VM3 & VM5 AIRFLOW

U.S. Patent No. 11125795

For Capacitive Air Gap Measuring Chains

VM™ AIRFLOW sensors are designed with apertures, thus limiting obstruction of the ventilation holes. This combination of holes makes it possible to adapt to different machine stator designs, and let cooling air pass efficiently through each sensor.

VM AIRFLOW air gap sensors are easy to install without removing the rotor or poles. These sensors are resistant to chemicals and solvents commonly used during installation. During operation, they are immune from strong magnetic fields, carbon dust, and deposits of oil.

Each VM AIRFLOW air gap measuring chain is composed of a passive, non-contact capacitive sensor that measures the distance between its surface and a metallic target. The raw signal picked up by the sensor is sent to a conditioner through a triaxial extension cable to be converted into a linearized 4 to 20 mA signal. Different measuring ranges are available to adapt to different machine air gaps.

GENERAL SPECIFICATIONS

Sensors

Operation

• Measurement type	Non-contact proximity, capacitive technology

Connection

• Integral cable	VM3: Coaxial VM5: Triaxial with grounding wire assembly
• Connector	
Coaxial integral cable	Male, gold-plated SMA
Triaxial integral cable	Male, gold-plated SMA

Environmental

• Operating temperature range	0 to 125°C [32 to 257°F]
• Absolute maximum temperature	155°C [311°F] [1]
• Resistance to industrial chemicals and solvents	Very good [2]
• 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	Glass reinforced laminates
• Cable material	VM3: PVDF over FEP jacket / FEP insulation VM5: PVDF over FEP jacket / Teflon® insulation

Extension Cables

Connection

• Cable type	Triaxial
• Absolute minimum length	Nominal minus 0.5 m [19.7 in]

- Connectors
  - 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: 0 to 75°C [32 to 167°F]

Physical Characteristics

- Type S cable material: PVC Jacket / PE Insulation

LIN™-300 Conditioner

Power Requirements

- Voltage: 24 Vdc ±15%
- Consumption: 120 mA max.
- Warm-up time: 30 minutes

Connection

- Power/Output: 5-pin M12 male
- Sensor input: Female, gold-plated SMA and grounding terminal

Environmental

- Temperature range
  - Continuous operation: 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 oblong holes for #6 (M3.5) screws
- Max. torque on SMA: 1.1 Nm [10 in-lb]
- Status indicator: Bicolor LED

MEASURING CHAINS TECHNICAL SPECIFICATIONS

At room temperature, unless otherwise noted

Sensor	VM3 AIRFLOW	VM5 AIRFLOW
Nominal measuring range	1 to 20 mm [39 to 787 mils]	2 to 42 mm [79 to 1654 mils]
Sensor integral cable length	0.5 m [19.7 in]	
Extension cable nominal length	Type S: 10 m [32.8 ft]	
Conditioner model	LIN-33AF-10S-1/20	LIN-35AF-10S-2/42
Output	4 to 20mA	
Load at output	500 Ω max.	
Bandwidth	DC to 1.2 kHz (-3 dB)	
Sensitivity	0.842 mA/mm [21.4 µA/mil]	0.4 mA/mm [10,2 µA/mil]
Accuracy	See figure 1	See figure 2
Repeatability (% of reading)	± 0.3 %	± 0.3 %
Maximum temperature drift *(From 25°C [77°F] to 70% of maximum operating range of all 3 components)*	± 2% (at mid-range)	± 2% (at mid-range)

Figure 1: LIN-33AF-10S-1/20 Measuring Chain

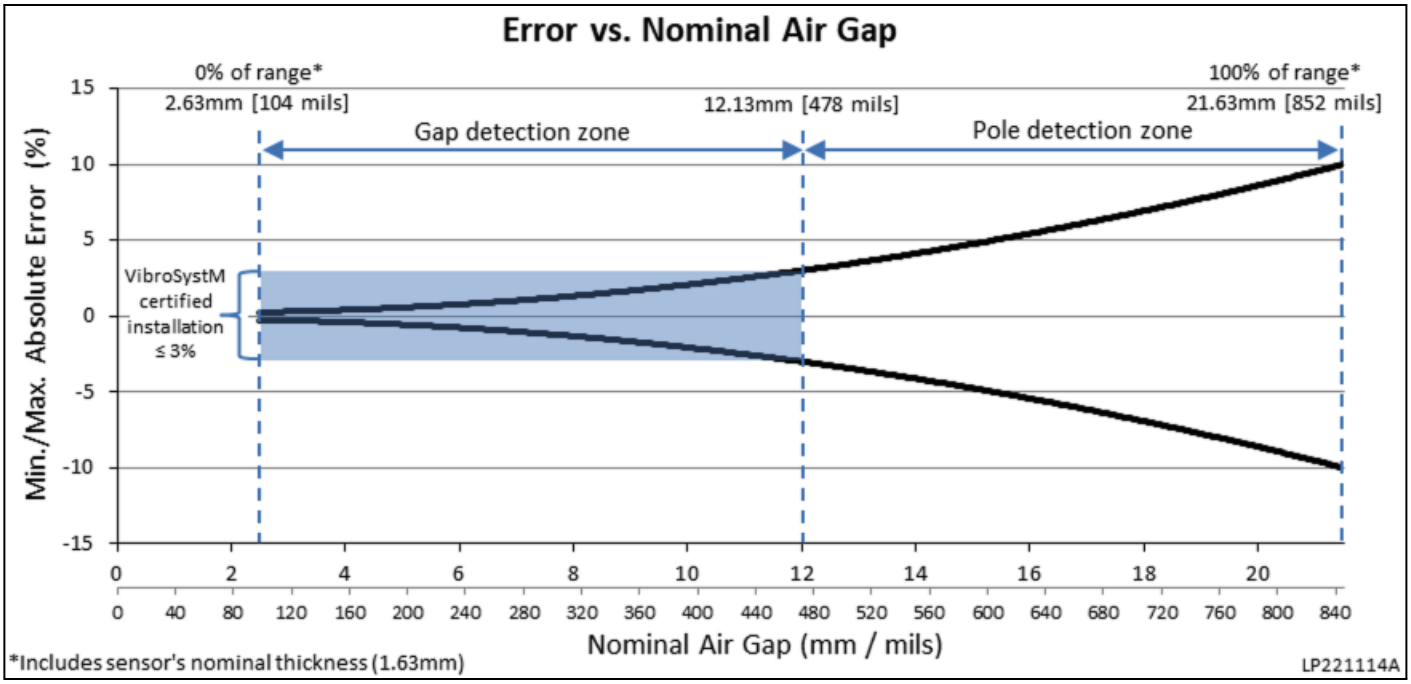
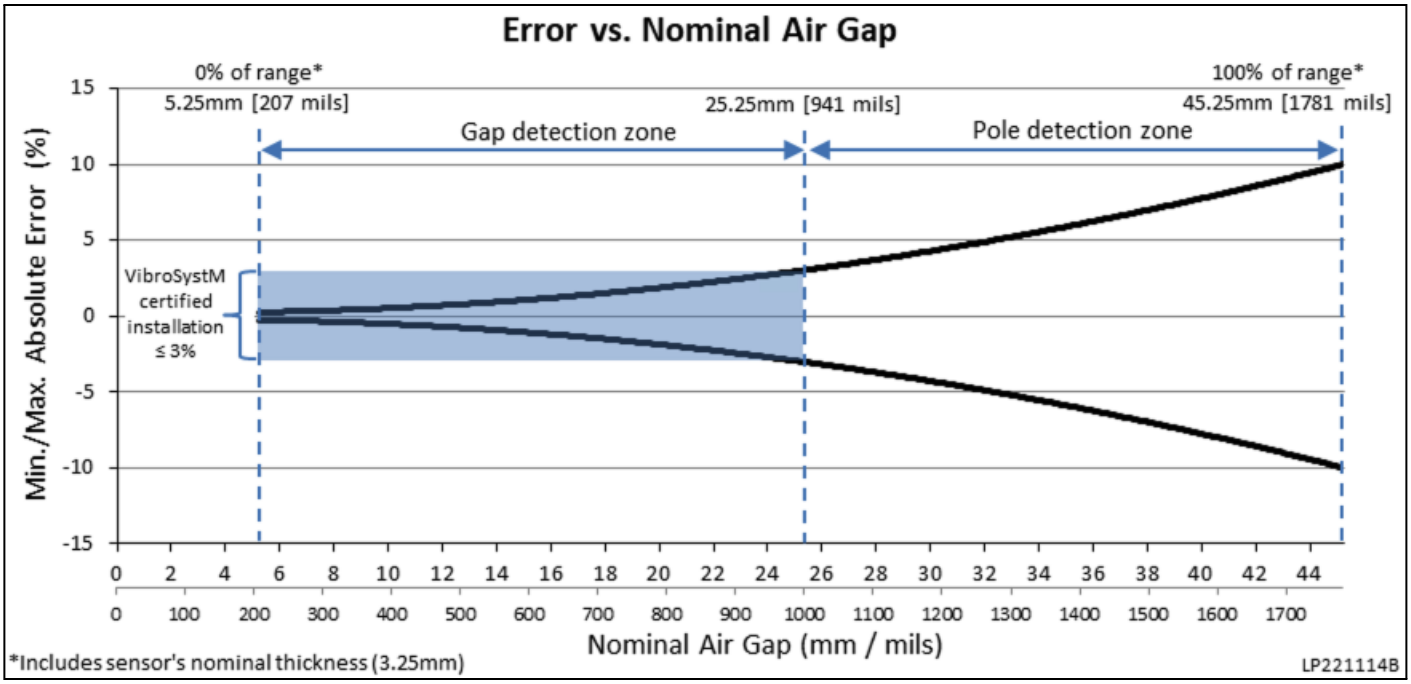
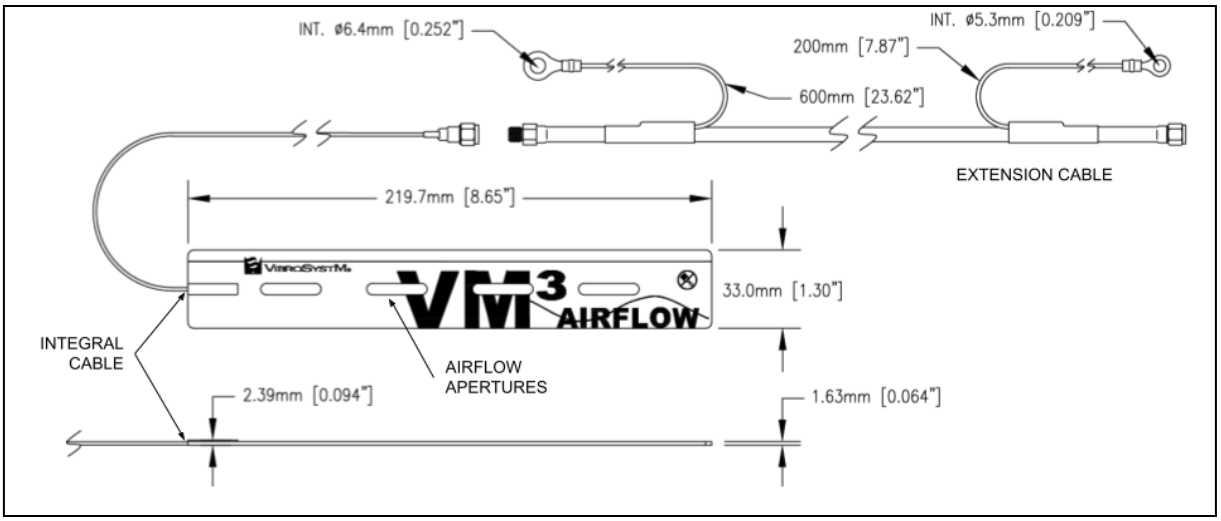


Figure 2: LIN-35AF-10S-2/42 Measuring Chain

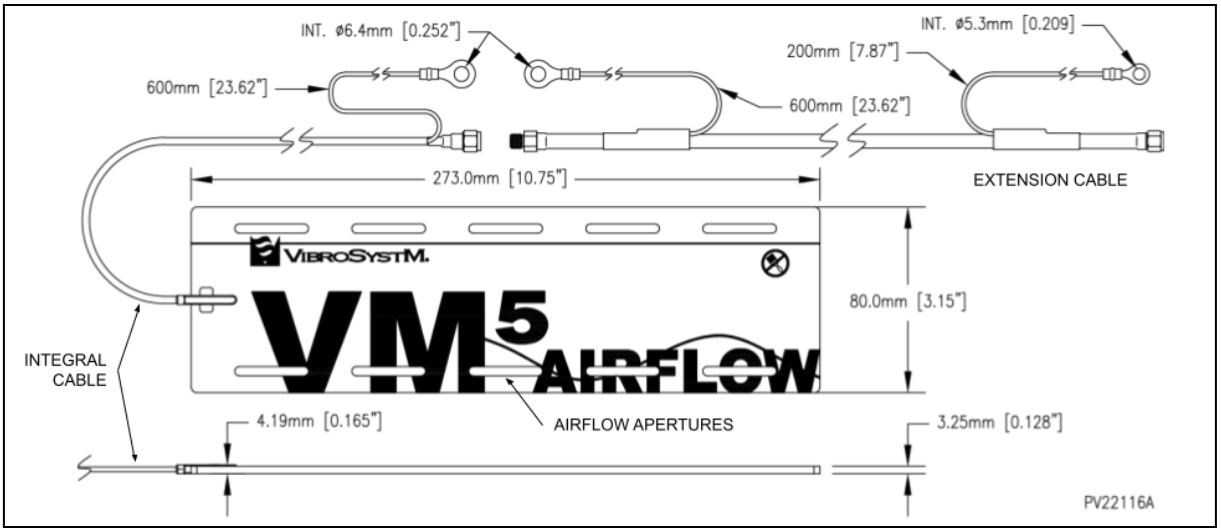


VM AIRFLOW MEASURING CHAINS OVERVIEW

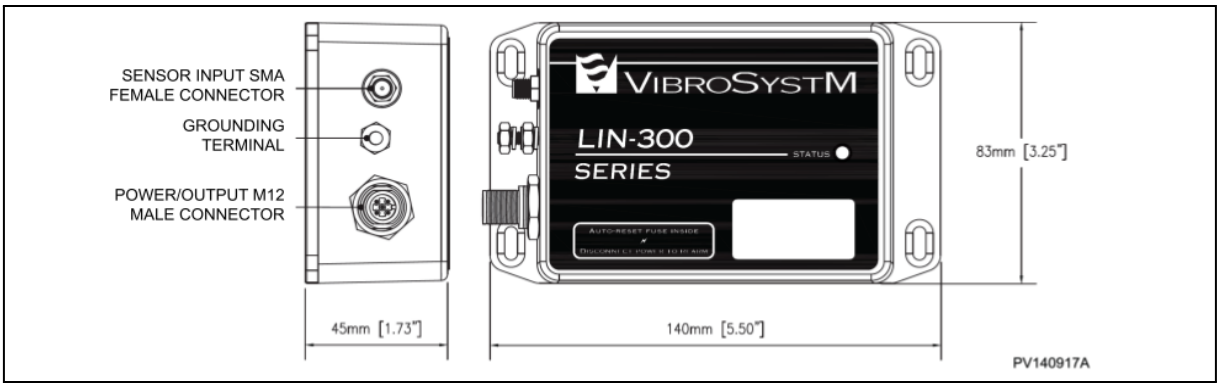
VM3 AIRFLOW Sensor with Extension Cable



VM5 AIRFLOW Sensor with Extension Cable



LIN-300 Series Conditioner



PRODUCT INFORMATION

Product Number	Description
LIN-33AF-10S-1/20 AIRFLOW Measuring Chain	
VSM-VM3AF	VM3 AIRFLOW air gap sensor (1-20 mm)
VSM-L33AF-10S-1/20	LIN-33AF-10S conditioner (1-20 mm)
VSM-CBL-3AF-10S	Cable / Triaxial - SMA/SMA / (10 m/32.8 ft)
LIN-35AF-10S-2/42 AIRFLOW Measuring Chain	
VSM-VM5AF	VM5 AIRFLOW air gap sensor (2-42 mm)
VSM-L35AF-10S-2/42	LIN-35AF-10S conditioner (2-42 mm)
VSM-CBL-5AF-10S	Cable / Triaxial - SMA/SMA / (10 m/32.8 ft)

[1] *Applicable to the sensor body in the event of a fault, for a short period of time (<3h per event). If left continuously at temperature above operating range, premature aging of the sensor will occur.*

[2] *Compatible with acetone, alcohol isopropyl, and paint thinner. Do not soak or submerge. Tests any other product on a small area of the sensor before using it. If in doubt, contact VibroSystM for support.*