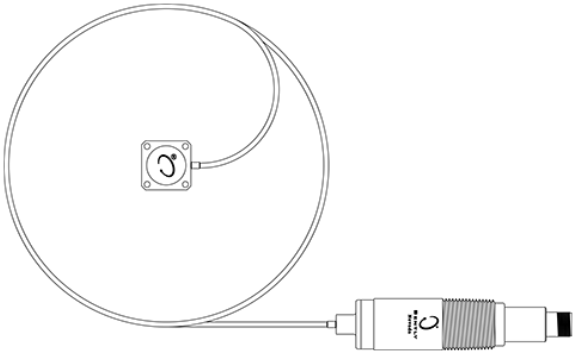
330750 and 330752 High Temperature Velomitor System

Datasheet

Cordant™

141639 Rev. V



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).

Baker Hughes

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°C to +30°C (+68°F 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/s2 (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°C to +400°C (-67°F to +752°F)
Electronics	-55°C to +121°C (-67°F to +250°F)
Shock Survivability	24,535 m/s2 (2500 g) peak
Relative Humidity	To 100% non-submerged; case is hermetically sealed.
Maximum Use Altitude	2000 meters (6561 ft) above sea level
Outdoor Use	Standard installation for these sensors is in a protected enclosure with wiring protected in conduit. Splash boots can be added for additional protection if needed by customer's requirements.

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)

Recommended cable length (assuming max vibration of 25 in/s, frequency 2 kHz, and cable capacitance 200 pf/m). For longer lengths, contact Bently Nevada Tech Support.	219 m (720 ft)

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

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.

cNRTLus

Class I, Div. 1, Groups A, B, C and D T4/T1
Class II, Div. 1, Groups E, F and G
Class III, Div 1
Ex ia IIC T4/T1 Ga
Class I, Zone 0, AEx ia IIC T4/T1 Ga
Class I, Div. 2, Groups A, B, C and D T4/T1

Ex ec IIC T4/T1 Gc
Class I, Zone 2, AEx ec IIC T4/T1 Gc
Type 4X

TAMB @ -40°C to +100°C (Electronics)
TAMB @ -40°C to +400°C (Sensor & Cable)

Install per BN drawing 168077

This sensor may only be powered by a power supply unit with a limited energy electric circuit in accordance with CAN/CSA C22.2 No. 61010-1-12 and ANSI/UL 61010-1, or Class 2 as defined in the Canadian Electrical Code C22.1, Section 16-200 and/or National Electrical Code (NFPA 70), article 725.121.

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	ia IIC	ec IIC
Ui	28 V	24 VDCMAX
Ii	120 mA	3 mA
Pi	1.0 W	
Ci	1 nF	
Li	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 range:
  - -40°C to +100°C (Electronic Housing)
  - -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.
- This sensor may only be powered by a power supply unit with a limited energy electric circuit in accordance with CAN/CSA C22.2 No. 61010-1-12 and ANSI/UL 61010-1, or Class 2 as defined in the Canadian Electrical Code C22.1, Section 16-200 and/or National Electrical Code (NFPA 70), article 725.121.
- 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.

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.

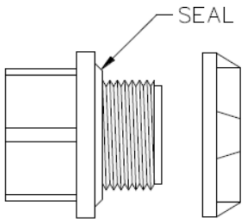
Standard Cable Lengths

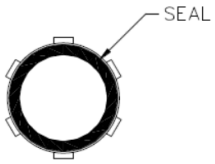
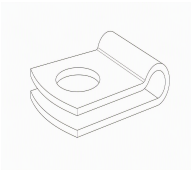
Feet	Meters (approximate)
6 ft	1.8 m
8 ft	2.4 m
10 ft	3.0 m
12 ft	3.6 m
15 ft	4.5 m
17 ft	5.0 m
20 ft	6.0 m
25 ft	7.6 m
30 ft	9.0 m
33 ft	10.0 m
50 ft	15.2 m
99 ft	30.0 m

Cable Part Numbers

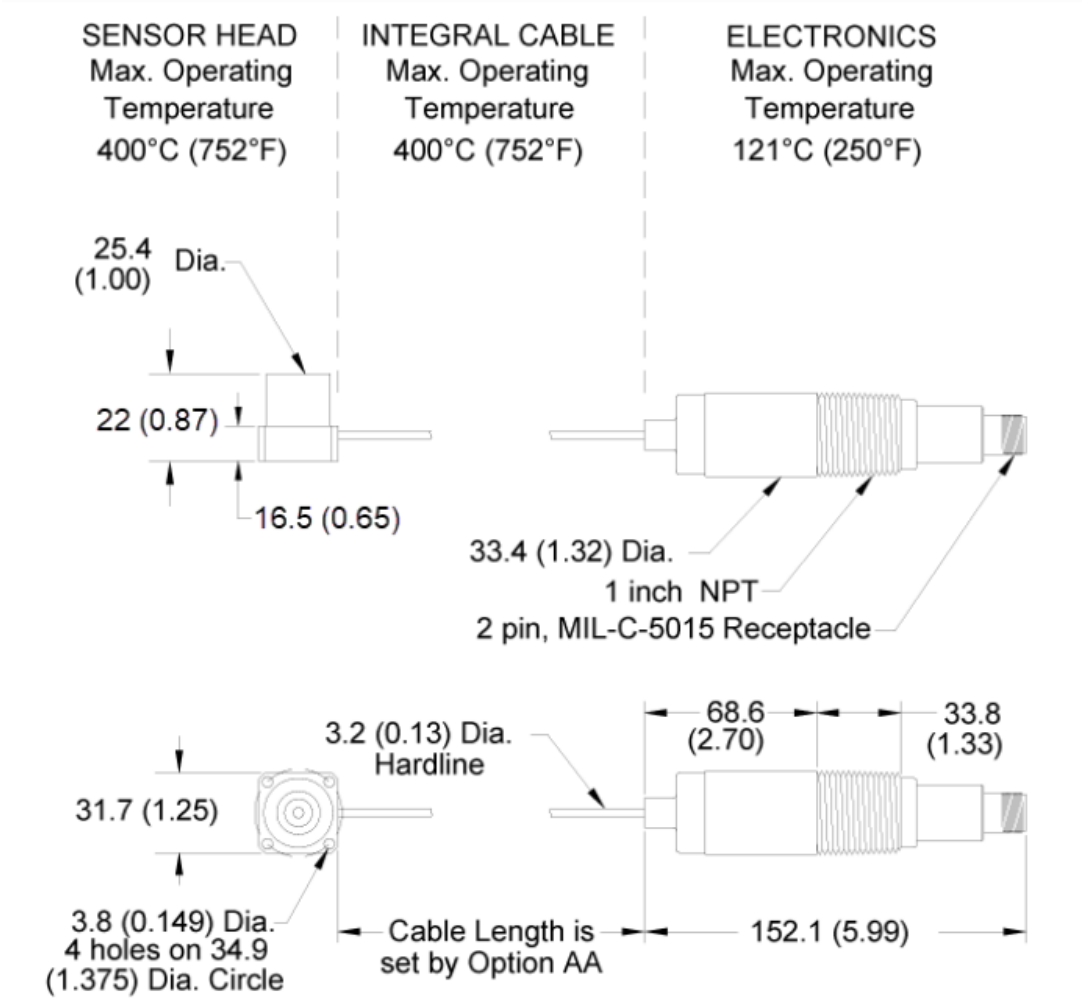
Part number	Description
	When entering a part number, use 'NN' in the part numbers to specify the length (in feet) of the cable you want to order.
9571-NN	**Standard interconnect cable** Shielded 0.382 mm² (22 AWG) cable with a moisture-resistant female connector at the HTVS end and ring lugs at the monitor end. Temperature range -29°C to 121°C (-20°F to 250°F). See Standard Interconnect Cable on page 13.
84661-NN	**Standard armored interconnect cable** Stainless steel armor over shielded 0.382 mm² (22 AWG) cable with a moisture-resistant female connector at the HTVS end and ring lugs at the monitor end. Temperature range -29°C to 121°C (-20°F 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.

Part number	Description
122129-NN	**Short run interconnect cable** Shielded 0.963 mm² (18 AWG) cable with a moisture-resistant female connector at the HTVS end and ring lugs at the monitor end. Temperature range -29°C to 121°C (-20°F to 250°F). See Short Run Interconnect Cable on page 14.
02173034	**CE installation interconnect cable (**required for CE installations)** Shielded 0.382 mm² (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°C 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

Part number	Description
101212-01	**Right angle connector** Right angle connector kit. Same connector as used on 89477-NN.
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. 

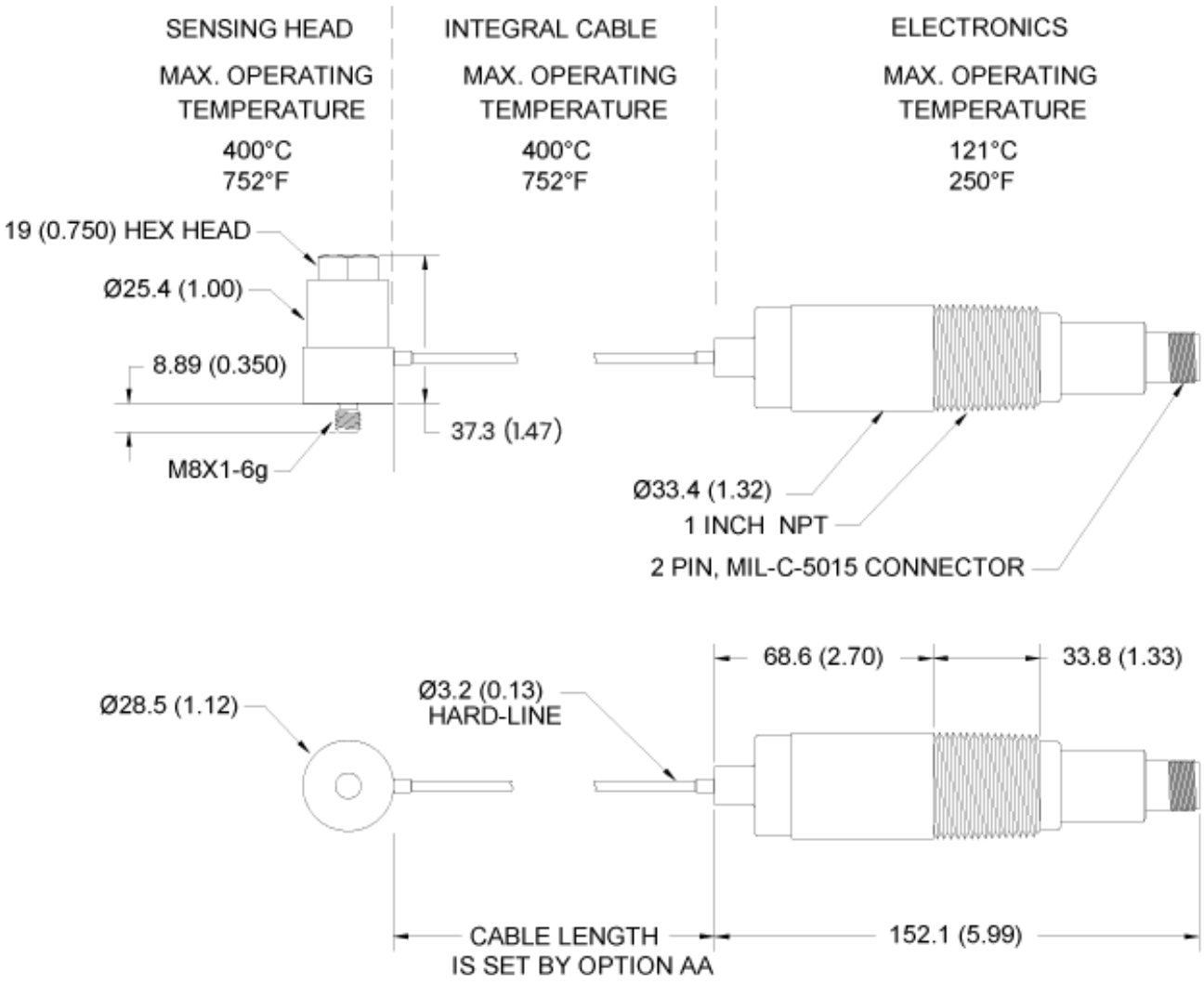
Part number	Description
03818072	**Seal Ring** One-inch sealing lock ring used to mount the electronics housing. Two rings are required to mount the electronics. 
169546	**Cable Clamp** Stainless steel tie down clamp for the hardline cable. For temperatures greater than 260°C (500°F). 

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

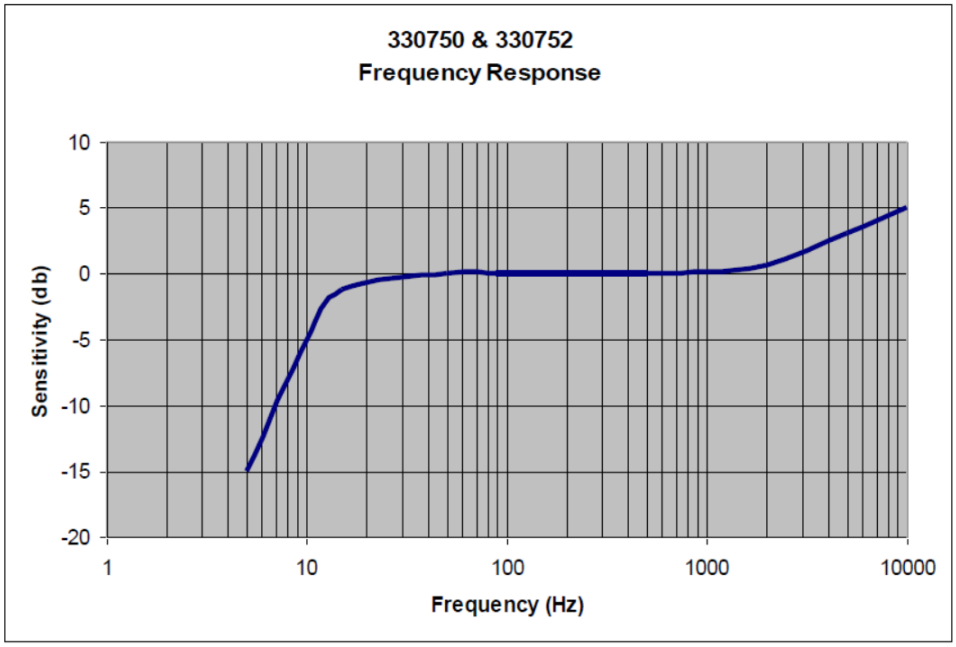


Figure 3: Velocity Amplitude

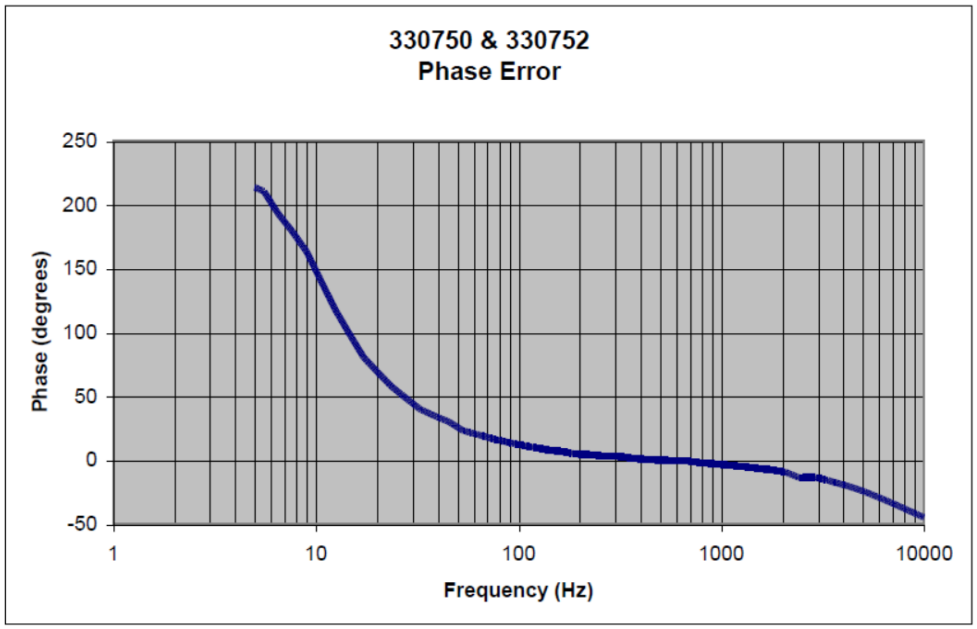


Figure 4: Velocity Phase Error

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

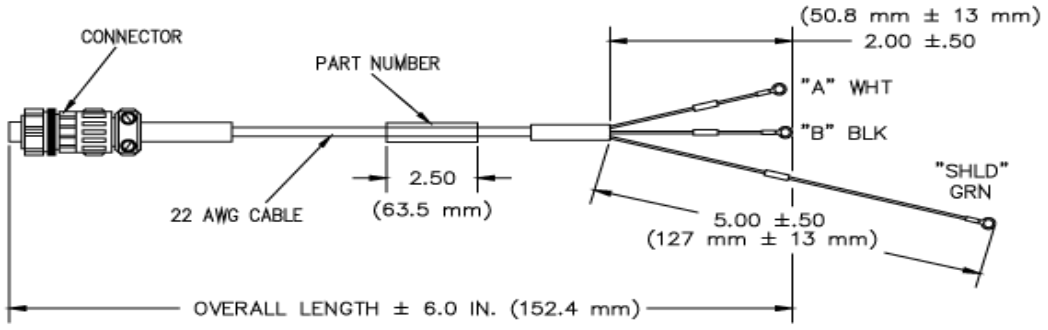


Figure 5: Standard Interconnect Cable

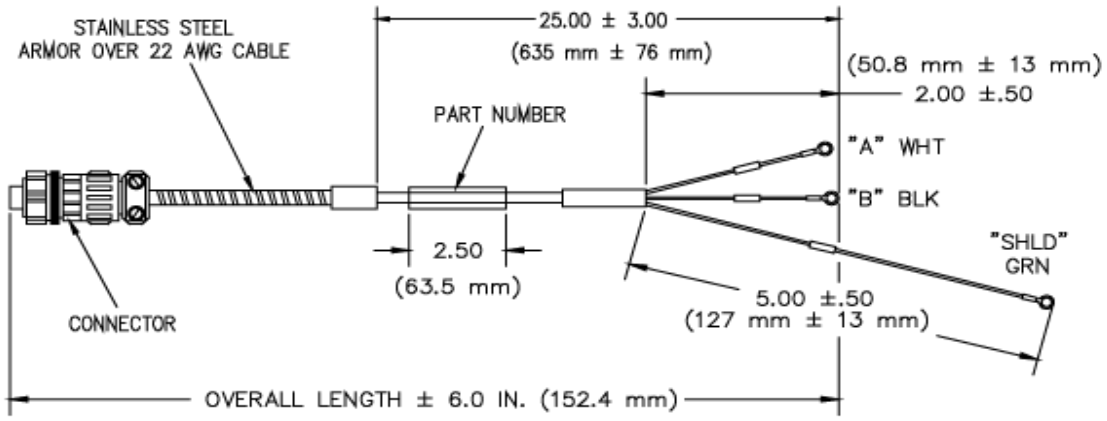


Figure 6: Standard Armored Interconnect Cable

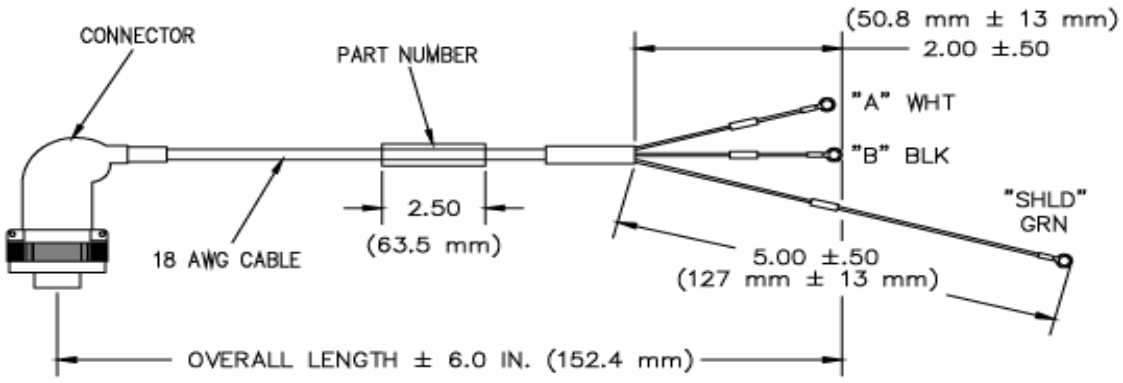


Figure 7: Standard Right-angle Interconnect Cable

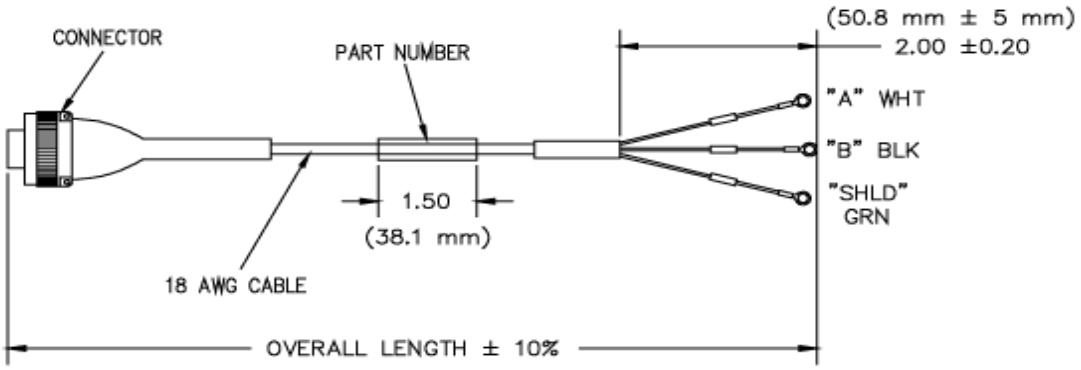


Figure 8: Short Run Interconnect Cable

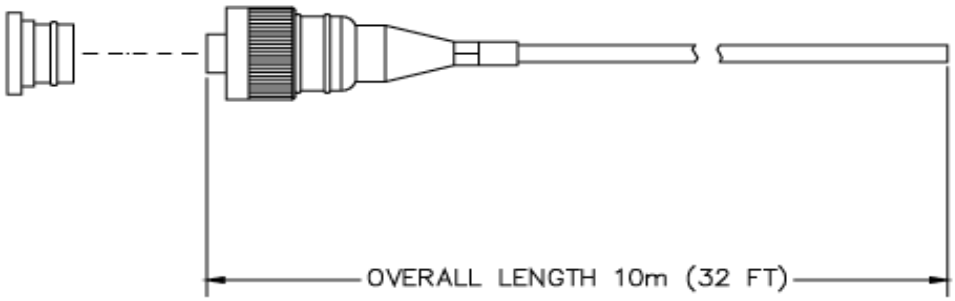


Figure 9: CE Installation Interconnect Cable

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