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
• lifetime 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. M12 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, ...

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
109.01-6D-7(02-Length)-H7 integral 200°C sstl 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 Inte gral 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
AA=5X ±3 dB : 0.5 to 20 000 Hz

Mounted Resonant frequency
AA=3X, 5X, 6X 40 kHz Nom

Dynamic range
AA=3X 800 g pk
AA=3X 160 g pk
AA=6X 80 g pk

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

Temperature response (fig 3)
(fig. 1) Suffix dependant
Linearity ±1% Max

Warm up time (Typical)
AA=3X, 6X < 1Sec

Option T0 (sensor should be powered to get temperature output)
Output (between - and Temp) Vout=10mV/°C * Temp.(°C)
Range 0VDC at 0°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 Q Nom
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
**Drawings**

![Outline drawing & Electrical layout, B=2 (M12 glass seal)](image1)

![Outline drawing & Electrical layout, B=5 (cable only)](image2)

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

**Fig 1d**: Outline drawing & Electrical layout, B=5 (cable only)

**Fig 1e**: Housing thread, option H1, H2, H7

**Fig 1f**: DC (Bias) deviation versus temperature

**Fig 1g**: Sensitivity deviation versus temperature

**Key**

1 - 2 - 3 - 4 - 14

**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°3 (-) / White N°2 (+) / White N°3 (Temp)

**CC=31 (PU) (1)**

- Blue (-) / Black (+) / White (Temp.) / Brown (NC)

(1) T0 option (10mV/*°C)

**Fig 1h**: Housing thread, option H1, H2, H7
Fig 4a: Frequency response, amplitude