

# Piezotron™

Type 211B...

## Miniature, High Sensitivity, Voltage Output Pressure Sensors

The 211B series are general purpose pressure sensors that measure transient and repetitive dynamic events in a wide variety of applications.

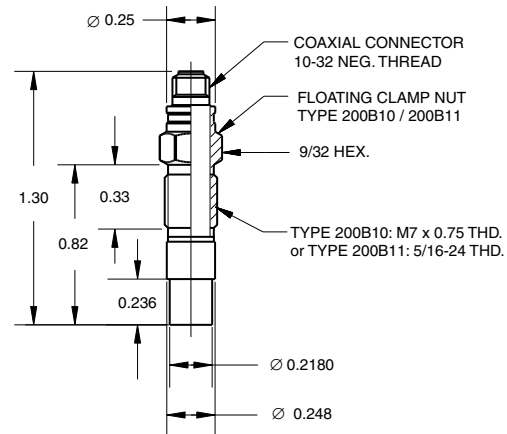
- Low impedance, voltage mode
- High level voltage signal
- Acceleration compensated
- High natural frequency
- Conforming to CE

### Application

The 211B pressure sensor series is ideally suited for fast transient measurements under varied environmental conditions. Typical applications include: line pressure pulsation and surge, cavitation, hydraulic and pneumatic systems, automotive tests, sound pressure, shock tubes, closed bomb and blast pressure measurements.

### Description

The 211B, general purpose, miniature pressure sensors incorporate acceleration-compensation, high natural frequency and integral, low impedance Piezotron circuit electronics. Cable noise is minimized, eliminating need for highly insulated cables. Contained within the housing, and located behind the diaphragm, is a pair of compression-preloaded quartz assemblies. Each assembly consists of quartz plates, interleaved with gold electrodes. The piezoelectric material of these plates generate a charge proportional to the force which causes stress. The force can be in the form of pressure on the diaphragm, vibrating the diaphragm mass. The acceleration sensitivity of each assembly is equal to the other but opposite polarity, thereby, canceling any acceleration effects



from the net charge generated by the assemblies. An internal microelectronic signal conditioning circuit converts the net charge into a useable high level voltage output signal at a low impedance level.

The signal and DC excitation power to the unit are conducted through a single coaxial cable, such as Series 1761 or 1762, or a standard, two-wire lead. This simple power signal circuitry makes it possible to easily check the circuit's integrity. Power and signal processing to the sensor can be provided by any one of the series 5100 couplers or by any industry standard voltage mode IEPE (Integral Electronic Piezo-Electric) power supply/coupler.

### Technical Data

Type	Units	211B1	211B2	211B3	211B4	211B5
Pressure Range	psi	10000	5000	500	200	100
Maximum Pressure without damage	psi	15000	10000	2500	1000	500
Sensitivity nom.	mV/psi	0.5	1	10	25	50
Threshold	psi <sub>rms</sub>	0.1	0.05	0.005	0.002	0.001
Amplitude Non-linearity zero based BFSL	± % FSO	1	1	1	1	1
Hysteresis	%	1	1	1	1	1
Time Constant nom.	s	700	340	100	15	20
Resonant Frequency nom.	kHz	500	500	300	500	300

continued...

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### Technical Data

Type	Units	211B1	211B2	211B3	211B4	211B5
Rise Time 10 ... 90%	µs	1	1	2	1	2
Low Frequency Response -5% point	Hz	0.0007	0.0014	0.005	0.033	0.025
High Frequency Response +5% point	kHz	100	100	50	100	50
Acceleration Sensitivity	psi/g	0.002	0.002	0.002	0.002	0.002
Shock Limit (1ms pulse)	g <sub>pk</sub>	20000	20000	20000	20000	5000
Vibration max.	g <sub>pk</sub>	1000	1000	1000	1000	500
Temperature Coefficient of Sensitivity	%/ °F	-0.03	-0.03	-0.03	-0.03	-0.03
Temperature Range Operating (4 mA supply current)	°F	-65 ... 250	-65 ... 250	-65 ... 250	-65 ... 250	-65 ... 250
Supply Current nom	mA	4	4	4	4	4
Power Supply:						
Constant Current	mA	2 ... 20	2 ... 20	2 ... 20	2 ... 20	2 ... 20
Voltage	VDC	20...30	20...30	20...30	20...30	20...30
Output:						
Bias nom.	VDC	11	11	11	11	11
Impedance max.	Ω	100	100	100	100	100
Current min.	mA	2	2	2	2	2
Voltage full scale, nom.	V	5	5	5	5	5
Construction:						
Sensing Element	type	quartz/ compression	quartz/ compression	quartz/ compression	quartz/ compression	quartz/ compression
Diaphragm	material	316L st stl.	316L st stl.	316L st stl.	316L st stl.	316L st stl.
Housing	material	17-4 st stl.	17-4 st stl.	17-4 st stl.	17-4 st stl.	17-4 st stl.
Connector, extension	material	303 st. stl.	303 st. stl.	303 st. stl.	303 st. stl.	303 st. stl.
Sealing housing/diaphragm	type	welded/ hermetic	welded/ hermetic	welded/ hermetic	welded/ hermetic	welded/ hermetic
Connector	type	epoxy	epoxy	epoxy	epoxy	epoxy
Connector	type	10-32 neg.	10-32 neg.	10-32 neg.	10-32 neg.	10-32 neg.
Weight with floating nut	grams	7	7	7	7	7
Mounting Torque	lbf-in	24 ... 48	24 ... 48	24 ... 48	24 ... 48	24 ... 48

1 g = 9.80665 m/s<sup>2</sup>, 1 inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.1129 Nm

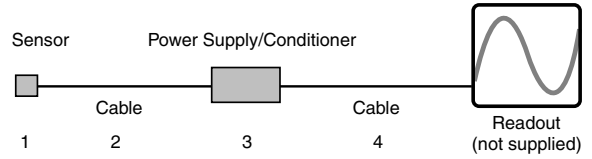
**Mounting**

Reliable and accurate pressure measurements require precise machining of the mounting hole. Data sheet 000-091a provides a wide variety of mounting adaptors which eliminates the need for precise machining and simplifies installation. The Operating Instruction Manual for the 211B provides detailed machining information for installing the sensor in a test structure not using a mounting adaptor.

**Related Products**

- 603B1 miniature, high frequency, charge output pressure sensor
- 601B1 miniature, high sensitivity, charge output pressure sensor

**Ordering Information**



sp = specify cable length in meters

x = 100, 200, 500, 5,000, 10,000 psi

- 1 - 211B(X) pressure sensor
- 2 - 1761B... general purpose cable, 10-32 pos. to BNC pos.,  
1762Bsp general purpose cable, 10-32 pos. to 10-32 pos.
- 3 - 5100 coupler series or  
5010B dual mode charge amplifier
- 4 - 1511 output cable, BNC pos. to BNC pos.

**Supplied Accessories**

- 200B10 floating nut, M7 x 0.75 thread
- 200B12 (2) brass seals, 0.062 thk.
- 200B15 (2) Teflon seals, 0.066 thk.

**Optional Accessories**

- 200B11 floating nut, 5/16-24 thread
- 200B13 brass seal, 0.094 thk.
- 200B14 stainless steel seal, 0.242 long

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