



VM™ AIR GAP

Capacitive Measuring Chains

The VM air gap measuring chains are composed of passive, non-contact type sensors that measure the distance between their surface and a metallic target. The raw signal picked up by these sensors is then sent to a conditioner through an extension cable to be converted into a linearized 4 to 20 mA signal. These sensors are immune from strong magnetic fields.

General Specifications

Sensors (Complete characteristics on following pages)

Operation

- Measurement Type Non-Contact Proximity, Capacitive Technology

Connection

- Integral Cable Coaxial or Triaxial
- Connector
 - Coaxial Integral Cable Male, Gold-Plated SMA
 - Triaxial Integral Cable Male, Gold-Plated SMA and Grounding Terminal

Environmental

- Temperature Range 0 to 125°C [32 to 257°F]
- Magnetic Field Immunity Up to 2 Tesla (50 or 60 Hz)
- Dust and Oil Contamination Films Have No Effect
- Humidity Up to 95%, Non-Condensing

Physical Characteristics

- Sensor Material Non-Conductive and Semi-Conductive Material
- Integral Cable Material FEP Jacket / Teflon® Insulation

Extension Cables

Connection

- Cable Type Triaxial
- Absolute Minimum Length
 - Type H (20 m) Cable Nominal Minus 1 m [39.4 in]
 - All Other Cables Nominal Minus 0.5 m [19.7 in]
- Connector
 - Sensor Side Female, Gold-Plated SMA and Grounding Terminal
 - Conditioner Side Male, Gold-Plated SMA and Grounding Terminal
- Minimum Bending Radius 10 cm [4 in]

Environmental

- Temperature Range
 - Type S Cable 0 to 75°C [32 to 167°F]
 - Type H Cable 0 to 125°C [32 to 257°F]

Physical Characteristics

- Cable Material
 - Type S Cable PVC Jacket / PE Insulation
 - Type H Cable FEP Jacket / FEP Insulation

LIN™ -300 Conditioner

Power Requirements

- Voltage 24 Vdc ±15%
- Consumption 100 mA max.
- Protection Auto-Reset Fuse
- Warm-Up Time 30 Minutes

Connection

- Power / Output 5-Pin M12 Male
- Sensor Input Female, Gold-Plated SMA and Grounding Terminal

Environmental

- Temperature Range
 - Operating 0 to 55°C [32 to 131°F]
 - Storage (Measuring Chain) -25 to 70°C [-13 to 158°F]

Physical Characteristics

- Body Nickel-Plated Aluminum
- Mounting 4 Slots for #6 (M3.5) Screws
- Max. Torque on SMA 1.1 Nm [10 in-lb]
- Status Indicator Bi-Color LED

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Specifications

VM3.12 Air Gap Measuring Chains

Sensor	VM3.12		
Nominal Measuring Range	2 to 20 mm [79 to 787 mils]	2 to 20 mm [79 to 787 mils]	5 to 35 mm [197 to 1378 mils]
Sensor Integral Coaxial Cable Length	0.5 m [19.7 in]		
Extension Cable (Type S) Nominal Length	10 m [33 ft]	---	10 m [33 ft]
Extension Cable (Type H) Nominal Length	---	15 m [49 ft]	---
Conditioner Model	LIN-331-10S-2/20	LIN-331-15H-2/20	LIN-331-10S-5/35
Output	4 to 20mA		
Bandwidth	DC to 1.2 kHz (-3 dB)		
Sensitivity	0.889 mA/mm [22.6 μ A/mil]	0.889 mA/mm [22.6 μ A/mil]	0.533 mA/mm [13.5 μ A/mil]
Accuracy (full scale)	See Figure 1	See Figure 2	See Figure 3
Repeatability (% of reading)	± 0.3 %	± 0.3 %	± 0.3 %
Temperature Drift (at mid-range)	< 500 ppm/ $^{\circ}$ C	< 800 ppm/ $^{\circ}$ C	< 800 ppm/ $^{\circ}$ C
Load at Output	500 Ω max.		

VM3.2 Air Gap Measuring Chain

Sensor	VM3.2
Nominal Measuring Range	1 to 10 mm [39 to 394 mils]
Sensor Built-In Integral Cable Length	0.23 m [9 in]
Extension Cable (Type S) Nominal Length	10 m [33 ft]
Conditioner Model	LIN-332-10S-1/10
Output	4 to 20mA
Bandwidth	DC to 1.2 kHz (-3 dB)
Sensitivity	1.78 mA/mm [45 μ A/mil]
Accuracy (full scale)	See Figure 4
Repeatability (% of reading)	± 0.3 %
Temperature Drift (at mid-range)	< 500 ppm/ $^{\circ}$ C
Load at Output	500 Ω max.

VM5.1 Air Gap Measuring Chains

Sensor	VM5.1	
Nominal Measuring Range	5 to 50 mm [197 to 1969 mils]	5 to 50 mm [197 to 1969 mils]
Sensor Integral Triaxial Cable Length	0.5 m [19.7 in]	
Extension Cable (Type S) Nominal Length	10 m [33 ft]	---
Extension Cable (Type H) Nominal Length	---	10 m [33 ft]
Conditioner Model	LIN-351-10S-5/50	LIN-351-10H-5/50
Output	4 to 20mA	
Bandwidth	DC to 1.2 kHz (-3 dB)	
Sensitivity	0.356 mA/mm [9 μ A/mil]	0.356 mA/mm [9 μ A/mil]
Accuracy (full scale)	See Figure 5	See Figure 6
Repeatability (% of reading)	± 0.3 %	± 0.3 %
Temperature Drift (at mid-range)	< 500 ppm/ $^{\circ}$ C	< 500 ppm/ $^{\circ}$ C
Load at Output	500 Ω max.	



VM5.1 Air Gap Measuring Chains (continued)

Sensor	VM5.1	
Nominal Measuring Range	5 to 35 mm [197 to 1378 mils]	5 to 35 mm [197 to 1378 mils]
Sensor Integral Triaxial Cable Length	0.5 m [19.7 in]	
Extension Cable (Type S) Nominal Length	---	---
Extension Cable (Type H) Nominal Length	15 m [49 ft]	20 m [66 ft]
Conditioner Model	LIN-351-15H-5/35	LIN-351-20H-5/35
Output	4 to 20mA	
Bandwidth	DC to 1.2 kHz (-3 dB)	
Sensitivity	0.533 mA/mm [13.5 μ A/mil]	0.533 mA/mm [13.5 μ A/mil]
Accuracy (full scale)	See Figure 7	See Figure 8
Repeatability (% of reading)	± 0.3 %	± 0.3 %
Temperature Drift (at mid-range)	< 800 ppm/ $^{\circ}$ C	< 1500 ppm/ $^{\circ}$ C
Load at Output	500 Ω max.	

VM6.1 Air Gap Measuring Chains

Sensor	VM6.1	
Nominal Measuring Range	3 to 30 mm [118 to 1181 mils]	5 to 50 mm [197 to 1969 mils]
Sensor Integral Triaxial Cable Length	7 m [23 ft]	7 m [23 ft]
Conditioner Model	LIN-361-7I-3/30	LIN-361-7I-5/50
Output	4 to 20mA	
Bandwidth	DC to 1.2 kHz (-3 dB)	
Sensitivity	0.593 mA/mm [15 μ A/mil]	0.356 mA/mm [9 μ A/mil]
Accuracy (full scale)	See Figure 9	See Figure 10
Repeatability (% of reading)	± 0.3 %	± 0.3 %
Temperature Drift (at mid-range)	< 800 ppm/ $^{\circ}$ C	< 1500 ppm/ $^{\circ}$ C
Load at Output	500 Ω max.	

Figure 1

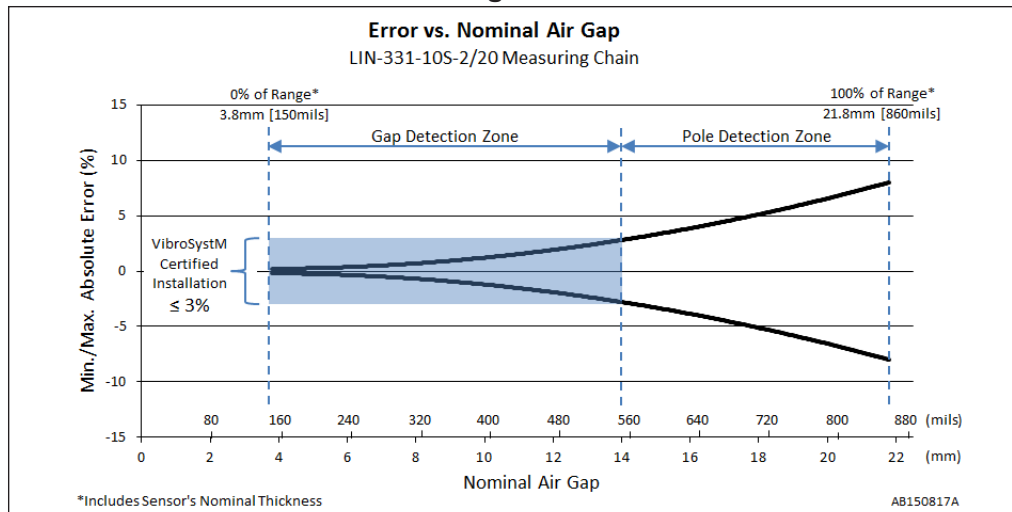




Figure 2

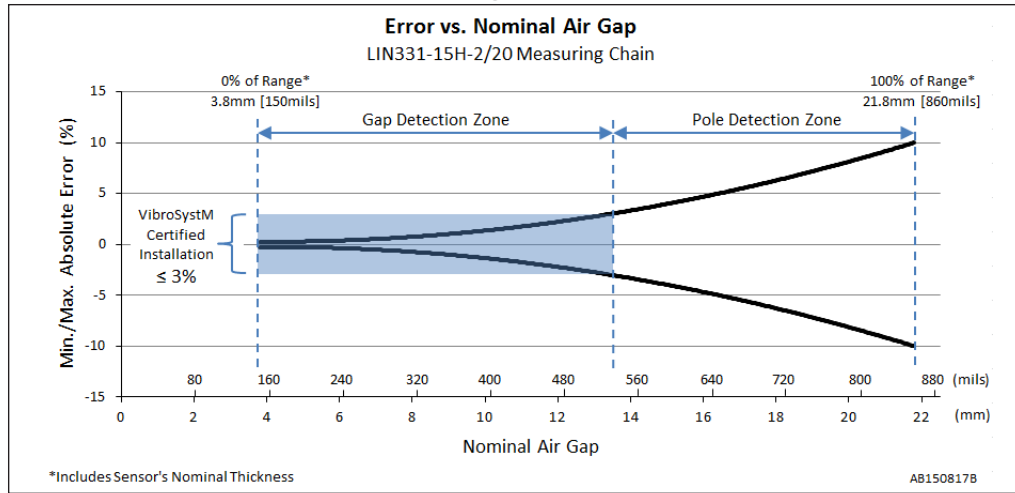


Figure 3

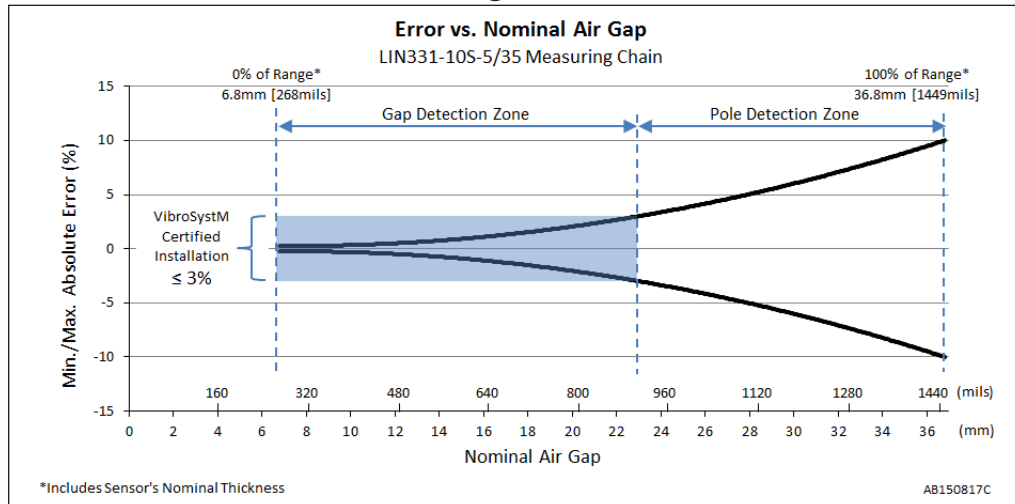


Figure 4

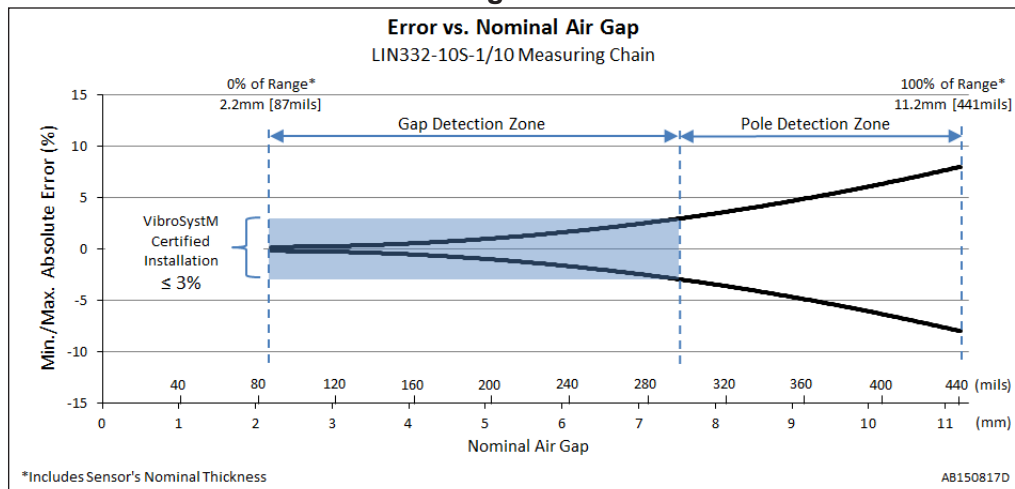




Figure 5

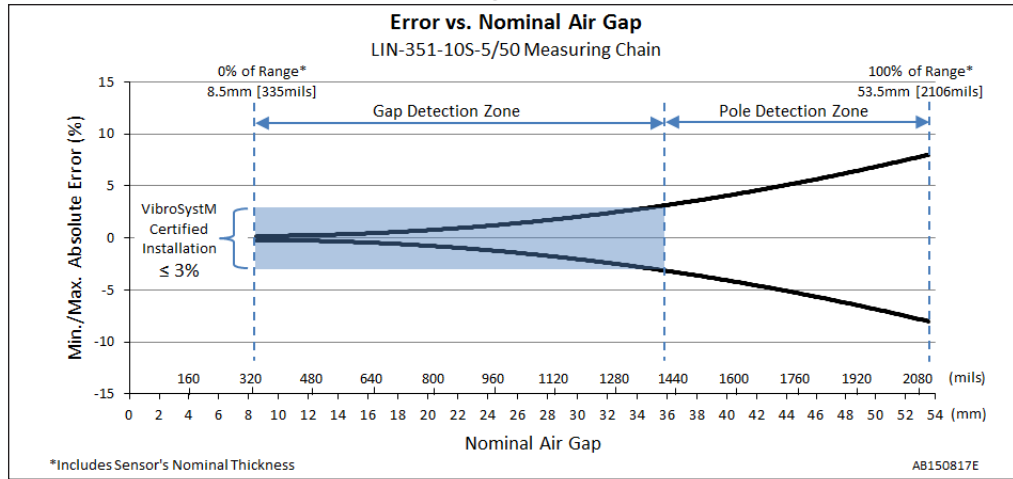


Figure 6

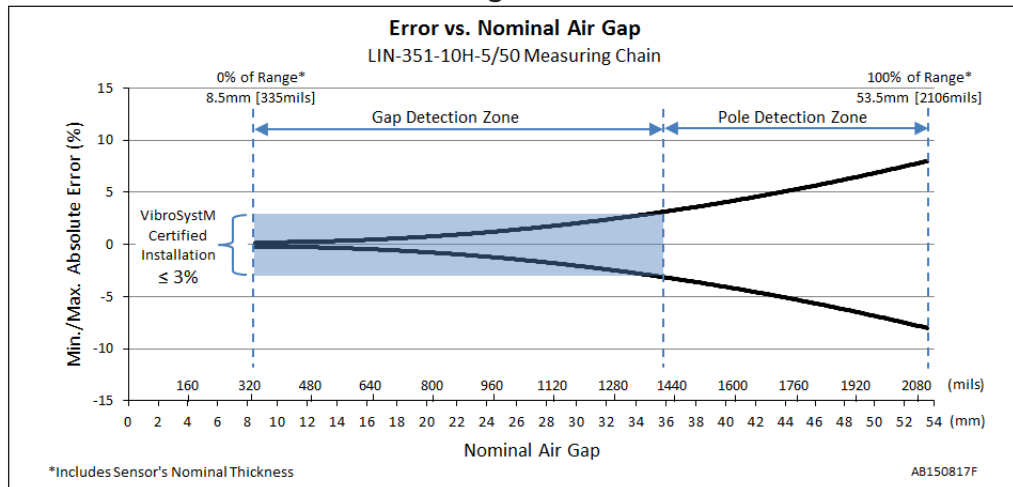


Figure 7

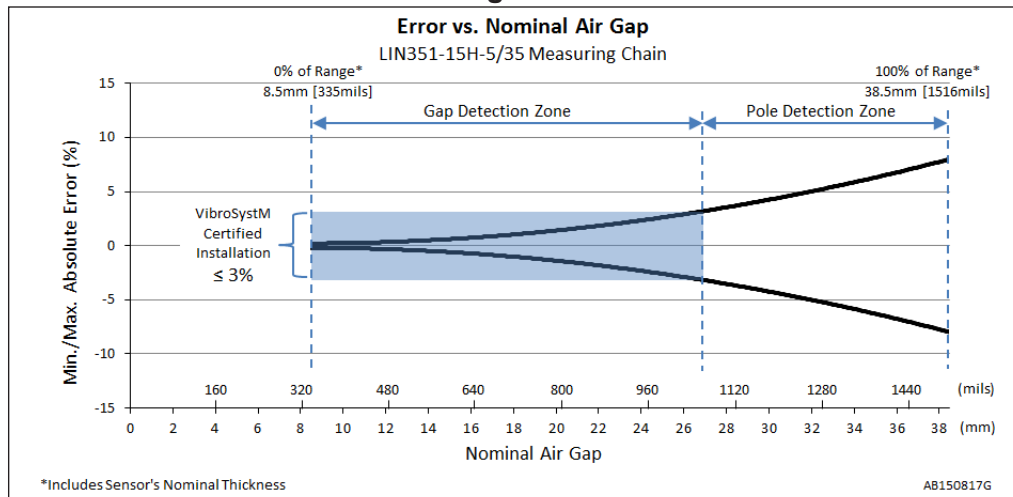




Figure 8

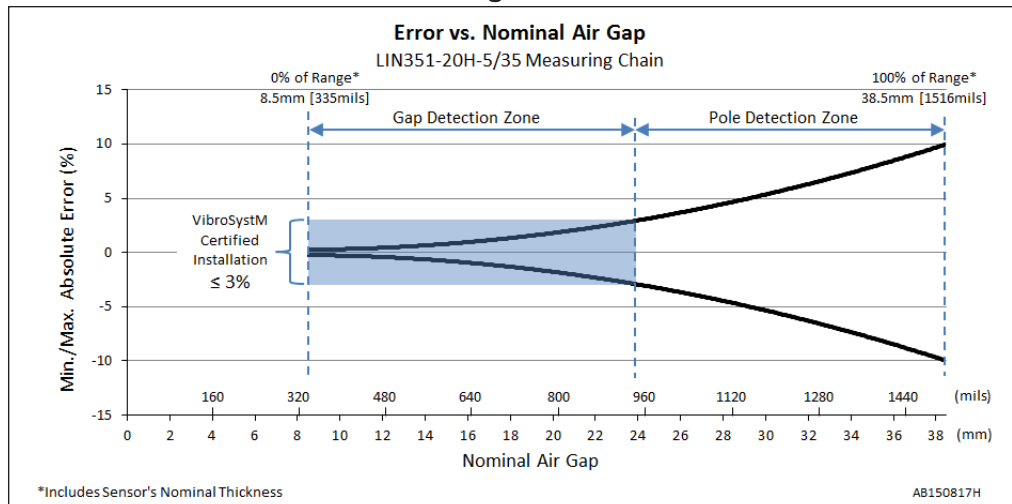


Figure 9

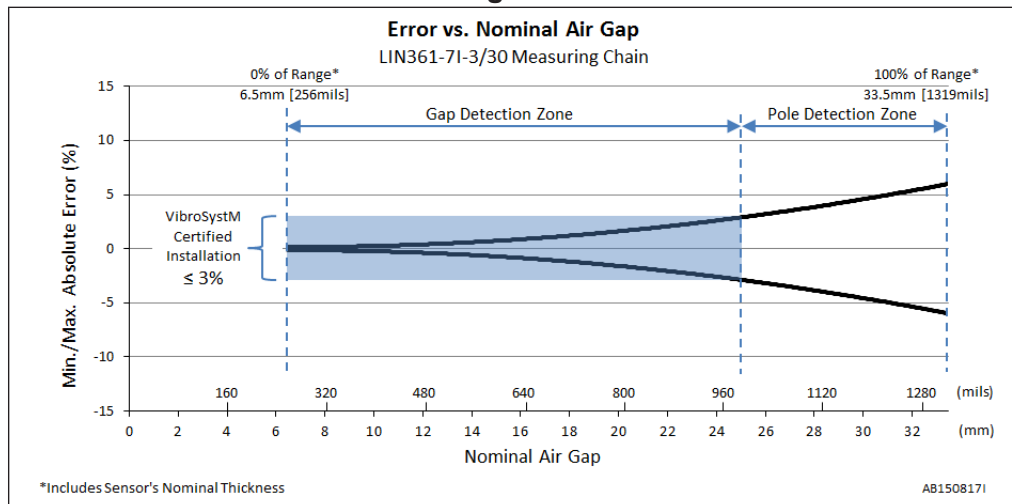
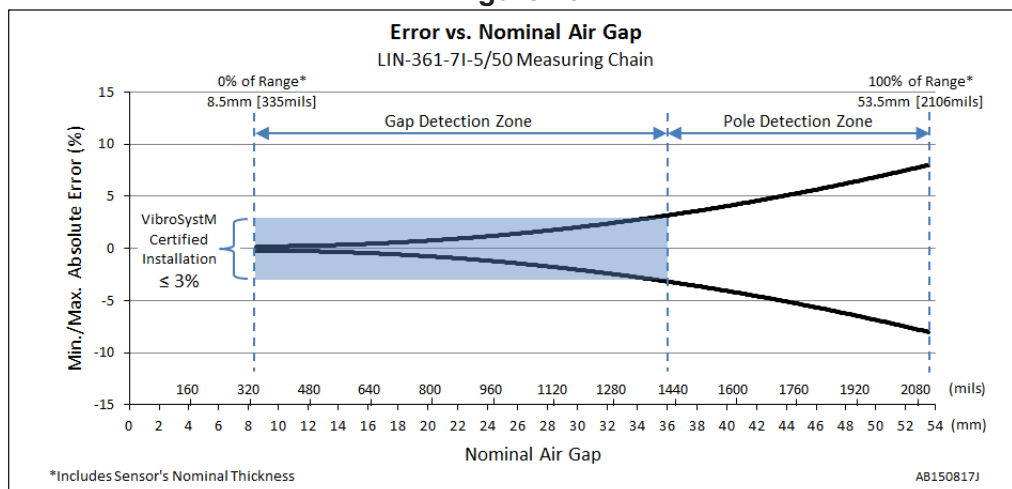


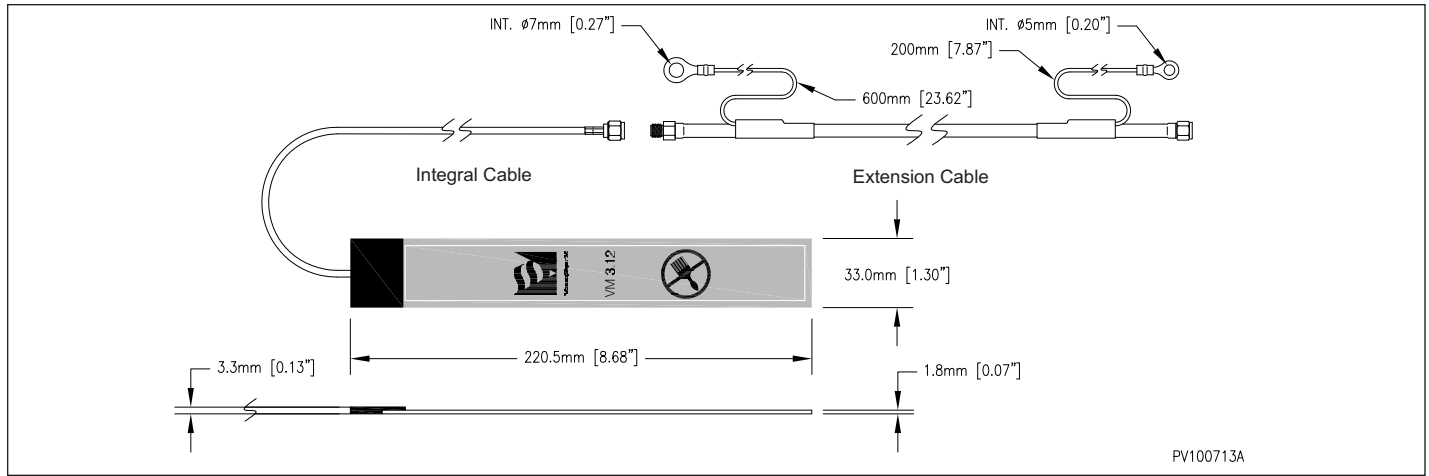
Figure 10



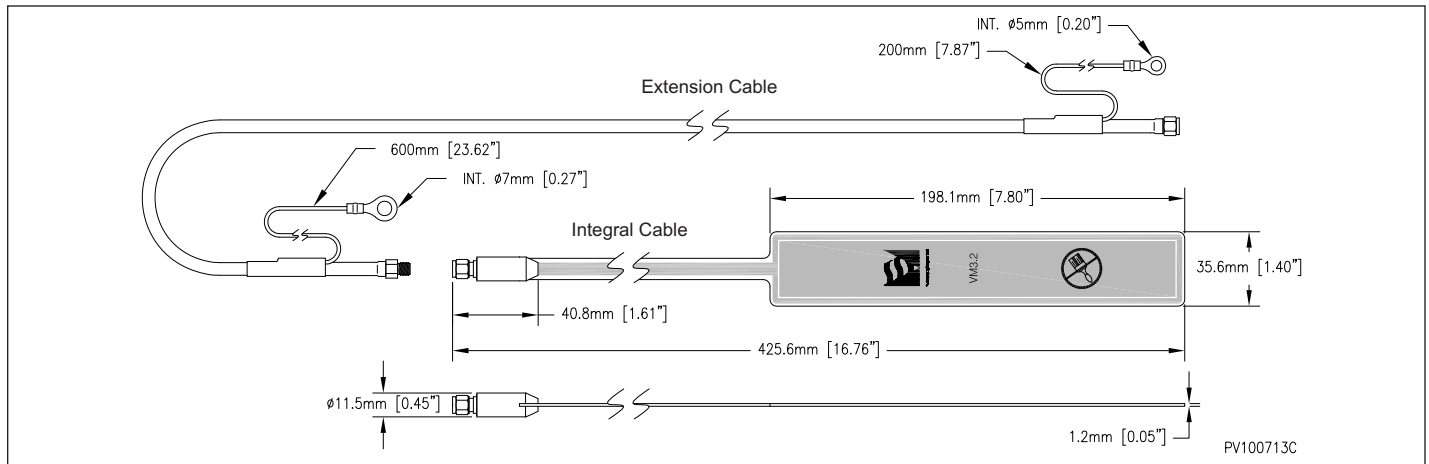


Dimensions

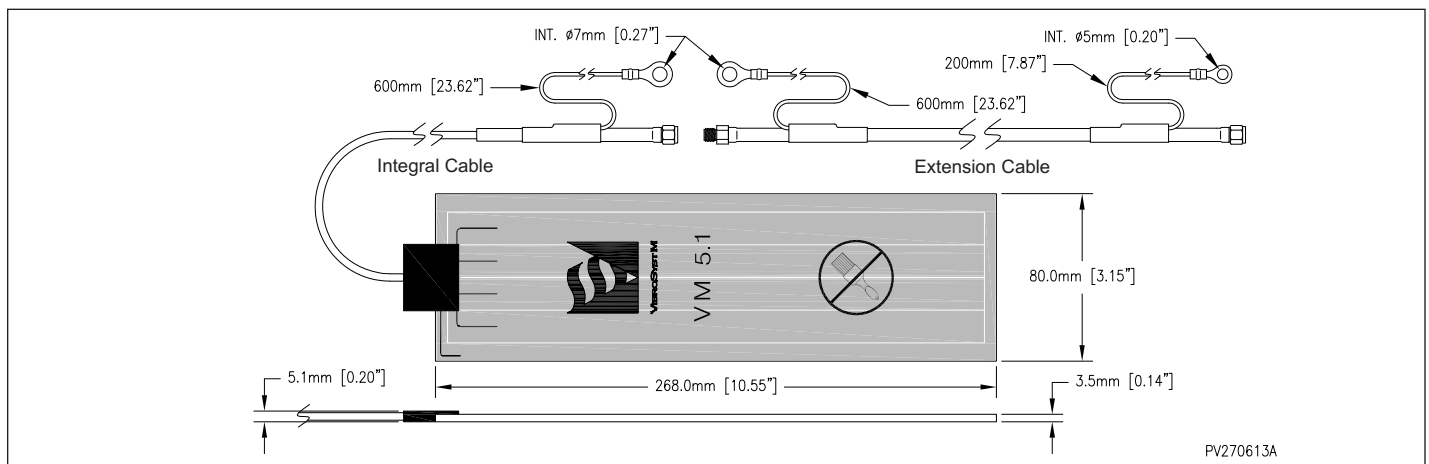
VM3.12 Sensor



VM3.2 Sensor

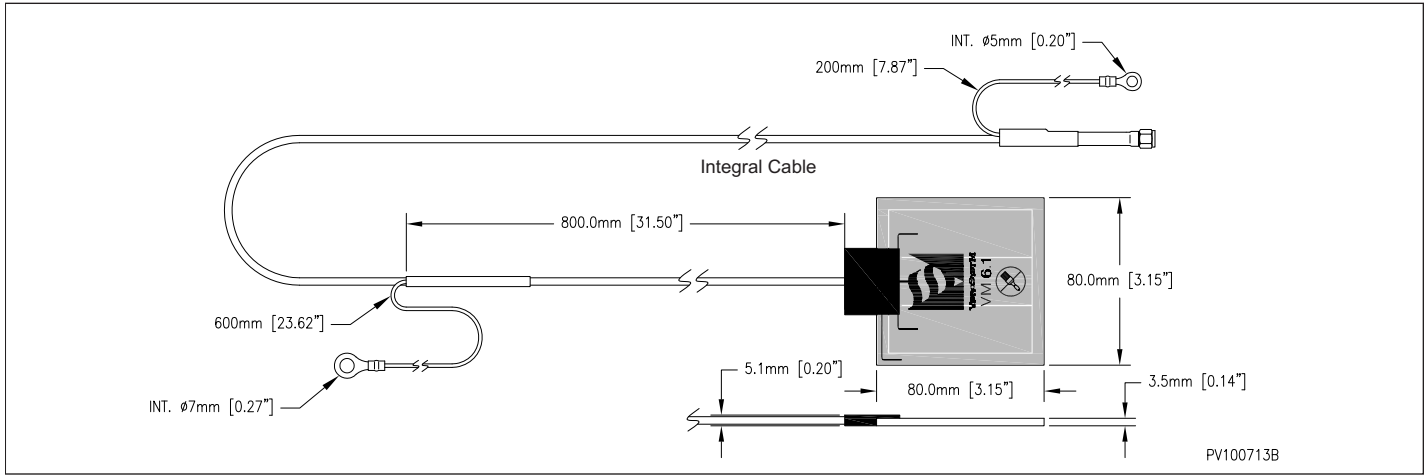


VM5.1 Sensor





VM6.1 Sensor



LIN-300 Conditioner

