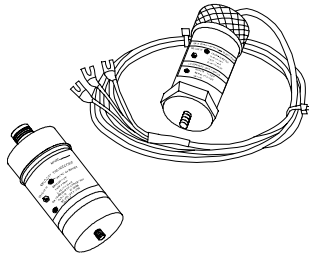


Specifications and Ordering Information  
9200, 74712, 47633 Seismoprobe®  
Velocity Transducer System



## Description

Bently Nevada Seismoprobe® Velocity Transducer systems are designed to measure absolute (relative to free space) bearing housing, casing, or structural vibration. The two-wire systems consist of a transducer, appropriate cable, and an optional velocity-to-displacement converter.

The Seismoprobe® family of velocity transducers are a two-wire design that uses moving-coil technology and provides a voltage output directly proportional to the transducer's vibration velocity. Unlike solid-state velocity transducers (which are inherently accelerometers with embedded integration electronics), moving-coil transducers are less sensitive to impact or impulsive excitation, and can represent a good choice for certain applications. Also, because they require no external power, they are convenient for portable measurement applications.

**Note:** For the majority of installations, Bently Nevada's Velomitor® family of velocity transducers incorporating solid-state technology represent superior performance and robustness for casing velocity measurement applications.

Three types of Seismoprobe® Velocity Transducers are available:

- **9200:** The 9200 is a two-wire transducer suitable for continuous monitoring or for periodic measurements in conjunction with test or diagnostic instruments. When ordered with the integral cable option, the 9200 has excellent resistance to corrosive environments without need of additional protection.
- **74712:** The 74712 is a high temperature version of the 9200.
- **47633:** The 47633 is available in fewer mounting configurations and is only available with integral, non-armored cable. Its design uses a replaceable cartridge for easy replacement when the moving-coil element eventually wears out. It is intended for general-purpose applications where a velocity transducer with limited mounting options and performance is adequate.

Various interconnect cables are available for connecting the 9200 and 74712 transducers to other instruments or a velocity-to-displacement converter. These cables are available in 300 mm (one-foot) increments, with or without stainless steel armor.

Two types of velocity-to-displacement converters (VDCs) are available:

- **9513:** to be used with 9200 and 74712 transducers.
- **46687:** to be used with 47633 transducers.



### **Caution**

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 decrease of the transducer amplitude and frequency, of the transducer amplitude and frequency response, and/or the generation of signals which do not represent actual machine vibration.

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.

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## Specifications

### 9200 and 74712 Seismoprobe® Velocity Transducers

Specifications are at +22°C (+72°F) and 25 mm/s (1 in/s) at 100 Hz unless otherwise specified.

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#### Electrical

<i>Sensitivity:</i>	20 mV/mm/s (500 mV/in/s), ±5% at 100 Hz (6,000 cpm) and 25 mm/s (1 in/s) zero-to-peak, ±5% at 100 Hz (6,000 cpm) when properly terminated and oriented at the angle of calibration.
<i>Frequency Response:</i>	From minimum operating frequency (see ordering information) to 1 kHz (60,000 cpm); +0, ±3dB typical.
<i>Shock Resistance:</i>	Withstands 50 g peak maximum acceleration.
<i>Transverse Sensitivity:</i>	±10% maximum.
<i>Leadwire Length:</i>	305 metres (1,000 feet) maximum between Seismoprobe® and 3300 Monitor. Consult manual for frequency roll-off at longer lengths.

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#### Environmental Limits

<i>Operating and Storage Temperature:</i>	<b>9200:</b> -29°C to +121°C (-20°F to +250°F). <b>74712:</b> -29°C to +204°C (-20°F to +400°F).
<i>Environment:</i>	Dust and moisture resistant.  <b>Note:</b> Contact your nearest Bently Nevada Sales Professional regarding transducer operation in a radiation environment.
<i>Relative Humidity:</i>	To 95%, noncondensing. 100%, non-submerged, when ordered with integral cable.

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#### Physical

<i>Height:</i>	102 mm (4 in) typical (depends on connector option).
<i>Diameter:</i>	41 mm (1.6 in) typical.
<i>Weight:</i>	480 grams (17 ounces) typical.

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#### Electrical

##### Velocity-to-Displacement Converters

<i>Model 9513 requires:</i>	-18 Vdc.
<i>Model 46687 requires:</i>	-24 Vdc.
<i>Output Sensitivity (with a 500 mV/in/s input)</i>	
<i>9513-02:</i>	200 mV/mil (8 V/mm) ±5%.
<i>46687-01:</i>	200 mV/mil (8 V/mm) ±5%.
<i>Frequency Range:</i>	Minimum operating frequency to 10 kHz (600,000 cpm).
<i>Output Impedance:</i>	For model 9513-02, 100 Ω.
<i>Output Bias:</i>	5.8 to 9.5 Vdc.

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## Physical

### 46687

<i>Height:</i>	51 mm (2 in)
<i>Width:</i>	61 mm (2.40 in)
<i>Length:</i>	79 mm (3.10 in)
<i>Weight:</i>	220 grams (7.90 ounces)
<i>Mounting Holes:</i>	Four 4.8 mm (0.19 in) diameter holes centered in all corners of a 50.8 mm (2 in) square.

### 9513

<i>Height:</i>	38 mm (1.50 in)
<i>Length:</i>	89 mm (3.50 in)
<i>Width:</i>	54 mm (2.12 in)
<i>Weight:</i>	180 g (6.50 oz)
<i>Mounting Holes:</i>	Four 4.8 mm (0.19 in) diameter holes centered in all corners of a rectangle 50.8 mm (2 in) long by 44.5 mm (1.75 in) wide.

*Seismoprobe® Orientation:* All Seismoprobe® Velocity Sensors are specified for mounting orientations as shown in Figure 1.

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## Ordering Information

### Two-wire Transducer

The 9200 Two-wire Velocity Seismoprobe® transducer can be used with the 9513 VDC which is ordered separately (see Velocity-to-Displacement Converters).

#### 9200-AXX-BXX-CXX-DXX

##### Option Descriptions

<i>A: Transducer</i>	<b>01</b>	0 ±2.5, 4.5 Hz (270 cpm)
<i>Mounting</i>	<b>02</b>	45 ±2.5, 4.5 Hz (270 cpm)
<i>Angle/Minimum</i>	<b>03</b>	90 ±2.5, 4.5 Hz (270 cpm)
<i>Operating</i>	<b>06</b>	0 ±100, 10 Hz (600 cpm)
<i>Frequency Option</i>	<b>09</b>	0 ±180, 15 Hz (900 cpm)
<i>B: Connector Option</i>	<b>01</b>	Top Mount
	<b>02</b>	Side Mount
	<b>05</b>	Terminal block top mount

**06** Coaxial connector (for test equipment only)  
**07** Thru  
**50** Environmentally-resistant with integral cable. Option number corresponds to cable length 7.0 feet (2.1 metres) min., 50.0 feet (15 metres) max., ordered in increments of 1.0 foot.

##### *C: Mounting Base Option*

**01** Circular; 1/4-in 20 UNC stud  
**02** Circular; 1/4-in 28 UNF stud  
**03** Rectangular flange  
**04** Circular; with three 8-32 threaded studs on a 44 mm (1.75 in) diameter bolt circle  
**05** No base; 1/2-in 20 UNF-3A stud  
**06** Isolated circular 1/4-in 20 UNC stud  
**07** Isolated circular 1/4-in 28 UNF stud  
**08** Isolated rectangular flange  
**09** Isolated circular 5/8-in 18 UNF stud  
**10** Circular; M10X1 stud

##### *D: Agency Approval Option*

**00** No approvals required  
**01** CSA/NRTL/C  
**02** BASEEFA  
**03** Not Available

### Hi-temp two-wire transducer

The 74712 High Temperature Two-Wire Velocity Transducer can be used with the 9513 VDC which is ordered separately (see Velocity-to-Displacement Converters).

#### 74712-AXX-BXX-CXX DXX

##### Option Descriptions

<i>A: Transducer</i>	<b>01</b>	0 ±2.5, 4.5 Hz (270 cpm)
<i>Mounting</i>	<b>02</b>	45 ±2.5, 4.5 Hz (270 cpm)
<i>Angle/Minimum</i>	<b>03</b>	90 ±2.5, 4.5 Hz (270 cpm)
<i>Operating</i>	<b>04</b>	135 ±2.5, 4.5 Hz (270 cpm)
<i>Frequency Option</i>	<b>05</b>	180 ±2.5, 4.5 Hz (270 cpm)
	<b>06</b>	0 ±100, 10 Hz (600 cpm)
	<b>07</b>	0 ±180, 15 Hz (900 cpm)

##### *B: Mounting Base Option*

**01** Circular; 1/4-in 20 UNC stud  
**02** Circular; 1/4-in 28 UNF stud  
**03** Rectangular flange  
**04** Circular base with three 8-32 studs  
**05** No base; 1/2-in 20 UNF-3A stud

- C: Connector Option*
- 01** Coaxial connector for test equipment only: rated to +165°C (+329°F).
  - 02** Top mount
  - 03** Terminal block top mount
  - 04** Side mount
- D: Agency Approval Option*
- 00** No approvals required
  - 01** CSA/NRTL/C
  - 02** BASEEFA
  - 03** Not Available

### Velocity-to-Displacement Converters

#### For 9200 and 74712 Velocity Transducers (requires

-18 Vdc supply):

9513 -02 200 mV/mil (8 V/mm).

#### For 47633 Velocity Transducer (requires -24 Vdc supply):

46687-01 200 mV/mil (8 V/mm).

### Interconnect Cables

#### Standard Cables

- 9571** 2-conductor twisted, shielded 22 AWG (0.5 mm<sup>2</sup>) cable with 2-socket moisture-resistant female connector at one end, terminal lugs at the other end. (Used with monitors or VDCs).
- 84661** 2-conductor twisted, shielded 22 AWG (0.5 mm<sup>2</sup>) armored cable with 2-socket moisture-resistant female connector at one end, terminal lugs at the other end. (Used with monitors or VDCs).
- 9755** 2-wire shielded 22 AWG (0.5 mm<sup>2</sup>) cable with 2-pin female connectors at each end. (Connects 9200 or 74712 Seismoprobe transducers to Bently Nevada test kits).
- 83968** 2-wire straight cable with 2-pin female connector at one end and coaxial connector in the other end (used with instruments with BNC connector input jacks). Minimum length is 1.5 metres (5 feet).

#### High-Temperature cables

- 84508** 2-wire shielded 22 AWG (0.5 mm<sup>2</sup>) cable with terminal lugs at each end.

- 84509** 2-wire shielded 22 AWG (0.5 mm<sup>2</sup>) armored cable with terminal lugs at each end.
- 84660** 2-wire shielded 22 AWG (0.5 mm<sup>2</sup>) cable with 2-socket female connector at one end, terminal lugs at the other end.
- 84510** 2-wire shielded 22 AWG (0.5 mm<sup>2</sup>) armored cable with 2-socket female connector at one end, terminal lugs at the other end.
- 87143** 2-wire shielded 18 AWG (1.0 mm<sup>2</sup>) cable with terminal lugs at each end. Withstands 204°C (400°F).

### Cable Part Number-AXX

*A: Cable Length Option in feet*

Order in increments of 1.0 ft (305 mm).

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

Minimum length (armored): 3.0 ft (0.9 m)

Minimum length (unarmored): 2.0 ft (0.6 m).

Maximum length (armored): 70 ft (21 m).

Maximum length (unarmored): 99 ft (30 m).

### Accessories

- 80705-01** Coiled 2-conductor cable with 2-pin connector at one end and BNC connector at the other end (used with instruments with BNC connector input jacks). Coiled length of 0.5 metre (19.6 inches), stretched length of 2 metres (6.5 feet).
- 46000-01** Magnetic Base for portable mounting or Seismoprobes.
- 46122-01** Quick connect for semi-permanent mounting of Seismoprobe velocity transducers

02173006	Bulk cable; 2-conductor, twisted, shielded. 18 AWG (1.0 mm <sup>2</sup> ) cable without connectors or terminal lugs. Specify number of feet. Withstands +204°C (+400°F).
78920-01	Adapter for installing 47633 General-purpose Seismoprobe® Velocity Transducer in 21128 stainless steel housing.
00531061	Mating connector for 9200 and 74712 transducers.
00530574	Clamp

## Specifications

### 47633 General Purpose Velocity Seismoprobe® transducer

Specifications are at +22°C (+72°F) and 25 mm/s (1 in/s) at 100 Hz (6,000 cpm) unless otherwise specified.

#### Electrical

<i>Frequency Response:</i>	10 Hz to 1 kHz (600 cpm to 60,000 cpm) +0, ±3dB typical.
<i>Sensitivity:</i>	20 mV/mm/s (500 mV/in/s) ±5% at 100Hz (6,000 cpm) and 25 mm/s (1 in/s) peak with a mounting tolerance of ±30° for vertical (-01 option) or ±10° for horizontal (-02 option) when operated into a 24.9 k Ω load.
<i>Amplitude Linearity Error:</i>	±3% at 100 Hz (6,000 cpm) from 0.1 to 2.5 to 127 mm/s (5.0 in/s) peak.
<i>Amplitude Range:</i>	0.81 mm (32 mils) peak-to-peak, maximum.
<i>Transverse Sensitivity:</i>	±12% maximum.

#### Environmental Limits

<i>Operating Temperature:</i>	-29°C to +82° C (-20°F to +180°F)
<i>Storage Temperature:</i>	-29°C to +82°C (-20°F to +180°F)
<i>Relative Humidity:</i>	100%, nonsubmerged. (NEMA 4 requirement)

#### Physical

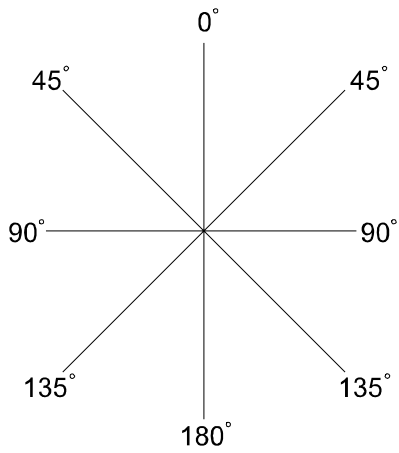
<i>Reference Height:</i>	114 mm (4.50 in) with mounting base.
<i>Cartridge Diameter:</i>	32 mm (1.25 in)
<i>Cartridge Weight:</i>	340 g (12.0 oz)

## Ordering Information

### General-purpose two-wire Seismoprobe® Velocity Transducer 47633-AXX-BXX-CXX Option Descriptions

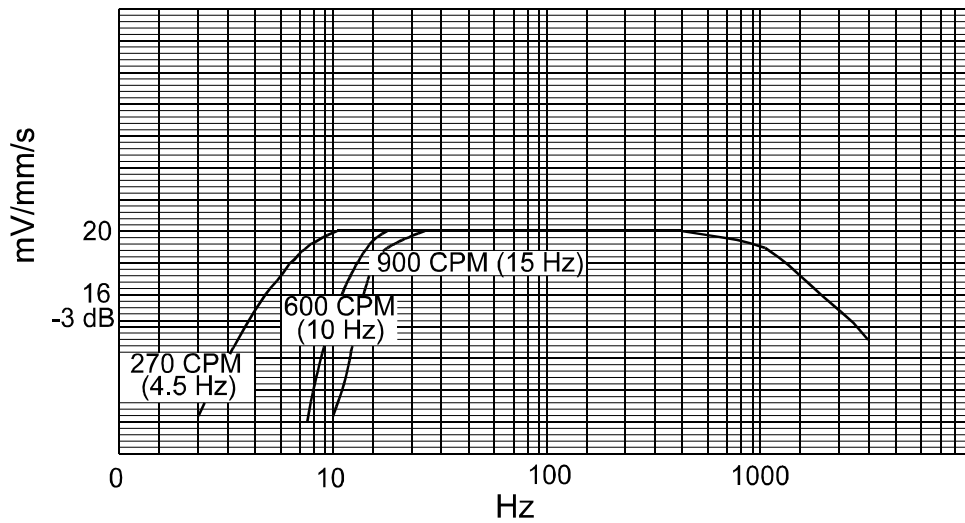
<i>A: Integral Cable length option</i>	<b>0 2</b> 2 metres (6 feet)
	<b>0 6</b> 6 metres (19 feet)
	<b>1 0</b> 10 metres (33 feet)
	<b>2 0</b> 20 metres (66 feet)
	<b>3 0</b> 30 metres (98 feet)
<i>B: Transducer Orientation Option</i>	<b>0 1</b> Vertical, 0 ±30
	<b>0 2</b> Horizontal, 90 ±10
<i>C: Mounting Option</i>	<b>0 0</b> No Base
	<b>0 1</b> With 3/8-in 24 UNF stud and 3/8-in 18 NPT adapter
	<b>0 2</b> With 1/2-in 13 UNC stud and 1/2-in 14 NPT adapter half union disconnect

**Note:** To order the replaceable cartridge only, specify the No Base Mounting Option.



**Figure 1: Seismoprobe® Orientation**

All Seismoprobe® velocity transducers are specified for mounting orientations as shown above: 0° is vertical, as viewed from driver end.



**Figure 2: Theoretical Velocity Seismoprobe® Frequency Response**

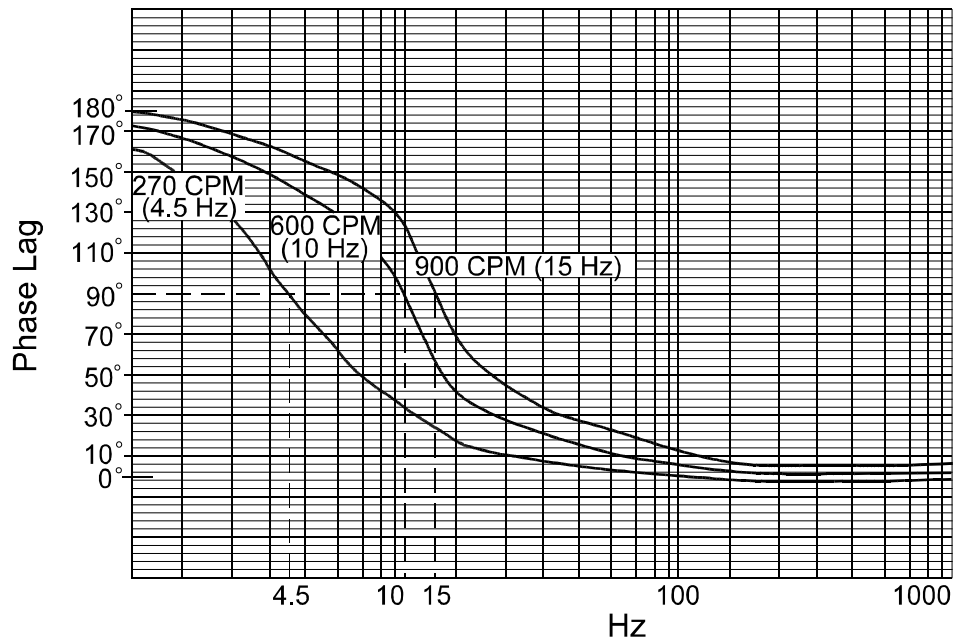


Figure 3: Theoretical Phase Shift between Output and Case Velocity

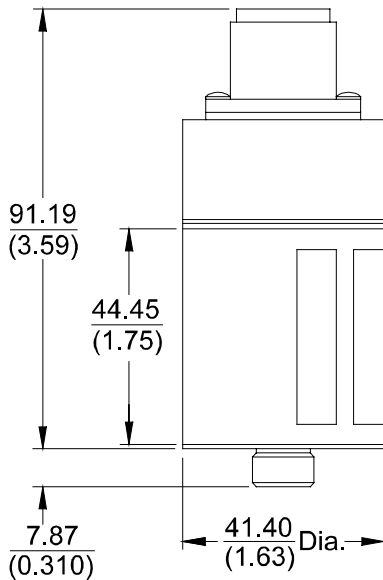


Figure 4: Top Mounted Connector  
9200 Option -01 or 74712 Option-02

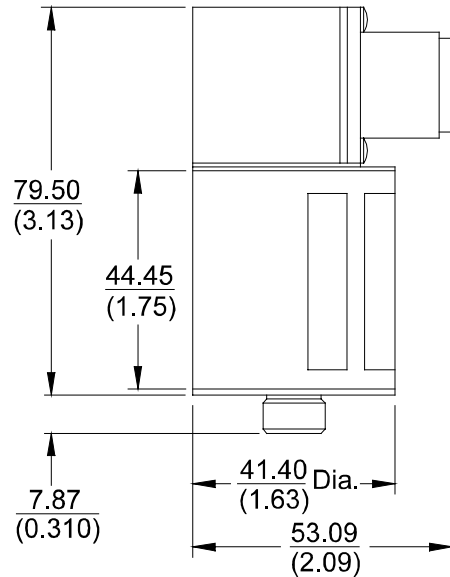
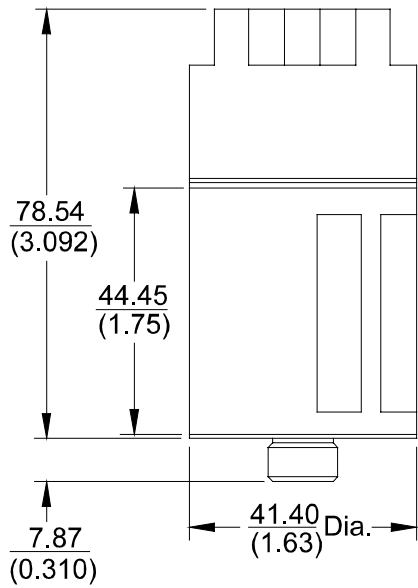
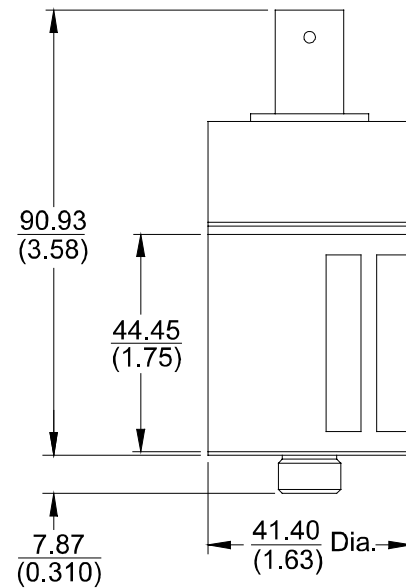


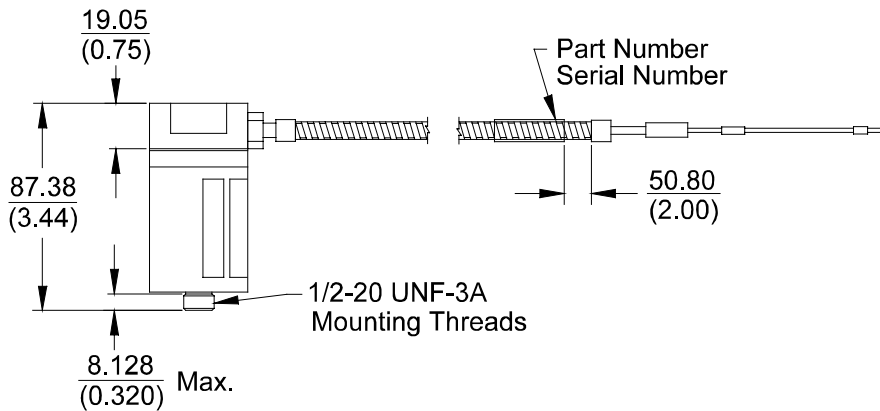
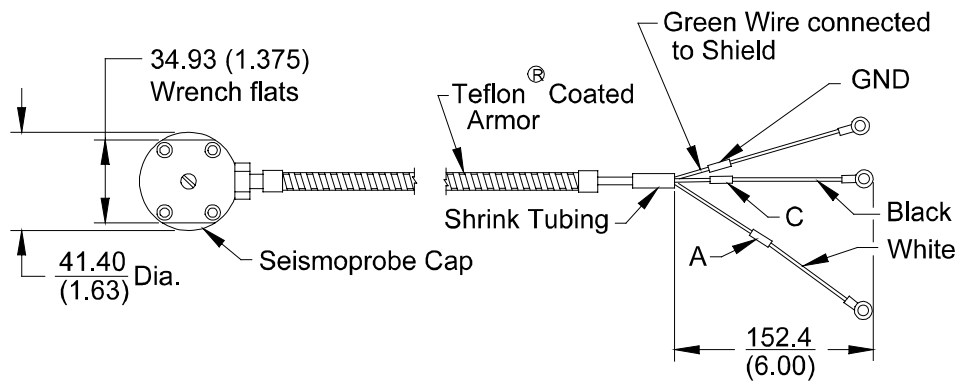
Figure 5: Side Mounted Connector  
9200 Option -02 or 74712 Option -04



**Figure 6: Terminal Block Connector  
9200 Option -05 or 74712 Option -03**



**Figure 7: BNC Connector  
9200 Option -06 or 74712 Option -01**



**Figure 8: 9200 Connector Options -05 thru -07**  
**Option -05 No Base required, Option -06 Isolated Circular 1/4-20 UNC-2B, and**  
**Option -07 Isolated Circular 1/4-28 UNF-2B**  
 All dimensions are in millimetres (inches)



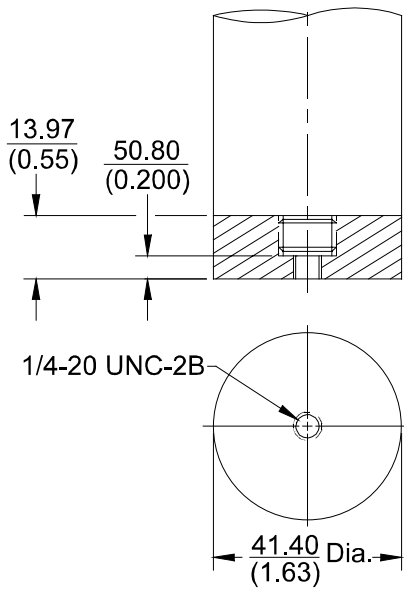


Figure 9: 9200 and 74712 Mounting Base Option -01 or -06  
 Option -01 Circular 1/4-20 UNC-2B, or  
 Option -06 Isolated Circular 1/4-20 UNC-2B

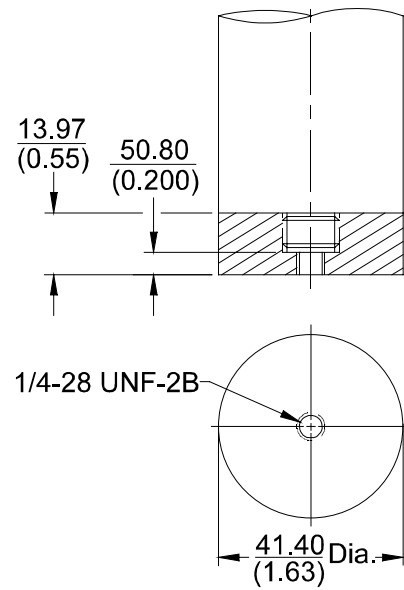


Figure 10: 9200 and 74712 Mounting Base Options -02 or -07  
 Option -02 Circular 1/4-28 UNF-2B, or  
 Option -07 Isolated Circular 1/4-28 UNF-2B

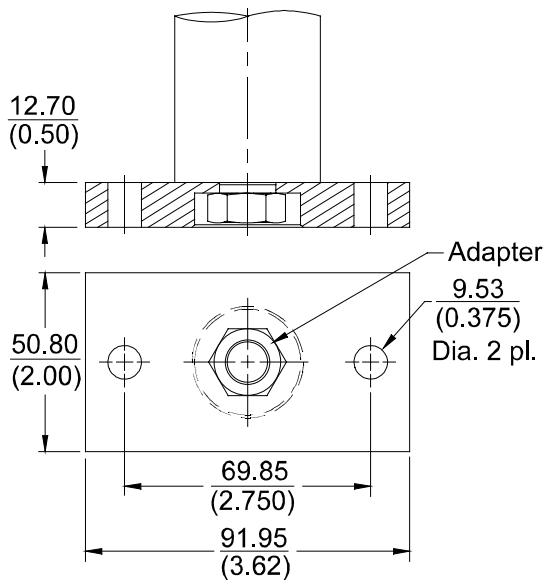


Figure 11: 9200 and 74712 Mounting Base Options -03 or -08  
 Option -03 Flanged or Option -08 Isolated Flanged

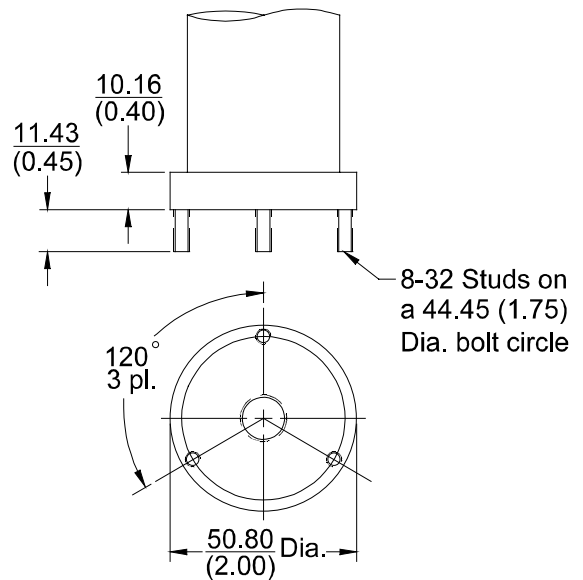


Figure 12: 9200 and 74712 Mounting Base  
 Option -04 3 each 8-32 studs

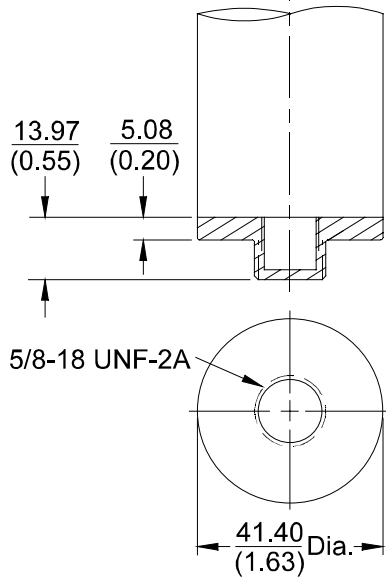


Figure 13: 9200 and 74712 Mounting Base  
Option -09 Isolated Circular 5/8-18 UNF-2A Base

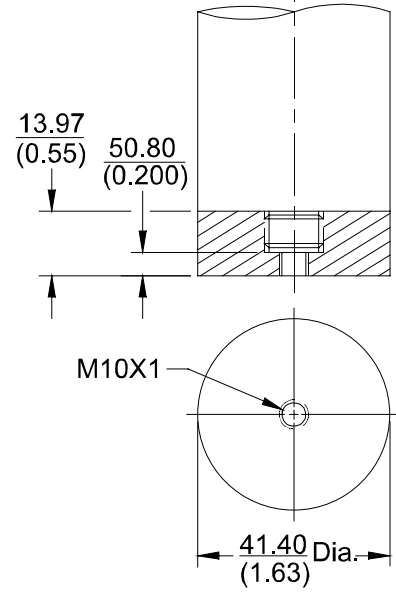


Figure 14: 9200 and 74712 Mounting Base Option -10 or -11  
Option -10 Circular M10x1 or  
Option-11 Isolated Circular M10x1 Base