®ICP PiezoVelocity sensor, Model 111, Top Connector

Main Characteristics

- 100 mV/ips (4 mV/mm/s)
- -55°C to 120 °C (-67°F to 248°F)
- ®ICP transmission mode
- Annular shear mode
- Dual case isolation with Faraday shield
- IP67 with associated cable (B=2, 3 only)

Model 111.01-A-2

Competitive advantage

- Annular shear mode is less susceptible to base strain.
- Ultra low noise electronic
- Miswiring and surge protections
- Low cost IP67 overmolded M12 cable assembly
- M12 overmolded cable assembly is available through local electronic distributor
- M12 offers compatibility with sensors used in automation.

Description

The hermetic sealed industrial piezoelectric accelerometer model 111 is designed to monitor the vibration in harsh industrial environment. It uses the industry standard ©ICP 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 base strain. Low noise electronic and a temperature compensated design will give you accurate result over the complete temperature range.

Approvals

Typical applications

Velocity is the preferred measurement for most rotating machines with rolling element bearings. Unfortunately it is sometimes impossible to get velocity (with digital or analog integration) from standard piezoelectric accelerometer : very high frequency noise can overload the accelerometer and saturate the output. Piezovelocity sensors use an internal integration circuit which inherently decrease high frequency signals allowing better measurement of low frequency signal. Paper machine dryers (when steam leaks), pumps (cavitation high frequency noise) are prone to such phenomenon.

Revision History

Ordering information

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

111.01- A - B (CC-DD) - Options - Accessories

A : Sensitivity (Suffix)

6 ……..…. 100 mV/ips (4mV/mm/s)
Available suffix : N, negative polarity

B : Connector / Integral cable

1 ……..……..…….. *MIL-C-5015, glass seal
2 ……..…….. *M12 glass seal
3 ……..……..…….. M12 epoxy sealed
5 ……..……..….. *Integral cable
7 ……..…….. *Integral cable with stainless steel overbraid protection
8 ……..…….. Integral cable with stainless steel protection conduit
Options 5, 7, 8 need additional information : (CC-DD)
Options 3, 5, 7, 8 are not stocked. Leadtime : 2 to 4 weeks.

CC : Cable type (only integral cable B=5, 7, 8)

01 ……..……..…….. *Polyurethane twisted pair cable (90°C)
02 ……..…….... *Teflon FEP twisted pair Cable (200°C)
03 ……..….... Radox twisted pair cable (120°C, halogen free)
12 ...……..….. Teflon FEP twisted triple Cable (200°C). For TO option
13 ……...…… Radox twisted triple (120°C, halogen free). For TO option
31 ……..... *Polyurethane 4 conductors cable (90°C). For TO option

DD : length in metre

Options :

Housing thread (Standard thread : M6x1)

H7 ……..……..... 1/4” 28 UNF-2A. (Not stocked)
option H7 is available for North American market.

Temperature output

T0 ……..…..…….....… 10 mV/°C. (+2° to +120°C)
Not available with Mil-C-5015 2 pins connector

Special Agency Approval

None

Accessories (Machine thread)

M6 ……..…. M6x1 mounting stud
M7 ……..……..……..... 1/4” 28 UNF 2A mounting stud
M8 ……..……..……..... M8x1.25 mounting stud
W9 ……..……..... Swivel adaptor

Special Engraving :

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

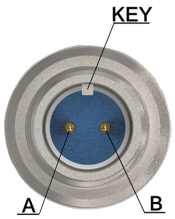
*** Most Popular Model :**

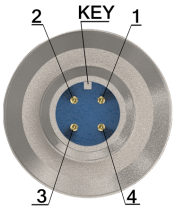
111.01-6-2 / 111.01-6-1

Ordering example :

111.01-6-1M6 Piezovelocity sensor, MIL 5015 glass seal top connector

Configurations





MIL-C-5015 (B = 1)

Pin 1 : not connected
Pin 2 : not connected or temperature output (T0 option)
Pin 3 : (-)
Pin 4 : (+)

M12 glass seal (B = 2)

Pin A : (+)
Pin B : (-)

Note: No temperature option available

Integral Cable B = 5 (CC-DD)

CC=01, 02 (PU, Teflon) : White (-); Red (+)

CC=03 (Radox) : White N°1 (-); White N°2 (+)

CC=12 (Teflon): White (-) ; Red (+)
Temperature output between Black and White

CC=13 (Radox) : White N°1 (-); WhiteN° 2 (+)
Temperature output between White N°3 and White N°1

CC=31 (PU) : Blue(-); Black(+); Brown (NC)
Temperature output between White(+) and Blue (-)

NC: Not connected; (1) with T0 option

Integral cable with overbraid B = 7 (CC-DD)

Same wiring color as B=5

Integral cable with protection conduit B = 8 (CC-DD)

Same wiring color as B=5

Specifications (24°C)

Dynamic

Sensitivity

A=6 ……..……..…… 100 mV/ips ± 6% (4mV/mm/s)

Frequency response (fig. 4a, 4b)

A=6 ……..…… ±10 % : 2.5 to 3500 Hz

……..…… ±3 dB : 1.9 to 7000 Hz

Mounted Resonant frequency

A=6 ……..……..…… 16 kHz Nom.

Dynamic range

A=6 ……..……..…… 50 in/sec pk (1250 mm/sec)

Transverse response sensitivity (20Hz, 5g) ……..……..…… <5%
Temperature response ……..…… see fig. 3
Polarity ……..……..…… (fig. 1) Suffix dependant
Linearity ……..……..…… ±1% Max
Warm up time (Typical) A=6 ……..……..…… < 1Sec

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 ……..…… 200 Ω Nom
DC output bias, 4mA supply ……..……..…… 10 VDC Nom (Fig; 2)

Residual noise (24°C) : A=6

2.5 Hz to 25 Hz ……..……..…… 100 µin/sec
10 Hz ……..……..…… 10 µin/sec
1000 Hz ……..……..…… 0.1 µin/sec

Power requirements

……..……..…… Constant current : +2 to +10mA DC
……..……..…… Voltage : +22 to +28 VDC

Protection

Overvoltage ……..……..…… Yes
Reverse polarity ……..……..…… Yes

Environmental

Temperature, operating continuous : (max. current =4mA)
……..……..…… -55 to 120 °C (-65 to 250 °F)
Humidity / Enclosure

B=1, 2 ……..…… Not affected, hermetically sealed, 1E-8torr.l/s
B=3 ……..……..…… IP67, epoxy sealed

Acceleration limit : Shock ……..……..…… 2500 g peak
Continuous vibration ……..……..…… 250 g peak
Base strain sensitivity ……..…… 0.004 g in/sec/µstrain
Mean time between failure (MTBF) ……..……..…… 10 Years Nom
ESD Protection ……..……..…… > 40V
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

Design — Ceramic, annular shear mode

Weight

A=6 ……..……...……...…...…. 95 gr Nom (3.4 Oz)

Connector

B=1 …..… MIL-C-5015 glass seal, Type MS3143 10SL-4P

B=2 ……..……..… M12 glass seal, IEC 60947-5-2

B=3 ……..……..… M12 epoxy seal, IEC 60947-5-2

Material ……..……...…..... AISI 316L, DIN 1.4401 (Stainless steel)

Sensor mounting thread ……..……...……..…..... Fig 1h

Mounting torque (M6, M7, M8 suffix) ……..……...… 2.4 N.m (21 in-lbs)

Accessories, supplied

Calibration supplied ……...…….…...… Sensitivity (5in/sec, 160 Hz)

……...……..…..……..... No frequency response

Accessories, not supplied

Cable assembly

MIL connector (B=1), Polyurethane cable .....…. 10.01-B01-A01-01-Length

MIL connector (B=1), FEP Teflon cable .....…. 10.01-B01-A01-02-Length

M12 connector (B=2, 3), Polyurethane cable ....…. 10.01-E01-A01-31-Length

PU or FEP armored cables are also available. See Model 10.01.

Mounting Stud

M6 ……..…...… 191.01-06-06-1

1/4” 28 UNF ……..… 191.01-06-16-1

M8 ……...……..... 191.01-06-08-1

Repair

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

Standard Wiring color

With Mil-C-5015 cable assembly: + = Red // - = White

With M12 cable harness: : + = Black // - = Blue // Temperature=White

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

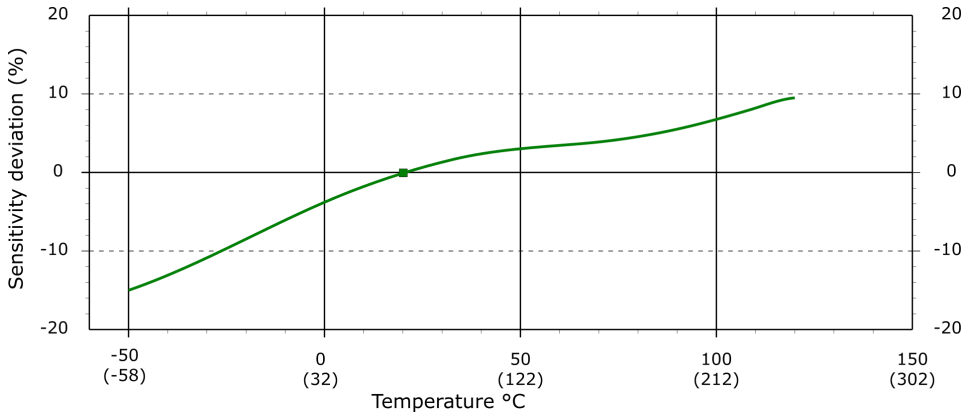


Fig. 2 : DC (Bias) deviation versus temperature

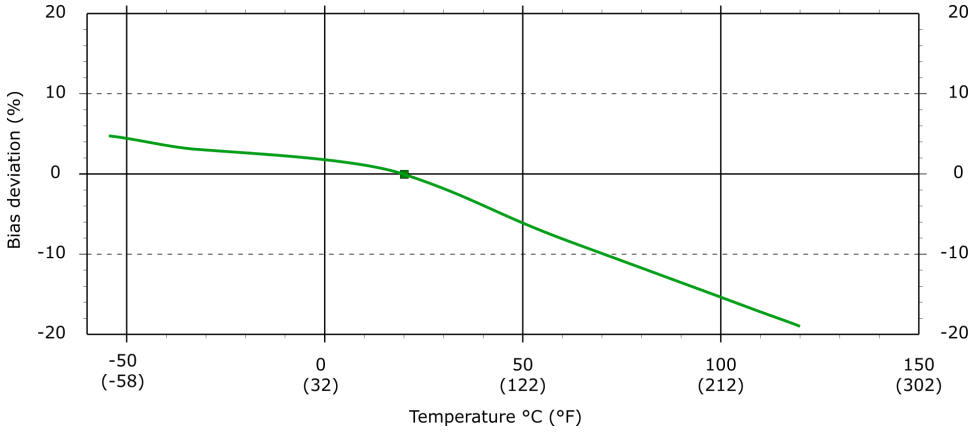


Fig 3 : Sensitivity deviation versus temperature

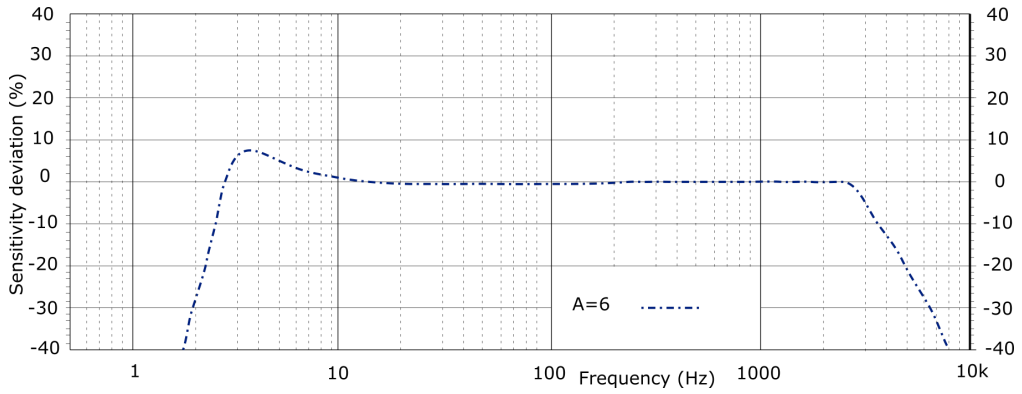


Fig 4a : Frequency response, amplitude

Legal Information