

®ICP Accelerometer Model 109 Compact, Top connector

Main Characteristics

- Annular shear mode
- 20 kHz Bandwidth
- 10, 50, 100 mV/g
- -55°C to 120 °C (-67°F to 250°F)
- Dual case isolation with Faraday shield
- Submersible version (150 metres) with associated IP68 overmolded cable
- life time hermetic sealing warranty (M12/Mil glass seal connector)

Competitive advantage

- Compare to obsolete compression design, annular shear piezoelectric sensors feature better frequency response, improved base strain, lower noise, smaller size, thermal transient immunity and insensitivity to cable motion. Annular shear mode is also less susceptible to transverse vibrations and better immune to electronic saturation at high frequency.
- Exceptional bias stability at elevated temperatures. (improved dynamic range, ex 80g dynamic for 100 mV/g sensitivity)
- Resistant to shock (magnet mounting) thanks to protected Mosfet transistor input.
- ESD and reverse wiring protection.
- The glass seal hermetic connector protects the piezoelectric disc and the electronic from harmful environmental influences, significantly increasing their reliability and lifetime. Associated with low cost IP68 overmolded M12 cable assembly it is a perfect solution for submersible application down to 150 metres. Sensors with epoxy seal will always leak after few temperature cycles.
- M12 connector offers compatibility with numerous sensors used in automation. M12 overmolded cable assemblies are available from many cable manufacturers around the world. Mil cordset are expensive because they are only available from vibration sensor manufacturer.

Description

The hermetic sealed industrial piezoelectric accelerometer model 109 is design to monitor the vibration in harsh industrial environment. It uses the industry standard ©ICP / ©IEPE / ©LIVM 2-wire voltage transmission technique with a 4 mA standard constant current supply. Signal ground is isolated from the mounting surface and outer case to prevent ground loops. Faraday shielding will limit sensitivity to EMC to a minimum. Annular shear mode design will prevent from thermal transient and from spurious signal from high transverse vibrations. Low noise electronic and a temperature compensated design will give you accurate result over the complete temperature range. Large choice of frequency range will help to fit almost every customer requirements.

Typical applications

Vibrations measurement in the rugged environments of industrial machinery monitoring. High frequency version (10mV/g) monitor the vibration on roller bearing, pumps cavitation, Medium frequency (100 mV/g) version monitor overall vibration on pumps, motors, fans, ...



Model 109.01 with overmolded
IP 68 submersible angled M12 cable assembly

Ordering information model 109

To order, specify model number, options, accessories and suffix :

109.01- AA - B - TT - MM - HH - YY

AA : Sensitivity

- 3 : 10 mV/g ± 5 %
- 3D : 10 mV/g ± 10 %
- 3V : 10 mV/g ± 20 %

- 5 : 50 mV/g ± 5 %
- 5D : 50 mV/g ± 10 %
- 5V : 50 mV/g ± 20 %.

- 6 : 100 mV/g ± 5 % (medium frequency, general purpose)
- 6D : 100 mV/g ± 10 % (medium frequency, general purpose)
- 6V : 100 mV/g ± 20 % (medium frequency, general purpose)

Available suffix : N, negative polarity

B : Connector

- 2 : M12 glass seal

B(CC-DD) Integral cable

- 5 (CC-DD) : Integral cable
- 7 (CC-DD) : Integral cable with sstl overbraid protection
- 8 (CC-DD) : Integral cable with stainless steel protection conduit
- 5, 7, 8 : epoxy seal.

CC : Cable Type

- 02 : *Teflon FEP twisted pair Cable (200°C)

DD : length in metre

TT : Temperature output.

- omitted : no temperature output
- T0 : 10 mV/°C. (range +2° to +120°C)

MM : Machine thread

- omitted : no mounting stud will be shipped with the sensor.
- M6 : M6x1
- M7 : 1/4" 28 UNF 2A
- M8 : M8x1.25

HH : Housing thread

- H2 : 10-32 UNF-2A
- H7 : 1/4" 28 UNF-2A

YY : Agency Approval

- omitted : no agency approval

Special Engraving :

- Add ZXX at the end of the part number.
- XX is a number supplied by VibraSens

In stock Model

109.01-6D-2-H7	100 mV/g ±10% general purpose version
109.01-3D-2-H7	10 mV/g ±10 % high frequency version

Available Model with short lead time (1 week)

109.01-6D-5(02-Length)-H7	integral 200°C teflon cable
109.01-6-6D-7(02-Length)-H7	integral 200°C sssl overbraided teflon cable

Old Part number compatibility

Not applicable

Ordering example :

109.01-6D-2-H7-M6	Compact accelerometer, 100mV/g, M12 glass seal connector
109.01-6D-7(02-05)-H7-M6	Compact accelerometer, 5 metres Integral teflon cable with Stainless steel overbraid.

Specifications (24°C)**Dynamic**

Sensitivity (101.01)

AA=3	10 mV/g ± 5%
AA=3D	10 mV/g ± 10%
AA=3V	10 mV/g ±20%

AA=5	50 mV/g ± 5%
AA=5D	50 mV/g ± 10%
AA=5V	50 mV/g ±20%

AA=6	100 mV/g ± 5%
AA=6D	100 mV/g ±10%
AA=6V	100 mV/g ±20%

Frequency response

AA=3X, 5X, 6X	±10 % : 1 to 10 000 Hz
	±3 dB : 0.5 to 20 000 Hz

Mounted Resonant frequency

AA=3X, 6X	40 kHz Nom
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Dynamic range

AA=3X	800 g pk
AA=5X	160 g pk
AA=6X	80 g pk

Transverse response sensitivity (20Hz, 5g) <5%

Temperature response fig3

Polarity (fig. 1) Suffix dependant

Linearity ±1% Max

Warm up time (Typical)

AA=3X, 6X	< 1Secc
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Option T0 (sensor should be powered to get temperature output)

Output (between - and Temp)	Vout=10mV/°C * Temp.(°C)
	0VDC at 0°C
Range	+2° to 120°C

Electrical

Electrical Grounding Isolated from machine ground

Internal Faraday shielding (fig. 1)

Isolation(Case to shield) 100 MΩ Min

Capacitance to ground 70 pF Nom

Output impedance 50 ΩNom

DC output bias, 4mA supply 12 VDC Nom (Fig 2)

Residual noise (24°C) : A=3X

1 Hz to 25 kHz	300 ug rms
1 Hz	30 ug

Residual noise (24°C) : A=6X

1 Hz to 25 kHz	300 ug rms
1 Hz	30 ug

Power requirements Constant current : +2 to +10mA DC

Voltage : +22 to +28 VDC

Protection : Overvoltage Yes

Reverse polarity Yes

Environmental

Temperature, operating continuous (4mA) -55 to 120 °C (-65 to 250 °F)

Humidity / Enclosure

B=2	Not affected, hermetically sealed, 1E-8storr.l/s
B=5, 7, 8	IP68, epoxy sealed
Acceleration limit : Shock	5 000g peak
Continuous vibration	500g peak
Base strain sensitivity	0.0002 g pk/u strain
Temp. transient sens. (3Hz, LLF, 20dB/dec)	5 mg/°C
Acoustic sensitivity (164 dBSP)	0.5 mg
Electromagnetic sens. (50Hz, 0.03 T)	0.2 g
Mean time between failure (MTBF)	10 Years Nom
ESD Protection	> 40 V
Safety	EN 61010-1 and IEC 1010-1
EMC emission	EN 50081-1, EN 50081-2
EMC immunity (1)	EN 50082-1, EN 50082-2

Physical

Dimensions

B=2	Fig. 1b
B=5	Fig. 1d
B=7	Fig. 1e
B=8	Fig. 1f

Design Ceramic, annular shear mode

Weight with connector

AA=3X, 6X	20 gr Nom (0.7 Oz)
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Connector

B=2	M12 glass seal, IEC 60947-5-2
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Material AISI 316L, DIN 1.4404 (Stainless steel)

Mounting torque (M6, M7, M8 suffix) 2,4 N.m (21 in-lbs)

Accessories, supplied

Calibration supplied

	Sensitivity (5g, 160 Hz)
	No frequency response

Accessories, not supplied

Cable assembly B=2 (M12 connector)

Polyurethane cable	10.01-E02-A01-31-Length
FEP Teflon cable	10.01-E02-A01-12-Length

For more cable option see Model 10.01 (specific cable harness).

Accessories, spares part

Mounting Stud with HH=H6

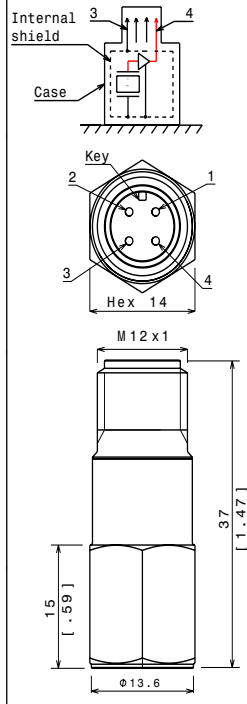
M6 machine thread	191.01-16-06-1
1/4" 28 UNF machine thread	191.01-16-16-1
M8 machine thread	191.01-16-08-1

Repair

Consult factory for replacement of connector in case of broken or bended pins. Repair of electronic is not possible.

(1) Guaranteed if using accessories listed in this product datasheet only

Drawings



Model Number	Pin 1	Pin 2	Pin 3	Pin 4
Standard, no option	NC	NC	(-)	(+)
T0 Option (10mV/°C)	NC	(Temp)	(-)	(+)

(NC) : Not connected
fig 1b : Outline drawing & Electrical layout, B=2 (M12 glass seal)

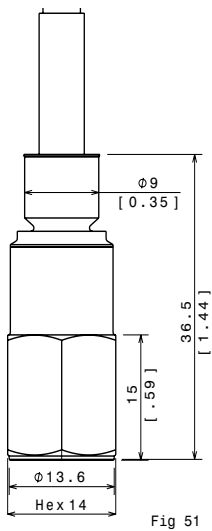


Fig 51

CC=01, 02 (PU, Teflon)	White (-) / Red (+)
CC=03 (Radox)	White N°1 (-) / White N°2 (+)
CC=12 (Teflon) (1)	White (-) / Red (+) / Black (Temp.)
CC=13 (Radox) (1)	White N°1 (-) / White N°2 (+) // White N°3 (Temp)
CC=31 (PU) (1)	Blue (-) / Black (+) / White (Temp.) / Brown (NC)

(1) T0 option (10mV/°C)
Fig 1d : Outline drawing & Electrical layout, B=5 (cable only)

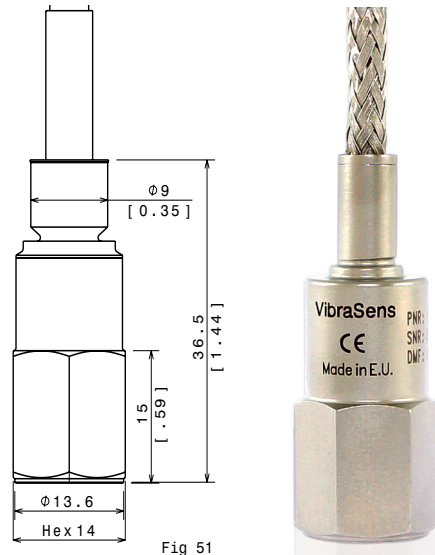


Fig 51

Fig 1e : Outline drawing B=7 (cable with overbraid)
electrical layout : See above B=5

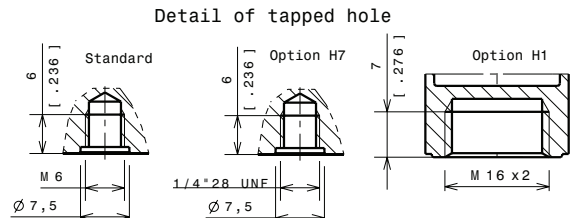


Fig 1h : Housing thread, option H1, H2, H7

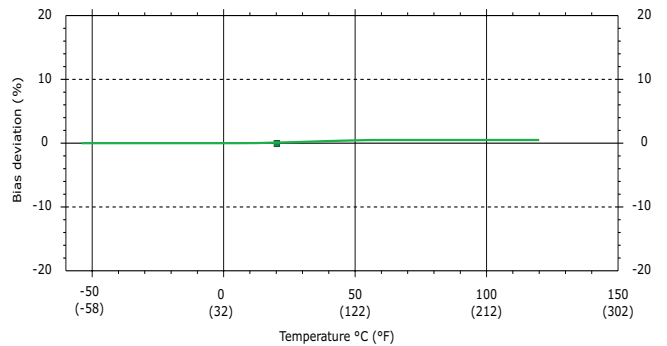


Fig 2 : DC (Bias) deviation versus temperature

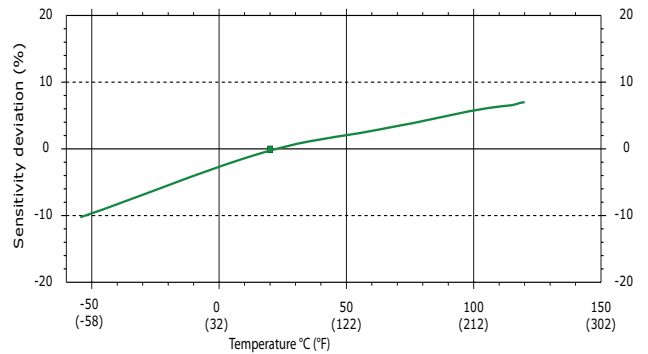


Fig 3 : Sensitivity deviation versus temperature

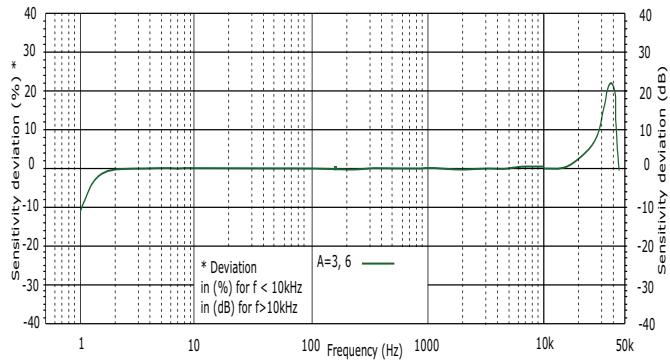


Fig 4a: Frequency response, amplitude