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## Описание на высокотемпературные системы акселерометров. Модель 330450



**BENTLY**  
Nevada

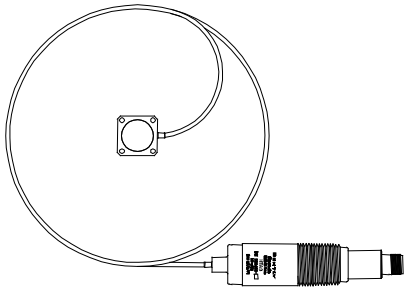
# 330450 High Temperature Acceleration System

## Bently Nevada\* Asset Condition Monitoring

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### Description

The standard 330400 Accelerometer has a limited temperature range it can be exposed to, due to its signal conditioning electronics being located in the same case as the sensing element. Temperature limitations of the electronics limit its maximum operating temperature to +100°C (+212°F).



The 330450 High Temperature Acceleration System (HTAS) has a fundamentally different construction to solve this problem. Its design segregates the sensing element from the signal conditioning electronics, with the two permanently connected via a hardline cable. Current versions (see note below) of these sensors allow the sensing head to be mounted on surfaces with temperatures as high as +400°C (+752°F). Due to the segregated design, the signal conditioning electronics can be installed in a cooler location. This achieves overall transducer system performance comparable to other acceleration transducers, but permits use at significantly higher temperatures. By eliminating connections between the sensing head and its associated signal conditioning electronics, a significant source of potential transducer failures (connector problems) is eliminated.

### 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 degradation of the transducer's performance, 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.

**Note:** The previous version limited the sensor head to +300°C (+572°F). The current versions will have the letter "G" preceding the serial number.



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## Specifications

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

**Note:** Operation outside the specified limits may result in false readings or loss of machine monitoring.

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### Electrical

#### Sensitivity:

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

#### Acceleration range:

785 m/s<sup>2</sup> (80 g) peak overall acceleration within the 15 to 10000 Hz frequency span.

#### Amplitude Linearity:

±2% to 785 m/s<sup>2</sup> (80 g) peak.

#### Broadband Noise Floor (10 Hz to 15 kHz):

0.059 m/s<sup>2</sup> (0.006 g) rms.

#### Frequency Response:

15 to 10000 Hz  
(900 to 600,000 cpm) ±3dB;  
40 to 4000 Hz  
(2400 to 240,000 cpm) ±5%

#### Transverse Sensitivity:

Less than 5% of axial.

#### Mounted Resonant Frequency:

Greater than 15 kHz.

#### Maximum cable length:

305 metres (1000 ft) with no degradation of signal.

#### Power requirements:

##### Input Voltage

-24 ± 0.5 Vdc.

##### Bias Current:

2 mA nominal.

##### Output Bias Voltage:

-12 ± 0.5 Vdc.

##### Grounding:

Case isolated.

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## Hazardous Area Approvals

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

#### North America:

Ex ia/AEx ia for IIC T4  
Class I, Div 1  
Groups A, B, C, and D;  
Class II, Div 1, Groups E, F, and G;  
Class III, Div 1, when installed per drawing 168078.  
T4 @ Ta (- 40°C to 100°C)  
Enclosure Type 4X  
Ex nL IIC T4  
Class 1, Zone 2  
Class I, Div 2  
Groups A, B, C, and D when installed per drawing 168078.  
T4 @ Ta (- 40°C to 100°C)  
Enclosure Type 4X

**ATEX:**

II 3 G

Ex nA IIC or IIB T4/T1, 492°C Gc

T4:  $-40^{\circ}\text{C} \leq \text{Tamb} \leq +100^{\circ}\text{C}$   
(electronic housing)T1:  $-40^{\circ}\text{C} \leq \text{Tamb} \leq +400^{\circ}\text{C}$   
(sensor and cable)492°C, Ta =  $-40^{\circ}\text{C} \leq \text{Tamb} \leq +482^{\circ}\text{C}$  (sensor and cable) for model 350900

LCIE 04 ATEX 6141 X

For further certification and approvals information please visit the following website:

<http://www.ge-mcs.com/en/bently-nevada.html>

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**Environmental Limits****Operating and storage temperature range****Sensing head:**Maximum mounted surface temperature  $-55^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$   
( $-67^{\circ}\text{F}$  to  $+752^{\circ}\text{F}$ )**Integral****hardline cable:** $-55^{\circ}\text{C}$  to  $+400^{\circ}$   
( $-67^{\circ}\text{F}$  to  $+752^{\circ}\text{F}$ )**Electronics:** $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$   
( $-67^{\circ}\text{F}$  to  $+212^{\circ}\text{F}$ )**Shock****survivability:**24,535 m/s<sup>2</sup> (2500 g) peak**Relative****humidity:**

To 100% non-submerged; case is hermetically sealed.

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**Physical****Weight (typical):****2 metres:**

635 grams (1.40 lb)

**4 metres:**

794 grams (1.75 lb)

**6 metres:**

953 grams (2.10 lb)

**8 metres:**

1111 grams (2.45 lb)

**Mounting:**

See Dimensional Drawing, Figure 1

**Case material:**

300 series stainless steel.

**Connector:**

3-pin Mil-C-5015 receptacle, hermetically-sealed, 304 stainless steel shell.

**Polarity:**

Pin A goes positive with respect to Pin C when the applied force is from the base to the top of the sensing head.

**Bend Radius:**

Minimum bend radius of 51mm (2.0in)

**Note:** Please read and understand the User Guide *before* attempting to install and use this product.

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**Ordering Information****Country specific approvals may be available. Please consult your local Customer Care Representative for more information.****330450-AXX****A: Length**

<b>20</b>	2 metres
<b>40</b>	4 metres
<b>60</b>	6 metres
<b>80</b>	8 metres

Graphs and Figures

Dimensional Drawing – 330450

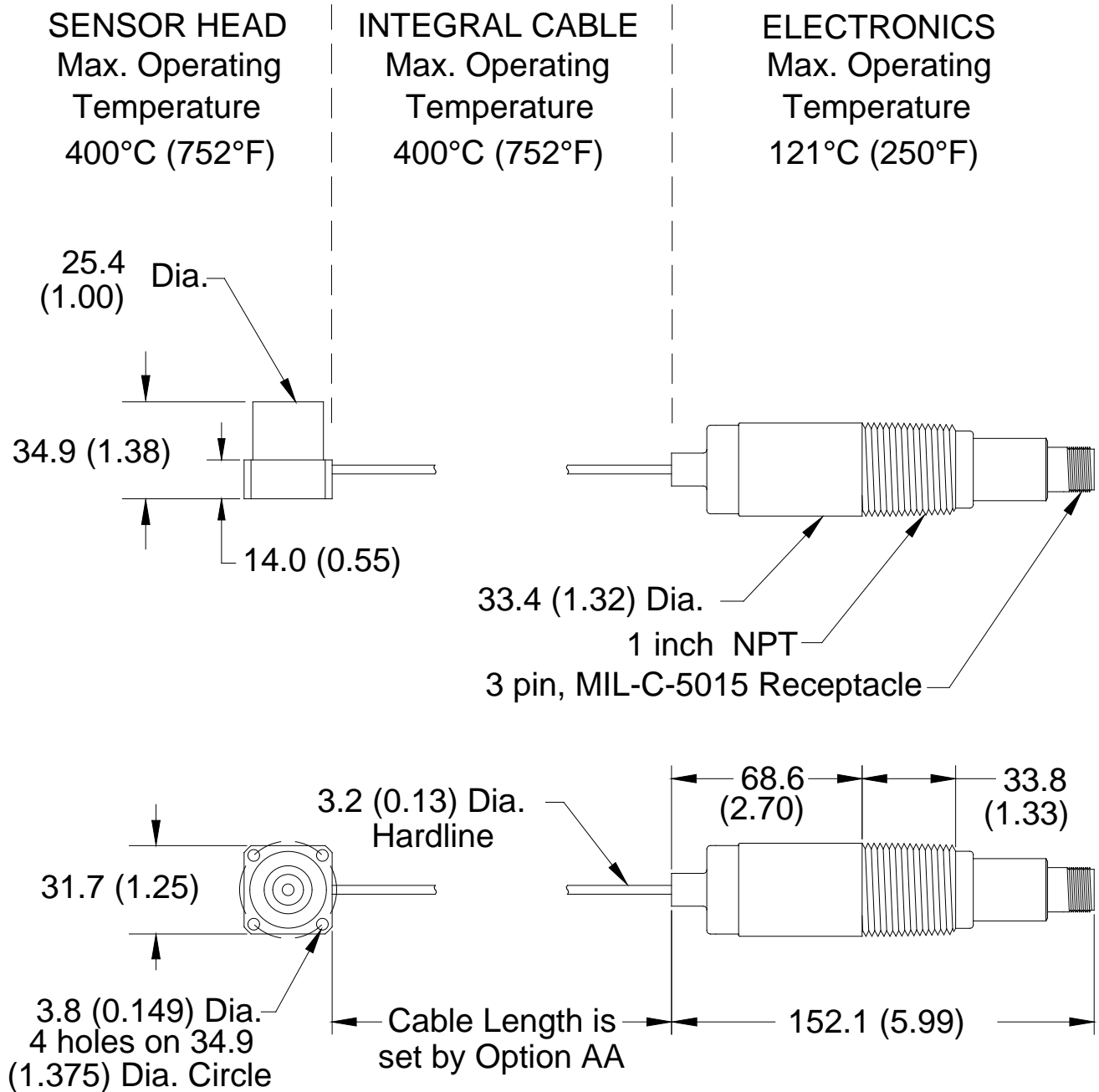


Figure 1: 330450 System Dimensional Drawing  
 Dimensions are in millimeters (inches)

# Graphs - 330450

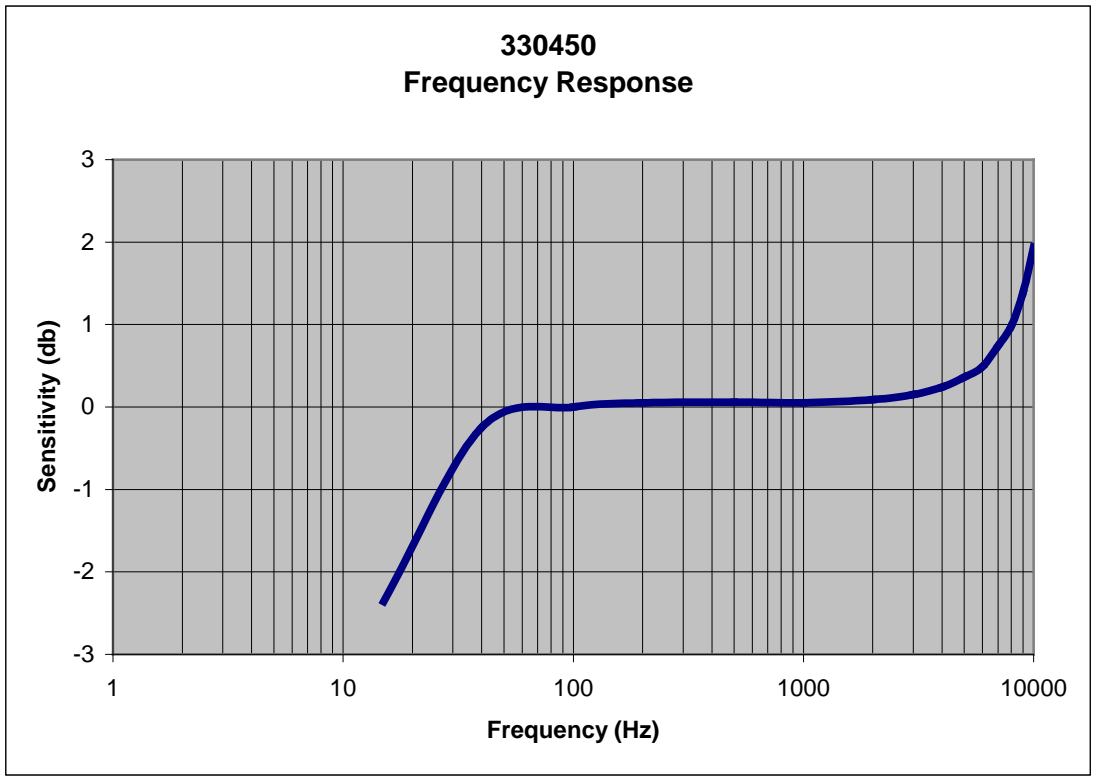


Figure 2: Acceleration Amplitude

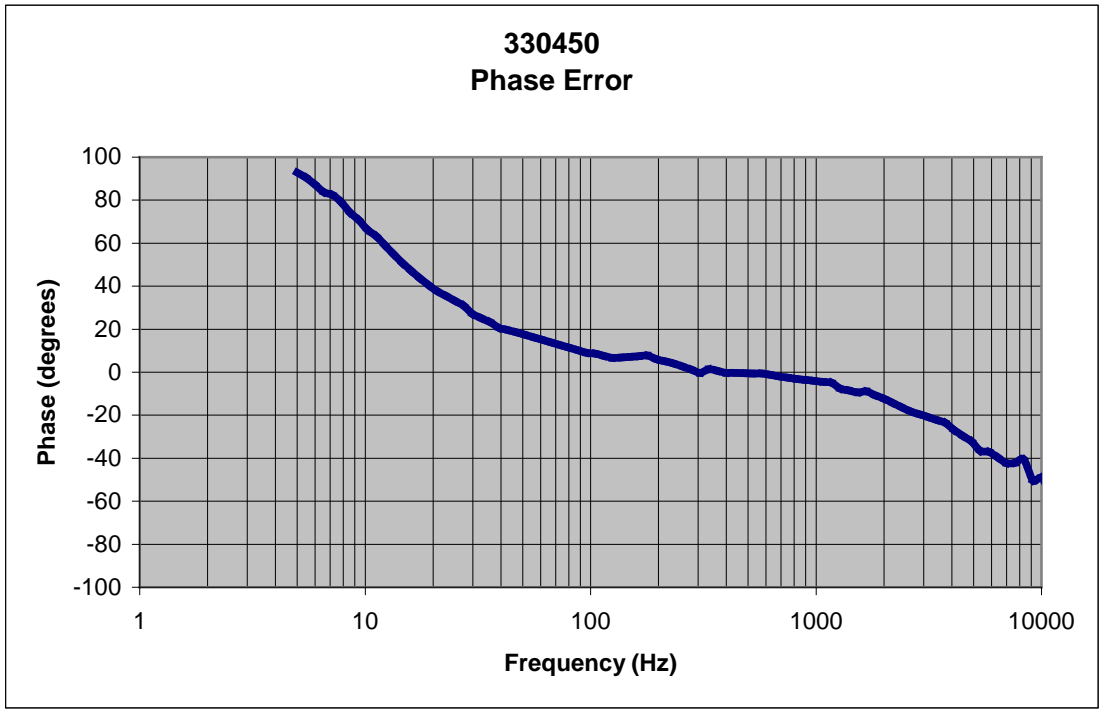
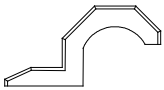
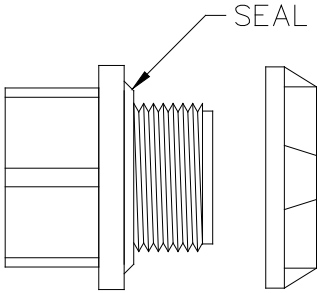
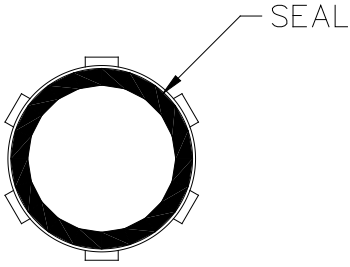
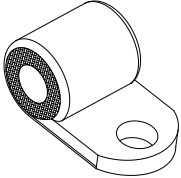


Figure 3: Acceleration Phase Error

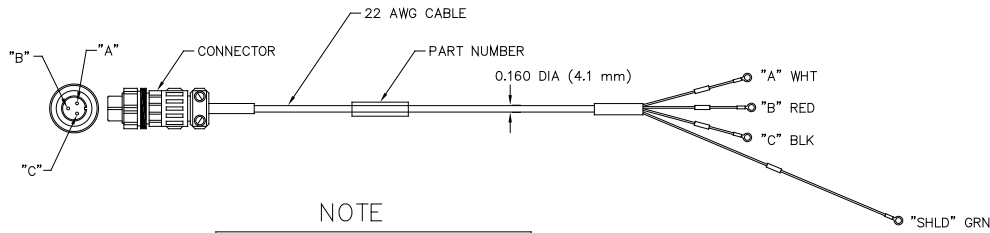
**Table 1: Interconnection Cables and Accessories**

APPLICATION	PART NUMBER	DESCRIPTION
†Note: AA - Specifies the length (in feet) of cable required		
Standard Interconnect Cable	16925-AA†	3-conductor shielded 22 AWG (0.5 mm <sup>2</sup> ) cable with 3-socket plug at one end, terminal lugs at the other end. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m). See Figure 4
Standard Armored Interconnect Cable	16710-AA†	3-conductor shielded 22 AWG (0.5 mm <sup>2</sup> ) armored cable with 3-socket plug at one end, terminal lugs at the other end. Minimum length of 3.0 ft (0.9 m), maximum length of 99 ft (30 m). See Figure 5
Interconnect Cable with Boot	130539-AA†	3-conductor shielded 18 AWG (1.0 mm <sup>2</sup> ) cable with 3-socket plug and fluorosilicone elastomer boot at one end, terminal lugs at the other end. Minimum length of 2.0 ft (0.6 m), maximum length of 99 ft (30 m). A manual is available to assist with installation of this cable (part number 133080-01). See Figure 6
330450 Manual	139976-01	User Guide
Spare Mating Connector	00531080	Mating connector for 330450 HTAS.
Electronics Housing Strap	03818073	<p>1 inch rigid conduit strap for securing the electronics housing.</p> 

<p>Electronics Mounting Hub</p>	<p>03818071</p>	<p>1 inch weather tight hub used to mount the electronics housing in a weatherproof enclosure.</p>  <p>The diagram shows a cross-section of the hub on the left, which has a spring seal (indicated by a line and the word 'SEAL') that fits into a groove. To the right is a side view of the hub, showing its cylindrical shape and a flange at the top.</p>
<p>Seal Ring</p>	<p>03818072</p>	<p>1 inch sealing lock ring used to mount the electronics housing. Two rings are required to mount the electronics.</p>  <p>The diagram shows a cross-section of the seal ring, which is a circular ring with a central hole. A seal (indicated by a line and the word 'SEAL') is located on the inner edge of the ring. The ring has several small protrusions around its circumference.</p>
<p>Cable Clamp</p>	<p>169546</p>	<p>Stainless steel mesh tie down clamp for the hardline cable. For temperatures greater than 260C (500F).</p>  <p>The diagram shows a stainless steel mesh tie down clamp, which consists of a circular mesh ring and a strap with a buckle that is used to secure the ring to a cable.</p>



PART NUMBER 16925 –   (SEE NOTE)



**NOTE**

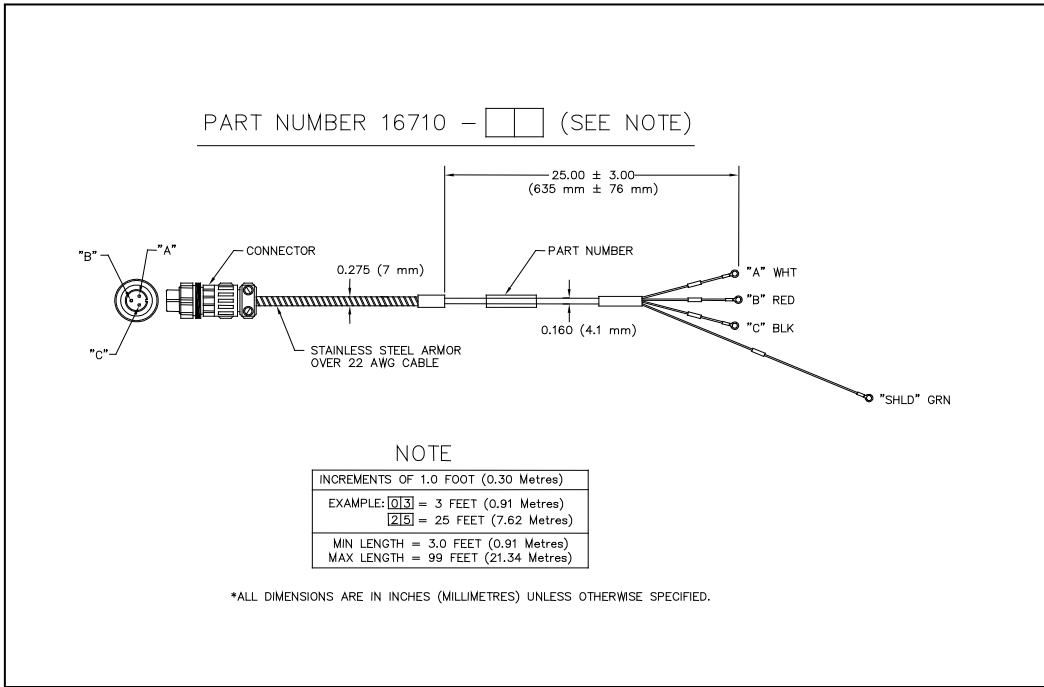
INCREMENTS OF 1.0 FOOT (0.30 Metres)
EXAMPLE: <input type="text"/> <input type="text"/> = 2 FEET (0.61 Metres)
<input type="text"/> <input type="text"/> = 25 FEET (7.62 Metres)
MIN LENGTH = 2.0 FEET (0.61 Metres)
MAX LENGTH = 99 FEET (30.18 Metres)

\*ALL DIMENSION ARE IN INCHES (MILLIMETRES) UNLESS OTHERWISE SPECIFIED.

The following are standard lengths	
Feet	Metres (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

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

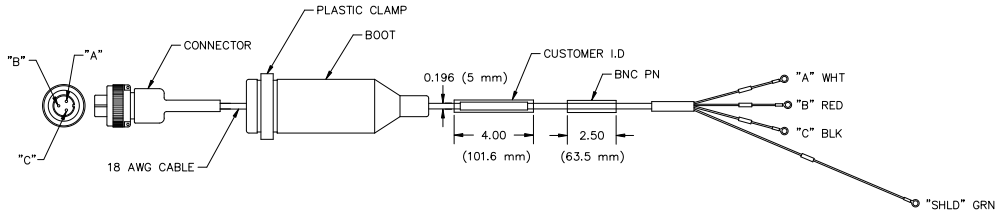
**Figure 4: Standard Interconnect Cable**



The following are standard lengths	
Feet	Metres (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
<b>NOTE:</b> Non-standard/custom lengths can also be ordered at additional cost	

**Figure 5: Standard Armored Interconnect Cable**

PART NUMBER 130539 –  (SEE NOTE)



**NOTE**

INCREMENTS OF 1.0 FOOT (0.30 Metres)
EXAMPLE: <span style="border: 1px solid black; padding: 2px;">12</span> = 12 FEET (3.66 Metres)
<span style="border: 1px solid black; padding: 2px;">25</span> = 25 FEET (7.62 Metres)
MIN LENGTH = 2.0 FEET (0.61 Metres)
MAX LENGTH = 99 FEET (30.18 Metres)

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) UNLESS OTHERWISE SPECIFIED

The following are standard lengths	
Feet	Metres (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
<b>NOTE:</b> Non-standard/custom lengths can also be ordered at additional cost	

**Figure 6: Standard Right Angle Interconnect Cable**

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