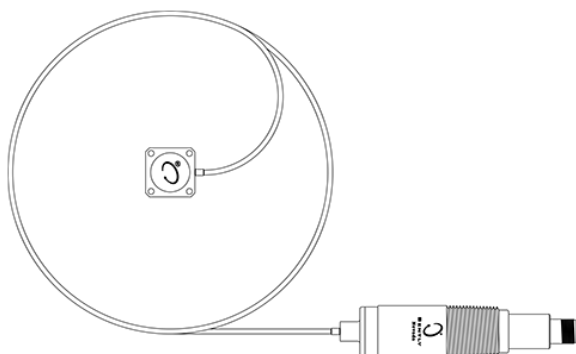


330750 and 330752 High Temperature Velomitor System

Datasheet

Bently Nevada Machinery Condition Monitoring

141639 Rev. T



Description

The 330750 and 330752 High Temperature Velomitor System sensor head and integral cable are designed for high temperature environments. This enables you to mount the sensing head on surfaces with temperatures up to +400°C (+752°F).



Earlier versions of the 330750 and 330752 High Temperature Velomitor System were limited to environments with a maximum temperature of +300°C (+572°F). The serial number of current versions that measure up to +400°C (+752°F) are preceded by the letter "G".

To accomplish this, the transducer design segregates the sensing element from the signal conditioning electronics. The two are permanently connected using an integrated cable. The integrated cable eliminates connectors which are a significant source of transducer failures.

The cable enables you to position the signal conditioning electronics in a cooler location. The internal electronics withstands temperatures of 55°C to +121°C (-67°F to +250°F). The integrated design makes it possible to capture machinery performance data comparable to other Bently Nevada Velomitor transducers, but at significantly higher temperatures.

For lower temperature environments, use the standard 330500 Velomitor Piezo-velocity Sensor. You can install it in locations with a maximum operating temperature of +121°C (+250°F).



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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.

Specifications

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



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

Electrical

| | |
|--------------------------------------|---|
| Sensitivity | 5.7 mV/mm/s (145 mV/in/s) ±5% |
| Frequency Response | 15 to 2000 Hz (900 to 120,000 cpm) ± 3.0 dB; 20 to 1000 Hz (1,200 to 60,000 cpm) ± 0.9 dB |
| Transient Temperature Sensitivity | 0.0762 mm/s/°C (0.003 in/s/°C), typical, as defined in ISO 5347-18:1993(E) |
| Amplitude Range | 635 mm/s (25 in/s) peak below 680 Hz. 2940 m/s ² (300 g) peak above 680 Hz. Vibration at frequencies above 2 kHz decreases this range. |
| Transverse Sensitivity | Less than 5% of Sensitivity |
| Amplitude Linearity | ±2% to 152 mm/s (6 in/s) peak |
| Mounted Resonant Frequency | Greater than 5 kHz |
| Output Bias Voltage | -12 ±2.0 VDC |
| Broadband Noise Floor (15Hz to 2kHz) | 0.127 mm/s (0.005 in/s) rms nominal |

| | |
|----------------------|---|
| Grounding | Case Isolated |
| Maximum Cable Length | 305 meters (1000 feet) with no degradation of signal. |

Environmental Limits

| Operating and Storage Temperature Range | |
|---|---|
| Sensing Head | Maximum mounted surface temperature -55°C to +400°C (-67°F to +752°F) |
| Integral Hardline Cable | -55° to +400°C (-67° to +752°F) |
| Electronics | -55° to +121°C (-67° to +250°F) |
| Shock Survivability | 24,535 m/s ² (2500 g) peak |
| Relative Humidity | To 100% non-submerged; case is hermetically sealed. |

Physical

| Weight (typical) | |
|------------------|--|
| 2 meters | 635 grams (1.40 lb) |
| 4 meters | 794 grams (1.75 lb) |
| 6 meters | 953 grams (2.10 lb) |
| 8 meters | 1,111 grams (2.45 lb) |
| Mounting | See 330750 System Dimensional Drawing on page 10. See 330752 System Dimensional Drawing on page 11. |
| Case | 300 series stainless steel |
| Connector | 2-pin Mil-C-5015 receptacle, hermetically-sealed, 304 stainless steel shell. |

| | |
|-------------|--|
| Polarity | When the applied velocity is from the base to the top of the transducer, Pin A becomes positive with respect to Pin B. |
| Bend Radius | Minimum bend radius of 51mm (2.0in) |



Before installing this product, we recommend you read the 330750 and 330752 High Temperature Velomitor System User Guide (document 135090)

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.

CSA/NRTL/C

Ex ia IIC

Class I, Zone 0, AEx ia IIC

Class I, Division 1, Groups A, B, C and D

Class II, Division 1, Groups E, F and G

Class III, Division 1

Ex nL IIC

Ex ec IIC

Class I, Division 2, Groups A, B, C and D

ATEX/IECEx



II 1 G

Ex ia IIC or IIB Ta, T4 492°C



II 3 G

Ex na IIC or IIB Ta, T4, T1 492°C Gc

Ex ec IIC or IIB Ta T4, T1 492°C Gc

Ta, T1, T4 492°C

Ta, T4, T1 492°C

| Temperature Class | Temperature Range |
|-------------------|-------------------|
| T4 | -40°C to +100°C |
| T1 | -40°C to +400°C |

Entity Parameters for Zone 0/1 and Zone 2

| Group | IIC | IIC |
|-------------|-------------------------------------|-------------------------------------|
| Type | 330750 330750 Type S | 330752 330752 Type S |
| Ui | 28 V | 28 V |
| Ii | 120 mA | 120 mA |
| Pi | 1.0 W | 1.0 W |
| Ci | 1 nF | 1 nF |
| Li | 30 µH | 30 µH |

Hazardous Area Conditions of Safe Use

ATEX/IECEx

Zone 0/1:

Equipment must be connected to equipment that 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.

Special Notes

- This equipment is intrinsically safe and can be used in potentially explosive atmospheres.
- This system is intrinsically safe when connected to an associated intrinsically safe power supply meeting the entity parameters.
- Operating ambient temperature -40°C to +100°C (Electronic Housing)
- Operating ambient temperature -40°C to +400°C (Sensor and Cable)

Zone 2 :

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

Special Notes

- The equipment is safe when connected to an associated source, containing a reliable material limiting current and voltage meeting the entity parameters.
- Operating ambient temperature -40°C to +100°C (Electronic Housing)
- Operating ambient temperature -40°C to +400°C (Sensor and Cable)
- The mating part of the connector shall provide IP54 ingress protection or better according to requirements of IEC 60079-0 and IEC 60079-7 or IEC 60079-15.
- Provisions shall be made for ensuring that the rated voltage and current are not exceeded while in service.
- Shall be supplied from Class II limited energy source according to requirements of C22.2 No 61010-1-12 and UL 61010-1 3rd Edition.
- Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.

Ordering Information



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

330750-AA-BB

A: Length

| | |
|-----------|----------|
| 20 | 2 meters |
| 40 | 4 meters |
| 60 | 6 meters |
| 80 | 8 meters |

B: Approvals

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

330752-AA-BB

A: Length

| | |
|-----------|------------|
| 25 | 2.5 meters |
| 40 | 4 meters |
| 60 | 6 meters |
| 80 | 8 meters |

B: Approvals

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


Interconnection Cables

The standard cable lengths below are available. You can order custom cable lengths in increments of one foot at additional cost. Some cables have a minimum and maximum length. For details, see each part description below.


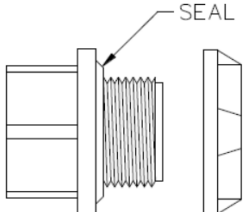
Standard Cable Lengths

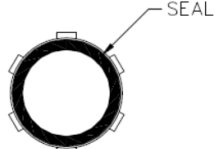

| Feet | Meters (approximate) |
|-------|----------------------|
| 6 ft | 1.8 m |
| 8 ft | 2.4 m |
| 10 ft | 3.0 m |
| 12 ft | 3.6 m |
| 15 ft | 4.5 m |
| 17 ft | 5.0 m |
| 20 ft | 6.0 m |
| 25 ft | 7.6 m |
| 30 ft | 9.0 m |
| 33 ft | 10.0 m |
| 50 ft | 15.2 m |
| 99 ft | 30.0 m |

Cable Part Numbers

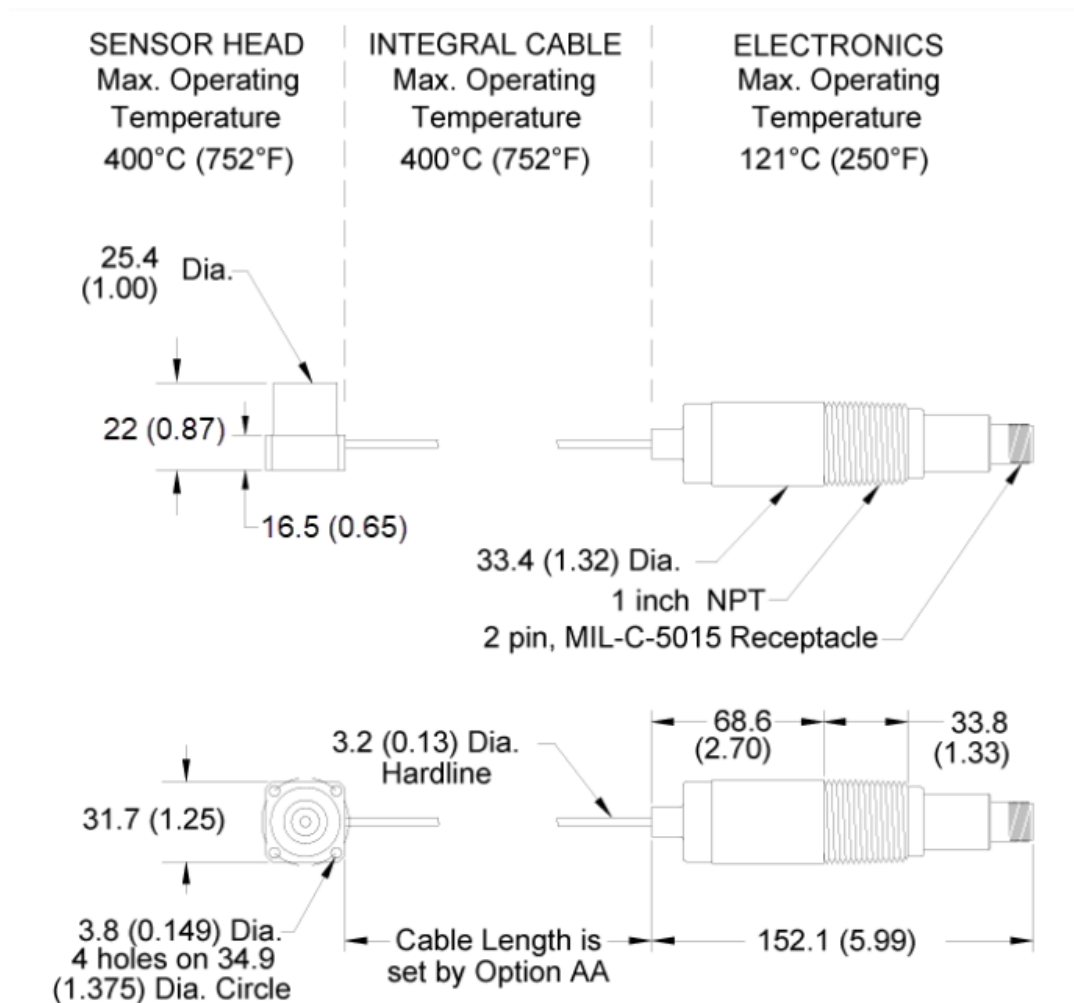
| Part number | Description |
|---|--|
|  When entering a part number, use 'NN' in the part numbers to specify the length (in feet) of the cable you want to order. | |
| 9571-NN | Standard interconnect cable Shielded 0.382 mm ² (22 AWG) cable with a moisture-resistant female connector at the HTVS end and ring lugs at the monitor end. Temperature range -29 to 121°C (-20 to 250°F). See Standard Interconnect Cable on page 13. |
| 84661-NN | Standard armored interconnect cable Stainless steel armor over shielded 0.382 mm ² (22 AWG) cable with a moisture-resistant female connector at the HTVS end and ring lugs at the monitor end. Temperature range -29 to 121°C (-20 to 250°F). See Standard Armored Interconnect Cable on page 13. |
| 89477-NN | Right angle interconnect cable Standard Armored Interconnect Cable. See Standard Right-angle Interconnect Cable on page 13. |
| 122129-NN | Short run interconnect cable Shielded 0.963 mm ² (18 AWG) cable with a moisture-resistant female connector |

| Part number | Description |
|-------------|---|
| | at the HTVS end and ring lugs at the monitor end. Temperature range -29 to 121°C (-20 to 250°F). See Short Run Interconnect Cable on page 14. |
| 02173034 | CE installation interconnect cable (**required for CE installations) Shielded 0.382 mm ² (22 AWG) cable with a splash-proof boot over a female connector at the HTVS end and flush cut at the monitor end. Temperature range -55 to 125°C (-67°F to 257°F). See CE Installation Interconnect Cable on page 14. |
| 02173006 | 0.963 mm² (18 AWG) bulk cable Shielded twisted pair. Same cable as used on 89477-NN and 122129-NN. Specify the number of feet. |
| 02173007 | 0.382 mm² (22 AWG) bulk cable Shielded twisted pair. Same cable as used on 9571-NN and 84661-NN. Specify the number of feet. The maximum length that should be used with the HTVS is 305 m (1000 ft) |
| 00502025 | Spare connector Same connector as used on 9571-NN and 84661-NN |
| 101212-01 | Right angle connector Right angle connector kit. Same connector as used on 89477-NN. |

| Part number | Description |
|-------------|---|
| 00531061 | Spare mating connector Mating connector for 330750 and 330752 Velomitor System. |
| 330535 | Standard temperature cable 22 AWG, double-shielded cable |
| 00530574 | Cable Mounting Clamp Mating connector clamp to be used with 00531061 |
| 03818073 | Electronics Housing Strap One-inch rigid conduit strap for securing the electronics housing.  |
| 03818071 | Electronics Mounting Hub One-inch weather tight hub used to mount the electronics housing in a weatherproof enclosure.  |

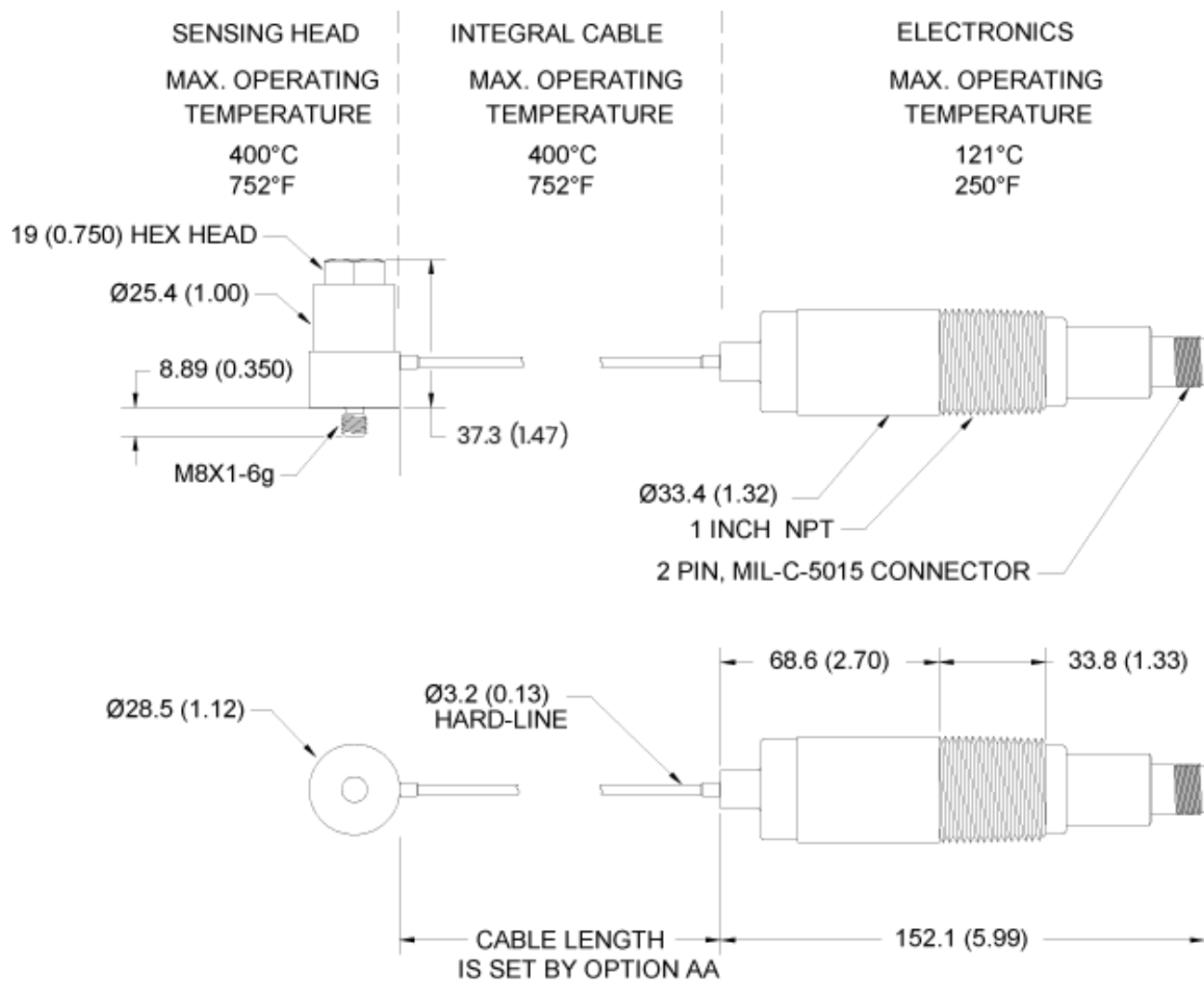
| Part number | Description |
|-------------|---|
| 03818072 | Seal Ring One-inch sealing lock ring used to mount the electronics housing. Two rings are required to mount the electronics.  |
| 169546 | Cable Clamp Stainless steel mesh tie down clamp for the hardline cable. For temperatures greater than 260C (500F).  |

Graphs and Figures



(All dimensions are in millimeters (inches))

Figure 1: 330750 System Dimensional Drawing



(All dimensions are in millimeters (inches))

Figure 2: 330752 System Dimensional Drawing

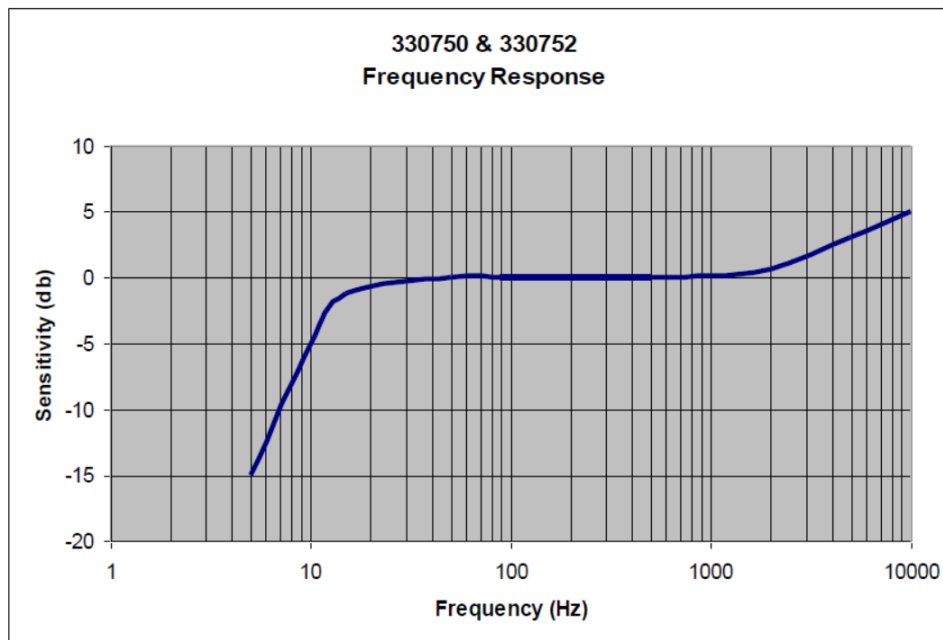


Figure 3: Velocity Amplitude

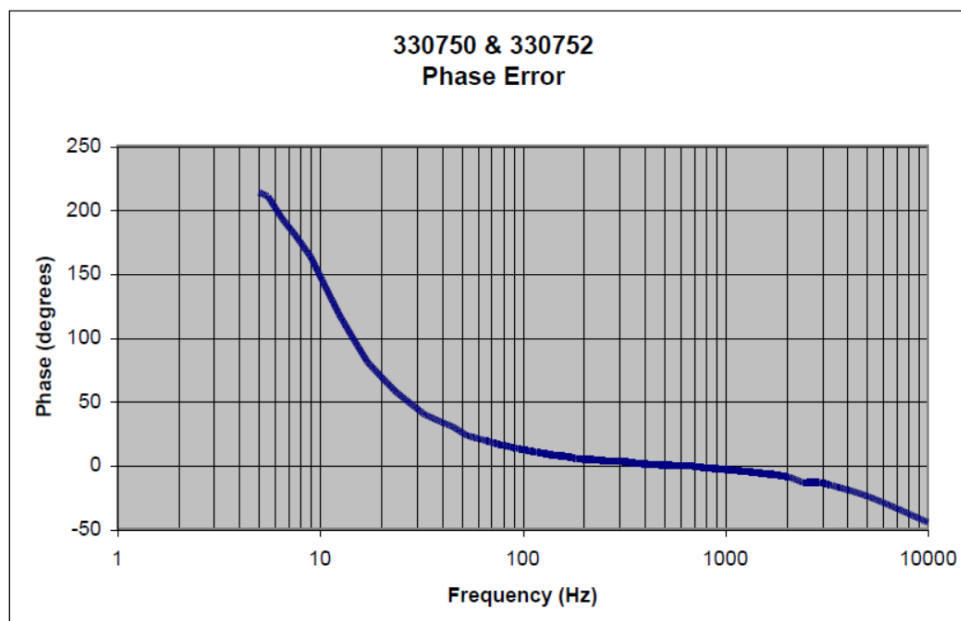


Figure 4: Velocity Phase Error



The Velomitor requires a two-conductor cable. We recommend using a double-shielded cable to minimize noise interference.

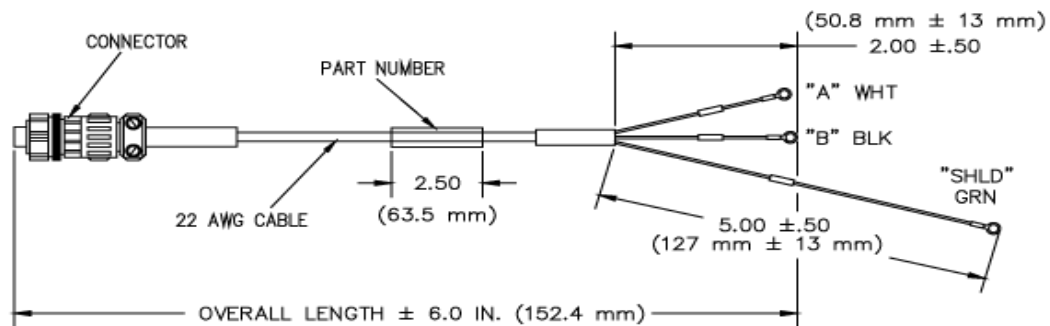


Figure 5: Standard Interconnect Cable

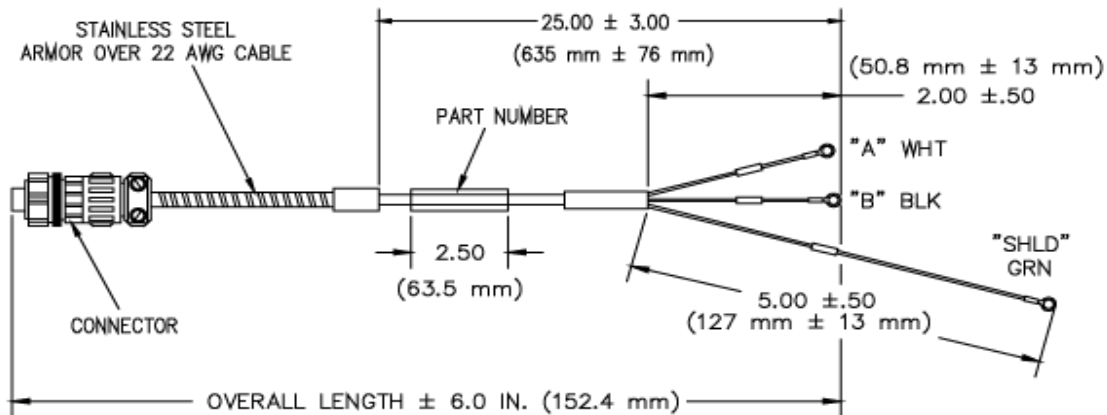


Figure 6: Standard Armored Interconnect Cable

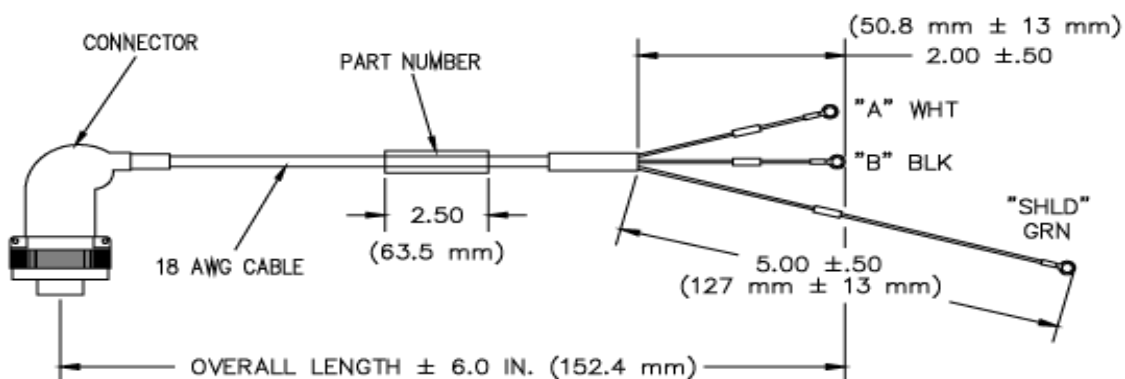


Figure 7: Standard Right-angle Interconnect Cable

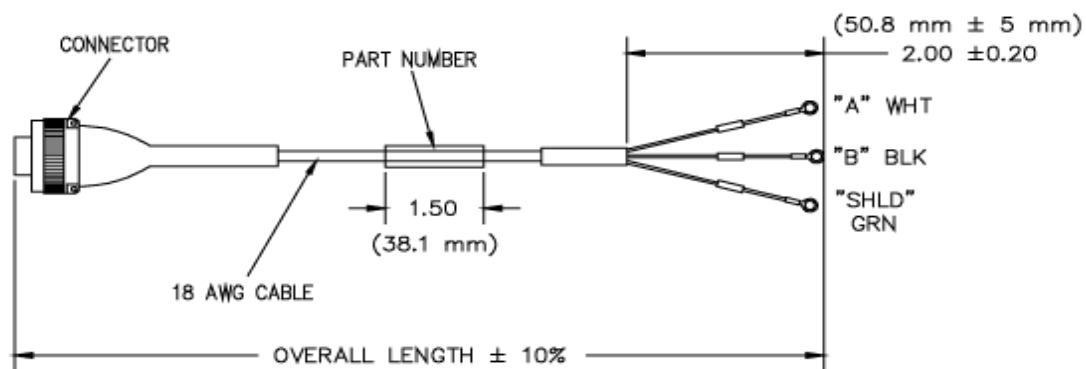


Figure 8: Short Run Interconnect Cable

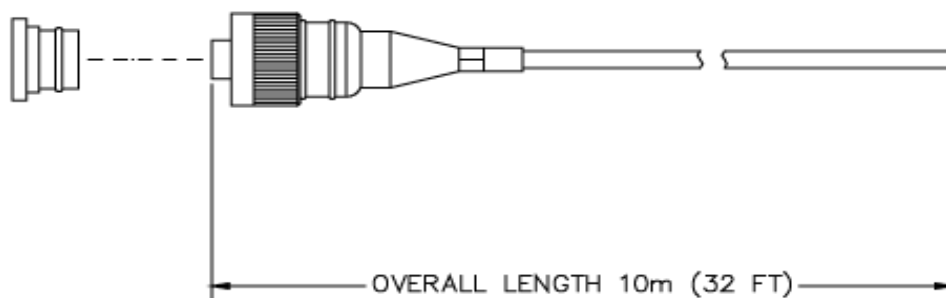


Figure 9: CE Installation Interconnect Cable

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