 to 600,000)
200157	10 to 10,000 (600 to 600,000)

Mounted Resonant Frequency

>20 kHz (>1200 kcpm)

Amplitude Linearity (1 to 10g pk)

±2%

Transverse Sensitivity

≤7%

Settling Time (Within 5% of Bias)

See Table 4.

Table 4: Measurement Ranges

Accelerometer	Settling Time (ms)
200150	≤300
200155†	≤2000
200157	≤300

†**Note:** Because of its long settling time, you can use the 200155 only with low frequency acceleration-to-velocity channel types on a proTIM, DSM, or System 1* system.

Excitation Voltage

4.7 to 5.5 Vdc

Polarity (Acceleration from Base to Connector)

SIG+ positive with respect to SIG-.

Quiescent Current

<800 µA

Output Bias Voltage

+2.5 ± 0.23 Vdc

Broadband Electrical Noise

See Table 5.

Table 5: Broadband Electrical Noise (1 Hz to 15 kHz)

Accelerometer	Measurement Range in mm/s² (mg)
200150	14.7 (1.5)
200155	24.5 (2.5)
200157	14.7 (1.5)

Electrical Isolation

600 Vrms

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Environmental

Axial Shock Limit

49,050 m/s^2 pk (5,000 g pk)

Temperature Range

-40 °C to +105 °C (-40 °F to +221 °F)

Sealing (Hermetic)

5X10^{-8} atm•cc/s (3.1X10^{-9} atm•in^3/s), maximum

Relative Humidity

100% relative, condensing, non-submerged

Physical

Size (Hex x Height)

17.5 mm x 45.7 mm (11/16 in x 1.8 in)

Weight

58 g (2.0 oz), typical

Mounting Thread

3/8-24 female

Mounting Torque

2.7 to 6.8 N•m (2 to 5 ft•lbf)

Sensing Element

Ceramic

Sensing Geometry

Shear

Housing and connector material

200150

316L stainless steel

200155

316L stainless steel

200157

316L stainless steel

Electrical Connector (Top)

5-pin 1/2-20

Cables

Operating Temperature Range

-20 °C to +100 °C (-4 °F to +212 °F)

These cables may be used at lower temperatures if the installation prevents the cable from flexing or bending. Flexing these cables at temperatures below –20 °C (-4 °F) may damage the cables.

Construction

4-conductor, 22 AWG with braided shield and drain wire (85% coverage, minimum), PVC outer jacket. Nickel-plated coupling nuts.

Seal

Connectors provide an IP67 seal to transducers and mating hardware. Connectors are molded to the cable. The addition of DC4 electrical insulating compound in the connectors provides additional protection against moisture during a thermal shock.

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Minimum Bend Radius

200151

63.5 mm (2.5 in)

200152

73.7 mm (2.9 in)

Maximum Cable Length

25 m (82 ft)

Custom products may be able to provide longer cable lengths for the 200150 and 200157 accelerometers.

Adhesive (see Mounting Hardware Options)

Temperature Range

-55 ºC to +121 ºC (-67 ºF to +250 ºF)

Cure Time

24 hours

Compliance and Certifications

EMC

Standards:

EN 61326, Electrical Equipment for Measurement, Control, and Laboratory Use, EMC Requirements.
CISPR 11, Radiated Emissions
EN 61000-4-2, Electro-Static Discharge
EN 61000-4-3, Radiated Immunity
EN 61000-4-4, Electrical Fast Transient
EN 61000-4-5, Surge

European Community Directives

EMC Directive 2004/108/EC

Explosive Atmospheres

European Community Directives:

ATEX 1994/9/EC

For further certification and approvals information please visit the following website:
www.ge-mcs.com/bently

Hazardous Area Approvals

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

North American

Ex ia IIC T4
Class I, Div 1
Groups A,B,C,D
T4 @ -40°C ≤ Ta ≤ 80°C
Per DWG 167535

Ex nL IIC T4
Class I, Div 2
Groups A,B,C,D
T4 @ -40°C ≤ Ta ≤ 80°C
Per DWG 167535

European

II 1G Ex ia IIC T4 Ga

T4 @ -40°C ≤ Ta ≤ +80°C

II 3G Ex nA IIC T4 Gc

T4 @ -40°C ≤ Ta ≤ +80°C

IECEx

Ex ia IIC T4 Ga

Ui = 27V, Ii = 150mA, Pi = 880mW, Li = OμH, Ci = 16,2nF

Ex nA IIC T4 Gc

T4 @ -40°C ≤ Ta ≤ +80°C

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Ordering Information

Country specific approvals may be available. Please consult your local Customer Care Representative for more information.

General Purpose Trendmaster 2000 or Trendmaster Pro Accelerometer

200150-AA-BB

Low Frequency Trendmaster Pro Accelerometer

200155-AA-BB

Enveloping Trendmaster Pro Accelerometer

200157-AA-BB

Refer to Table 6 for detailed specifications.

AA: Mounting Stud Option

0 0	No mounting stud provided
0 1	3/8-24 thread, 2 adhesive mount frames with adhesive
0 2	3/8-24 to 3/8-24 UNF 1-3/8 inch hex plate stud
0 3	3/8-24 to 1/2-20 UNF 1-3/8 inch hex plate stud
0 4	3/8-24 to 1/4 NPT 1-3/8 inch hex plate stud
0 5	3/8-24 to 1/4-28 UNF 1-3/8 inch hex plate stud
0 6	3/8-24 to 1/4 NPT, 3/4 inch hex stud
0 7	3/8-24 to 3/8 NPT, 3/4 inch hex stud
0 8	3/8-24 to 1/2 NPT 1 inch hex stud
0 9	3/8-24 to 3/4 NPT, 1-1/4 inch hex stud
1 0	3/8-24 to 1 NPT, 1-3/8 inch hex stud
1 1	3/8-24 to 1-1/4 NPT, 1-3/4 inch hex stud
1 2	3/8-24 to 1/4-20 UNC, 3/4 inch hex stud
1 3	3/8-24 to 5/16-18 UNC, 3/4 inch hex stud
1 4	3/8-24 to 3/8-24 UNF, 3/4 inch hex stud
1 5	3/8-24 to 3/8-16 UNC, 3/4 inch hex stud
1 6	3/8-24 to 1/2-13 UNC, 3/4 inch hex stud
1 7	3/8-24 to 3/8-16 UNC 1-3/8 inch hex plate stud
1 8	3/8-24 to M8x1 1-3/8 inch hex plate stud
1 9	Quick-Set XDCR adapter, 1-inch hex stud
2 0	3/8-24 thread, 1 magnetic mount base
2 1	3/8-24 outer diameter to M6x1 inner diameter 1-3/8 inch hex plate stud
2 2	3/8-24 to M8x1.25 1-3/8 inch hex plate stud
2 3	3/8-24 to M16x2.0 1-3/8 inch hex plate stud

BB: Approvals

0 5	Multiple Approvals (CSA, ATEX, and IECEx)

Note: Adhesive studs (Options **0 1** and **2 0**) are sold in kits containing frames to hold the studs to the substrate while the adhesive cures. The kit also contains a packet of acrylic adhesive and materials to mix its 2 components and provides a scouring pad and alcohol wipe to prepare the mounting surface.

Application Advisory

Using adhesives and magnetic mounts will attenuate high frequency signals that may be present.

Accelerometer Interface Standard Cable, Connectors on Both Ends

200151-AA-BB-CC

AA: Cable length

2 0	2.0 meters
4 0	4.0 meters
6 0	6.0 meters

BB: Armor option

0 2	Blue cable without armor
0 3	Blue cable with armor

CC: Coupling nut

0 0	Standard coupling nut (see Figure 9)
0 2	Nylon coupling nut
1 0	Enhanced coupling nut. This option provides a better grip for tightening the cable to the accelerometer and is provided

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on both ends of the cable (see Figure 11).

Accelerometer Interface Standard Cable, Connector on Accelerometer End Only

200152-AA-BB

AA: Cable length

0 4	4.0 meters
1 5	15 meters
2 5	25 meters

BB: Coupling nut

0 0	Standard coupling nut (see Figure 10)
1 0	Enhanced coupling nut. This option provides a better grip for tightening the cable to the accelerometer and is provided on the accelerometer end only (see Figure 12).

Accessories

164985-01

200150, 200155, and 200157 Accelerometers Installation Guide.

162411

Trendmaster System Manual.

149831-01

Trendmaster Dynamic Scanning Module datasheet.

163662-01

200200 proTIM-R Module datasheet.

163663-01

200250 proTIM-C Module datasheet.

126709-01

Trendmaster 2000 for Windows Installation Guide.

141574-01

200100 Acceleration-to-Velocity flexiTIM Module datasheet.

137230-01

FlexiTIM Operation Manual.

190125-01

1900/25 Vibration Monitor Operation and Maintenance Manual.

141485-01

1900/25 Vibration Monitor datasheet.

190127-01

1900/27 Vibration Monitor Operation and Maintenance Manual.

141486-01

1900/27 Vibration Monitor datasheet.

141556

89130-01 and 89546-01 Accel-to-Velocity Transducer Interface Module datasheet.

142485-01

Housing cable adapter. See Figure 13.

141887-01

Conduit cable adaptor, single. See Figure 14.

141887-02

Conduit cable adapter, double. See Figure 15.

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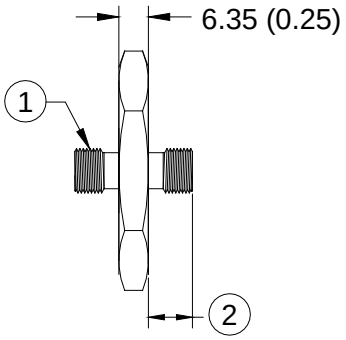
Mechanical Specifications, Graphs, and Figures

Note: All dimensions shown in millimeters (inches) except as noted.

Table 6: Mounting Stud Specifications

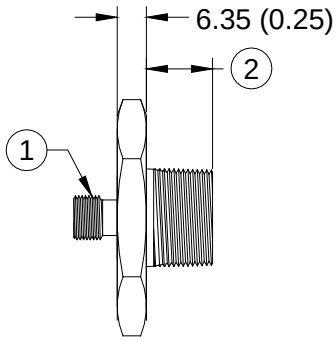
Option "A"	Stud Length in mm (in)	Recommended Torque in N•m (in•lbf)	Maximum Torque in N•m (in•lbf)	Replacement Part Number	Notes
0 1	N/A	N/A	N/A	04284020	2 adhesive mount frames with adhesive
0 2	6.0 (0.235)	N/A	22.6 (200) for curved mounting surface, 45.2 (400) for flat mounting surface	107756-01	See Figure 1
0 3	12.1 (0.475)	N/A	22.6 (200) for curved mounting surface, 45.2 (400) for flat mounting surface	107755-01	See Figure 1
0 4	16.5 (0.650)	N/A	22.6 (200) for curved mounting surface, 45.2 (400) for flat mounting surface	107754-01	See Figure 2
0 5	8.3 (0.325)	N/A	7.3 (65) for curved mounting surface, 14.6 (130) for flat mounting surface	128038-01	See Figure 1
0 6	18.2 (0.715)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-01	See Figure 3
0 7	18.4 (0.725)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-02	See Figure 3
0 8	23.0 (0.905)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-03	See Figure 3
0 9	23.2 (0.915)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-04	See Figure 3
1 0	28.1 (1.105)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-05	See Figure 3
1 1	28.8 (1.135)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-06	See Figure 3
1 2	11.6 (0.457)	16.9 to 22.6 (150 to 200)	22.6 (200)	131562-01	See Figure 4
1 3	13.0 (0.512)	16.9 to 22.6 (150 to 200)	22.6 (200)	131562-02	See Figure 4
1 4	6.1 (0.240)	16.9 to 22.6 (150 to 200)	22.6 (200)	131562-03	See Figure 4
1 5	13.7 (0.540)	16.9 to 22.6 (150 to 200)	22.6 (200)	131563-04	See Figure 4
1 6	16.8 (0.660)	16.9 to 22.6 (150 to 200)	22.6 (200)	131562-05	See Figure 4
1 7	10.2 (0.400)	N/A	22.6 (200) for curved mounting surface, 45.2 (400) for flat mounting surface	161961-01	See Figure 4
1 8	8.3 (0.325)	N/A	10.2 (90) for curved mounting surface, 20.4 (180) for flat mounting surface	125094-01	See Figure 1
1 9	6.4 (0.250)	3.9 (35)	3.9 (35)	138648-01	See Figure 5
2 0	N/A	N/A	N/A	139153-01	See Figure 6
2 1	N/A	N/A	N/A	87055-01	See Figure 7
2 2	8.3 (0.325)	N/A	10.2 (90)	125094-02	See Figure 8
23	16.8 (0.66)	N/A	22.6 (200) for curved mounting surface, 45.2 (400) for flat mounting surface	107755-02	See Figure 1

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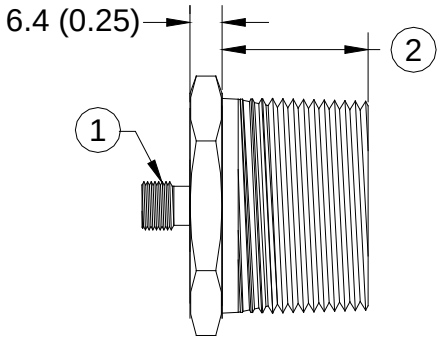
1. 3/8-24 UNF 2A
2. Stud length

Figure 1: Hex Plate Stud for "A" Options 02, 03, 05, 17, 18, and 23.



1. 3/8-24 UNF A
2. Stud length

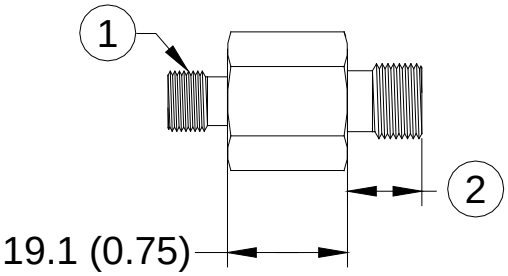
Figure 2: Hex Plate Stud for "A" Option 04



1. 3/8-24 UNF 2A
2. Stud length

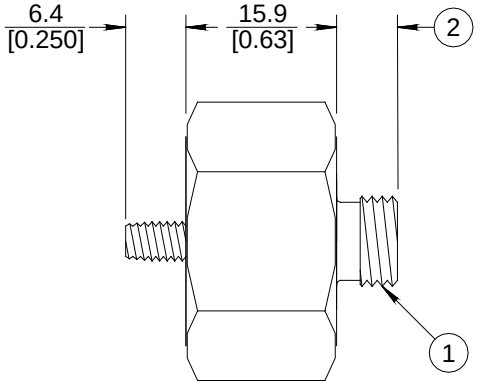
Figure 3: Hex Stud for "A" Options 06 Through 11

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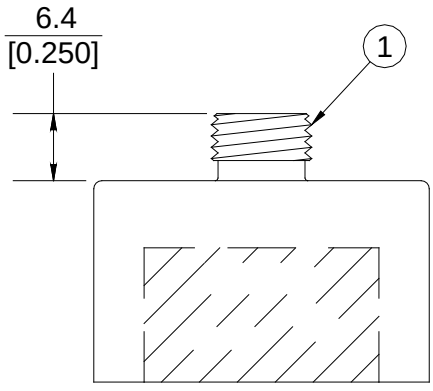
1. 3/8-24 UNF 2A
2. Stud length

Figure 4: Hex Stud for "A" Options 12 Through 17



1. 3/8-24 UNF 2A
2. Stud length

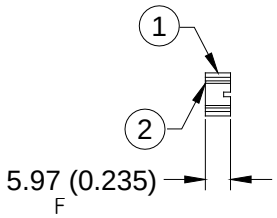
Figure 5: Quick-Set XDCR Adapter



1. 3/8-24 UNF 2A

Figure 6: Magnetic Mount Base

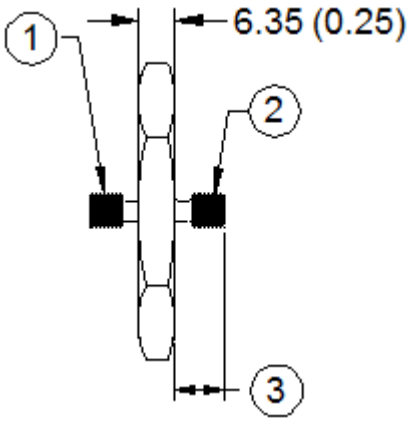
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2A outer diameter

2. M6 x 1 inner diameter

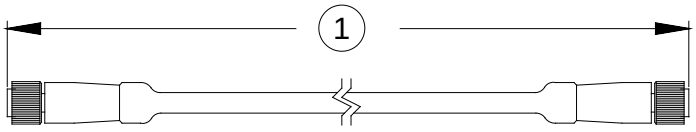
Figure 7: Hex Plate Stud for "A" Option 21



1. 3/8-24 UNF 2A
2. M8 x 1,25
3. Stud length

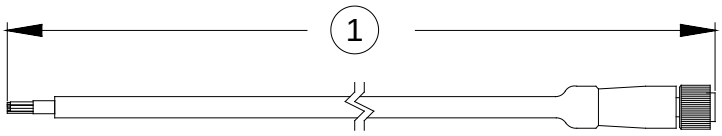
Figure 8: Hex Plate Stud for "A" Option 22

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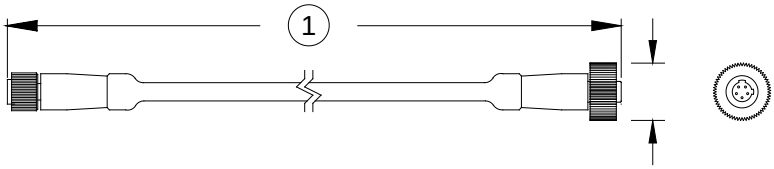
1. Cable length (Option "A")

Figure 9: 200151 With Standard Coupling Nut and No Armor



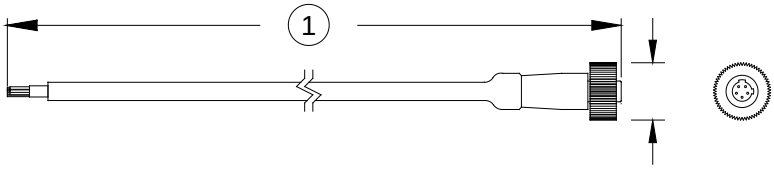
1. Cable length (Option "A")

Figure 10: 200152 With Standard Coupling Nut and No Armor



1. Cable Length (Option "A")

Figure 11: 200151 With Enhanced Coupling Nut and No Armor



1. Cable length (Option "A")

Figure 12: 200152 With Enhanced Coupling Nut and No Armor

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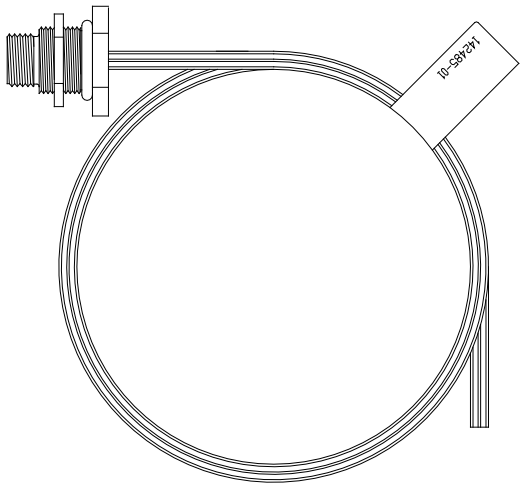


Figure 13: Housing Cable Adapter (Part Number 142485-01)

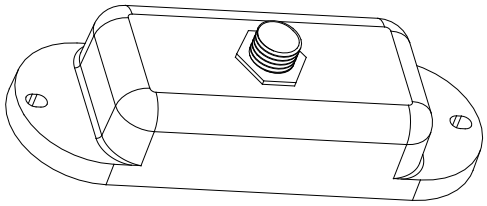


Figure 14: Conduit Cable Adapter, Single (Part Number 141887-01)

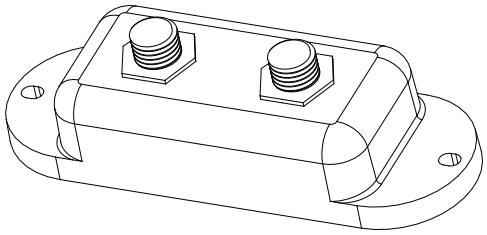
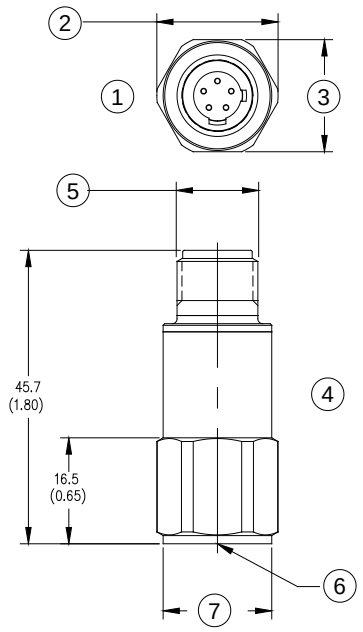


Figure 15: Conduit Cable Adapter, Double (Part Number 141887-02)

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1. Top view
2. 19.1 mm (0.750 in) across corners
3. 11/16-inch hexagonal
4. Side view
5. 1/2-20 UNC-2A 5-pin connector
6. 3/8-24 UNF-2B threads, 7.1 mm (0.28 in) deep, minimum
7. 17.0 mm (0.67 in) diameter, typical

Figure 16: Accelerometer Dimensional Drawing

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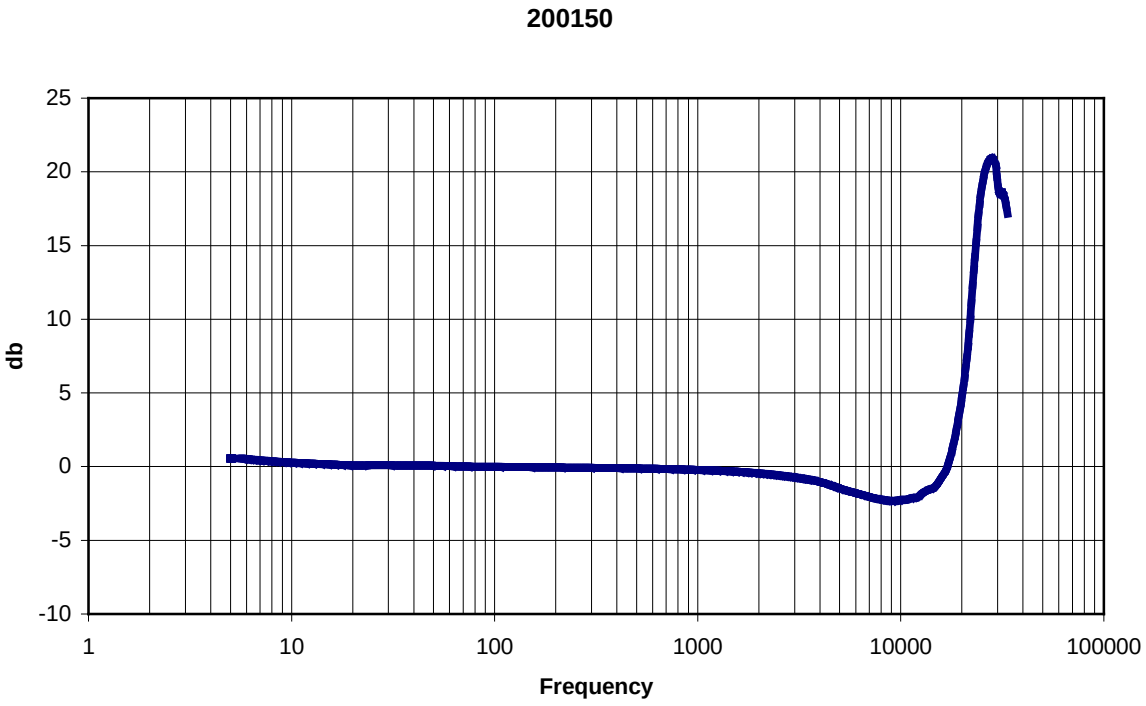


Figure 17: 200150 Amplitude Frequency Response (Typical)

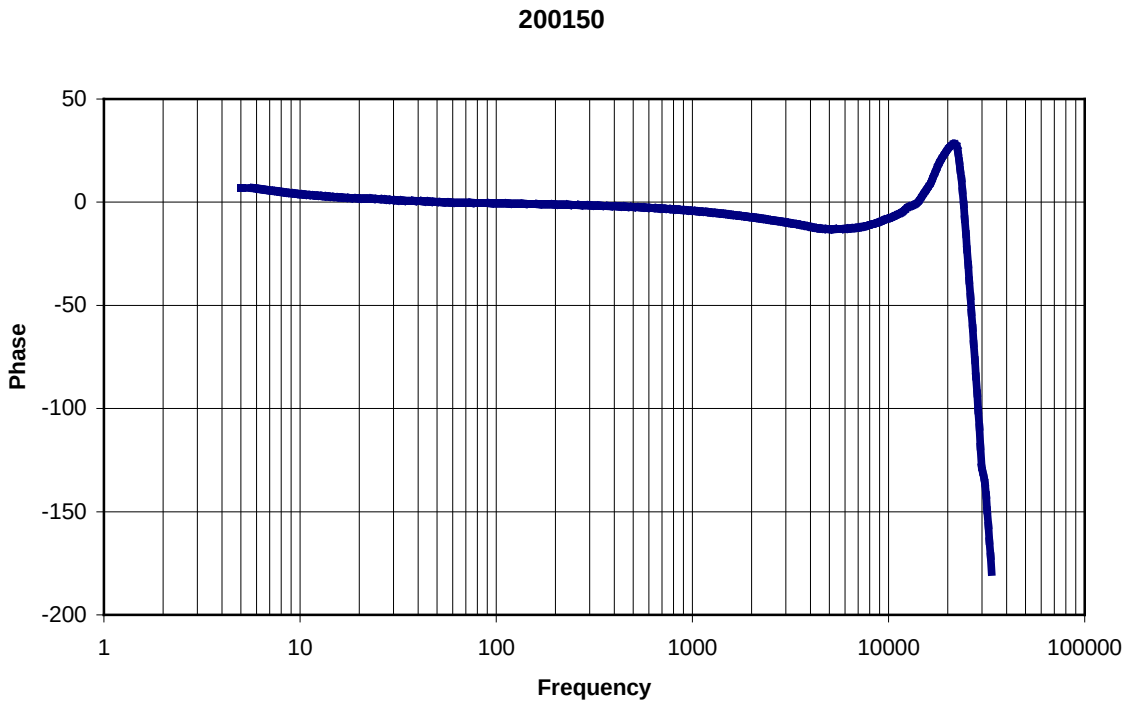


Figure 18: 200150 Phase Frequency Response (Typical)

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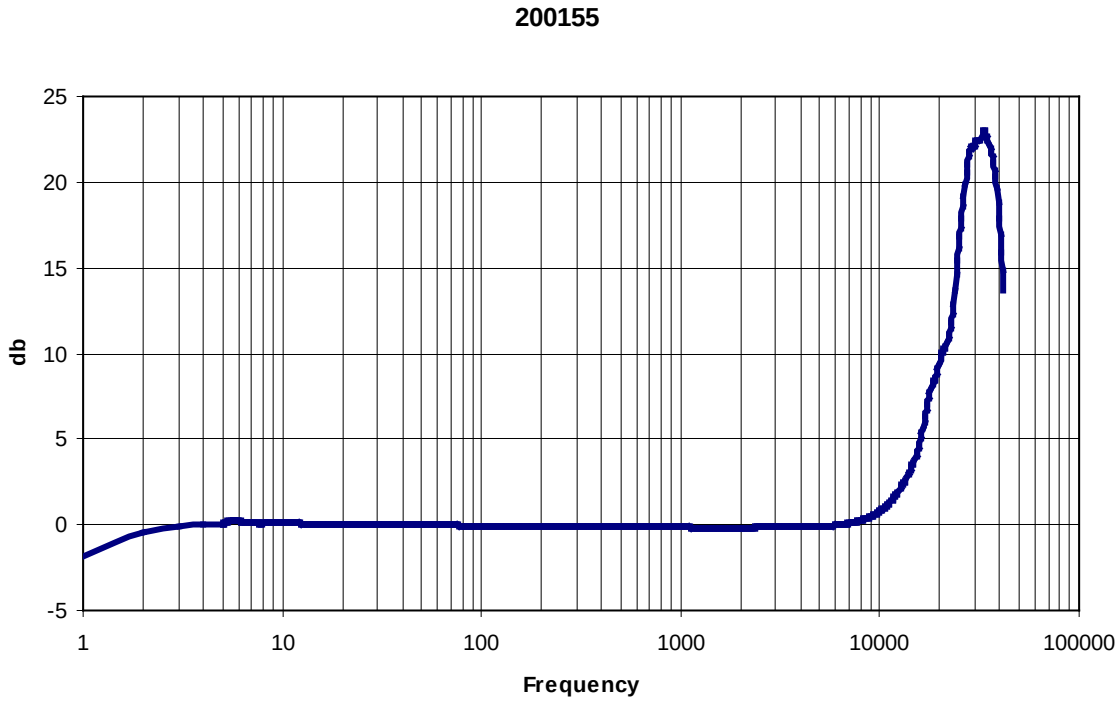


Figure 19: 200155 Amplitude Frequency Response (Typical)

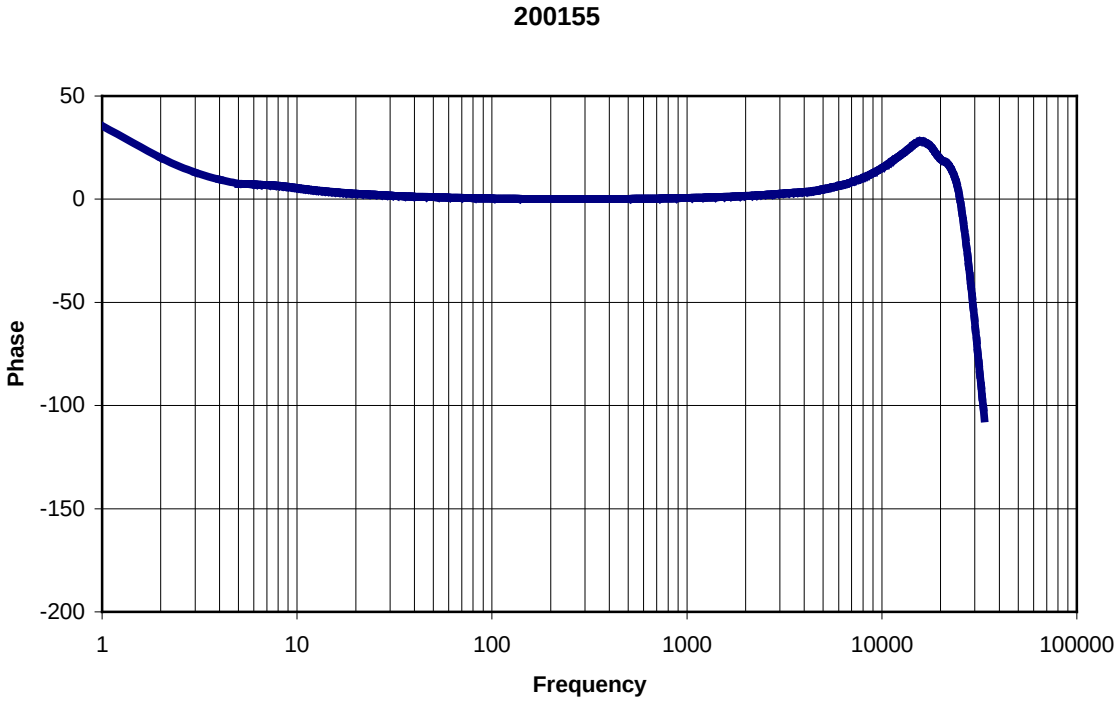


Figure 20: 200155 Phase Frequency Response (Typical)

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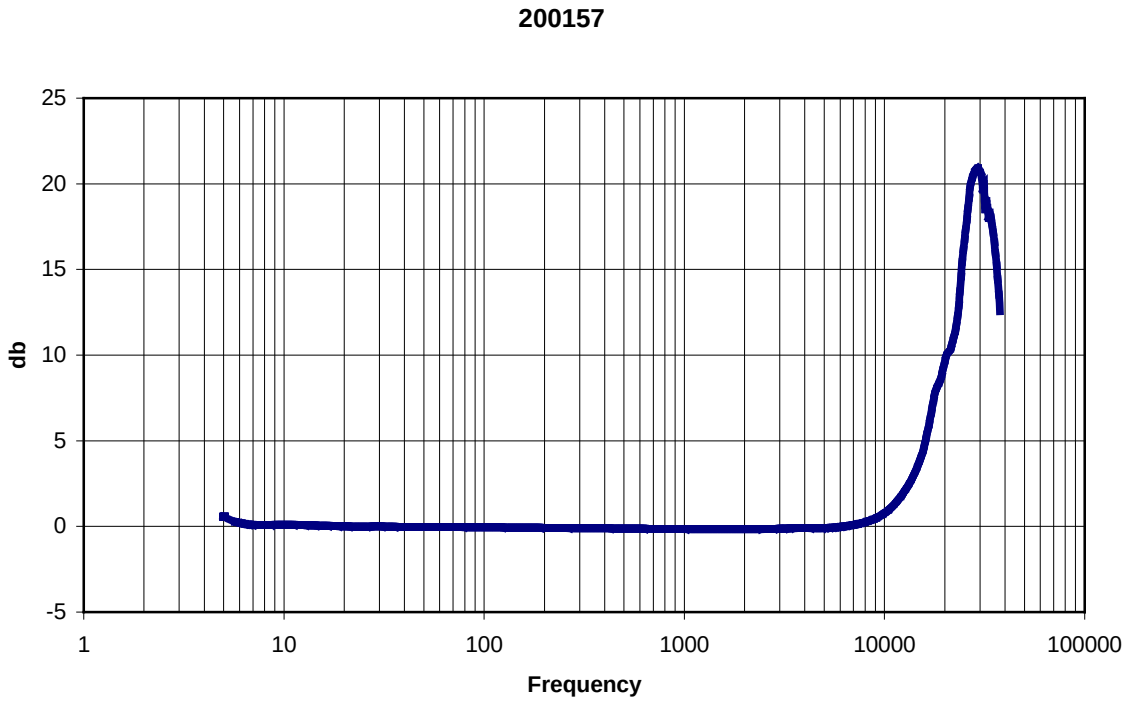


Figure 21: 200157 Amplitude Frequency Response (Typical)

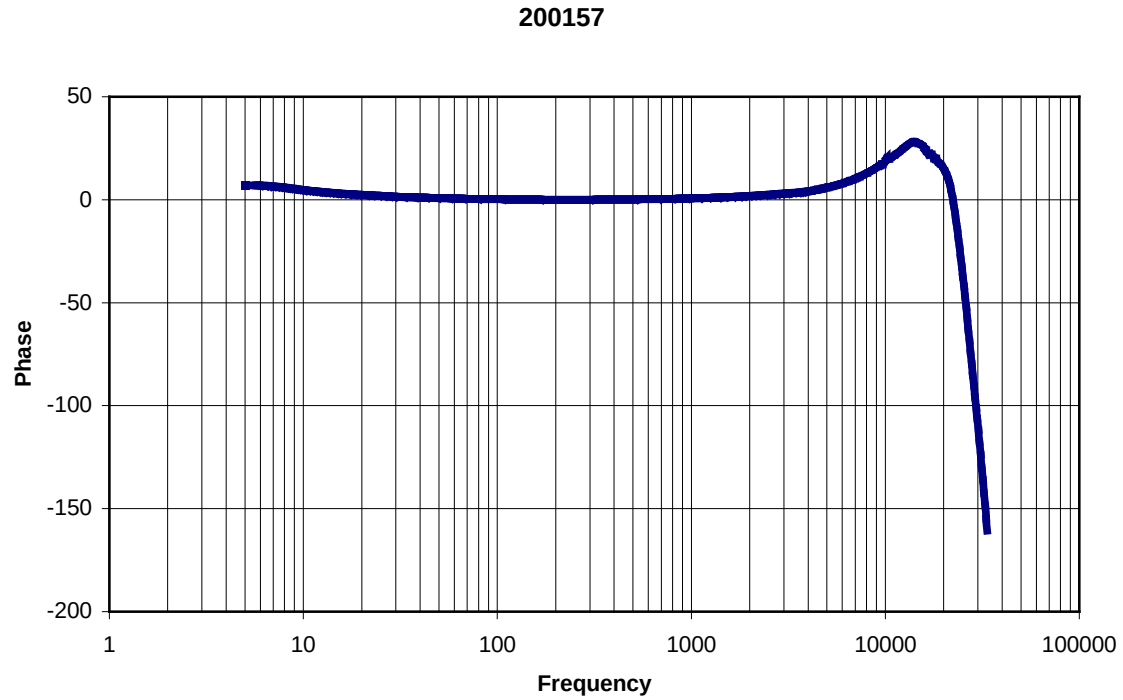


Figure 22: 200157 Phase Frequency Response (Typical)

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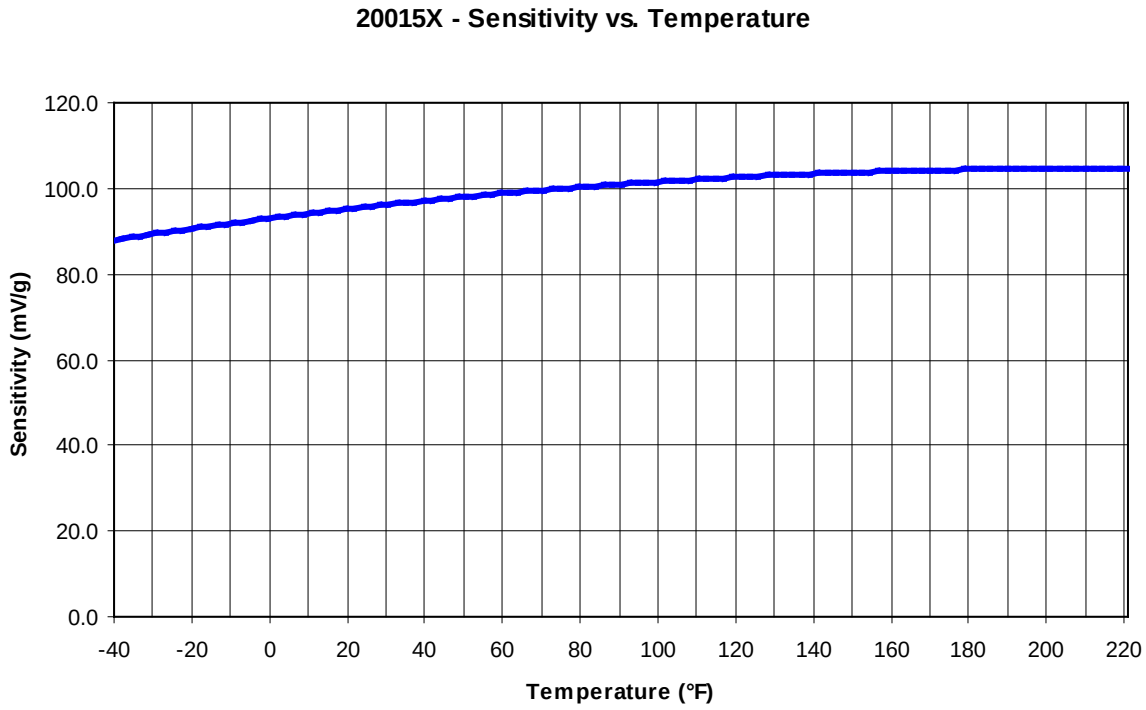


Figure 23: 20015x Accelerometer Temperature Sensitivity (Typical)

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