

High Sensitivity Dynamic Pressure Sensors

For High Intensity Acoustic, Turbulence, and Pulsation Measurements

- Measure high-intensity acoustic sound pressure levels such as jet engine, rocket motor, and weapons discharge noises
- Monitor low-level pressure pulsations, turbulence, and noise in hydraulic and pneumatic systems
- Detect pressure fluctuations in exhaust systems, compressors, turbines, pumps, and pipe lines
- Troubleshoot process systems to increase efficiencies, reduce maintenance, and trim waste



CE



Series 106 and 116

Piezoelectric quartz microphones offer durability, ultrasonic response, and high temperature operation

Piezoelectric pressure sensors are best suited for detecting and measuring dynamic pressure phenomena. With very rapid response times, these sensors can accurately measure fast transient pressures, such as surges, spikes, pulsations, and noise — both acoustic and ultrasonic. With no moving parts and solid state construction, their durability is unsurpassed by any other type of pressure sensor.

Since piezoelectric pressure sensors are AC coupled devices, they will ignore any ambient, static pressure, or very slow pressure change. This property provides these sensors with the unique ability to monitor low-level dynamic pressures while being subjected to a high static background pressure level.

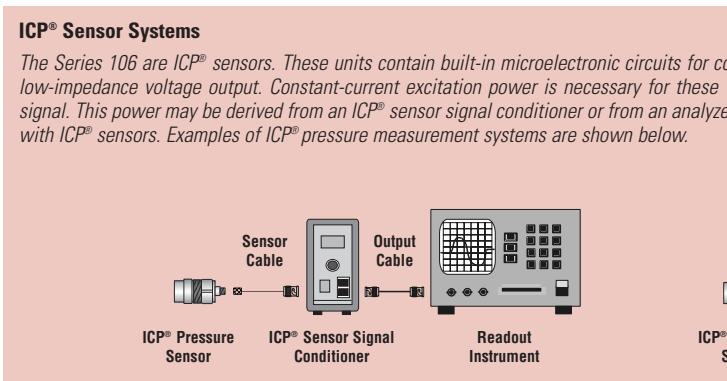
Series **106** and **116** pressure sensors generate high-level output signals capable of detecting small pressure fluctuations and high-intensity sound pressure levels. For this reason, these sensors can be categorized as microphones.

As with all equipment from PCB®, these sensors are complemented with toll free applications assistance, 24-hour customer service, and are backed by a no risk policy that guarantees satisfaction or your money refunded.



Model	ICP® Styles					
	106B		106B50		106B51	
	English	SI	English	SI	English	SI
Performance						
Measurement Range	8.3 psi [1]	57.2 kPa [1]	5 psi [1]	35 kPa [1]	5 psi [2]	35 kPa [1]
Sensitivity (± 15 %)	300 mV/psi	43.5 mV/kPa	500 mV/psi	72.5 mV/kPa	1000 mV/psi	145 mV/kPa
Maximum Pressure (step)	200 psi	1379 kPa	100 psi	690 kPa	100 psi	690 kPa
Maximum Pressure (static)	2000 psi	13,790 kPa	500 psi	3448 kPa	500 psi	3448 kPa
Resolution	0.1 mpsi	0.00069 kPa	0.07 mpsi	86 kPa	0.05 mpsi	0.0034 kPa
Resonant Frequency	≥ 60 kHz	≥ 60 kHz	≥ 40 kHz	≥ 40 kHz	≥ 40 kHz	≥ 40 kHz
Rise Time	≤ 9 μ sec	≤ 9 μ sec	≤ 12 μ sec	≤ 12 μ sec	≤ 12 μ sec	≤ 12 μ sec
Low Frequency Response (-5 %)	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Non-Linearity [3]	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS
Environmental						
Acceleration Sensitivity	≤ 0.002 psi/g	≤ 1.4 Pa/(m/s ²)	≤ 0.002 psi/g	≤ 1.4 Pa/(m/s ²)	≤ 0.002 psi/g	≤ 1.4 Pa/(m/s ²)
Temperature Range (operating)	-65 to +250 °F	-54 to 121 °C	-65 to +250 °F	-54 to 121 °C	-65 to +250 °F	-54 to 121 °C
Temperature Coefficient of Sensitivity	≤ 0.05 %/°F	≤ 0.09 %/°C	≤ 0.03 %/°F	≤ 0.054 %/°C	≤ 0.03 %/°F	≤ 0.054 %/°C
Maximum Flash Temperature	3000 °F	1649 °C	3000 °F	1649 °C	3000 °F	1649 °C
Maximum Vibration	1000 g pk	9810 m/s ² pk	500 g pk	4903 m/s ² pk	500 g pk	4903 m/s ² pk
Maximum Shock	2000 g pk	19,620 m/s ² pk	1000 g pk	9810 m/s ² pk	1000 g pk	9810 m/s ² pk
Electrical						
Output Polarity (positive pressure)	Positive	Positive	Positive	Positive	Positive	Positive
Discharge Time Constant (at room temp)	≥ 1 sec	≥ 1 sec	≥ 1 sec	≥ 1 sec	≥ 1 sec	≥ 1 sec
Excitation Voltage	12 to 30 VDC	12 to 30 VDC	11 to 30 VDC	11 to 30 VDC	11 to 30 VDC	11 to 30 VDC
Constant Current Excitation	2 to 20 mA	2 to 20 mA	2 to 20 mA	2 to 20 mA	2 to 20 mA	2 to 20 mA
Output Impedance	≤ 100 ohms	≤ 100 ohms	≤ 100 ohms	≤ 100 ohms	<100 ohms	<100 ohms
Output Bias Voltage	3 to 8 VDC	3 to 8 VDC	3 to 8 VDC	3 to 8 VDC	8 to 14 VDC	8 to 14 VDC
Capacitance	—	—	—	—	—	—
Insulation Resistance (at room temp)	—	—	—	—	—	—
Insulation Resistance (at max. oper. temp)	—	—	—	—	—	—
Physical						
Sensing Element	Quartz	Quartz	Quartz	Quartz	Quartz	Quartz
Housing Material	Stainless Steel	Stainless Steel	17-4 Stainless Steel	17-4 Stainless Steel	Stainless Steel	Stainless Steel
Diaphragm	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	Stainless Steel	Stainless Steel
Sealing	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic
Electrical Connector	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack
Weight	0.63 oz	18.0 gm	1.13 oz	32 gm	1.13 oz	32 gm
Supplied Accessories						
Clamp Nut	Model 060A12 (1) (9/16-18 thread)		Model 060A11 (1) (3/4-16 thread)		Model 060A11 (1) (3/4-16 thread)	
Seal Ring	Model 065A37 (3)		Model 065A36 (3)		Model 065A36 (3)	
Options (indicate using prefix letter shown)						
Emralon Coating	E		E		E	
Ground Isolated [4]	J		J		J	
Metric Mount	M (M14 × 1.25 mounting thread)		M (M20 × 1.50 mounting thread)		M (M20 × 1.50 mounting thread)	
Positive Output Polarity	—		—		—	
Attached, Water-Resistant Cable	W		W		W	

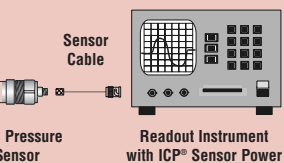
- Notes**
- All specifications are at room temperature unless otherwise specified.
- [1] for ± 2.5 V output
 - [2] for ± 5 V output
 - [3] Zero-based, least-squares, straight line method.
 - [4] Achieved with optional mounting adaptor.
 - [5] Resolution dependent on range setting and cable length used in charge system.





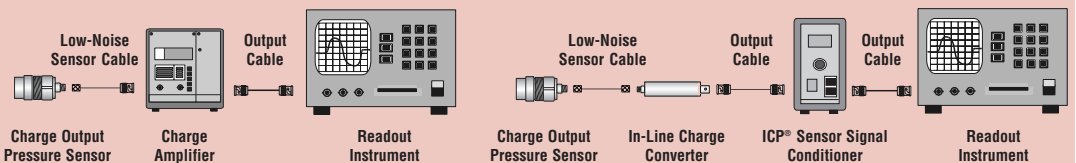
			Charge Output Styles					
106B52			116B		116B02		116B03	
SI	English	SI						
psi [2]	1 psi [2]	6.89 kPa [2]	100 psi	689.5 kPa	100 psi	689.5 kPa	100 psi	689.5 kPa
Pa	5000 mV/psi	725 mV/kPa	6 pC/psi	870 pC/kPa	6 pC/psi	870 pC/kPa	6 pC/psi	870 pC/kPa
Pa	10 psi	68.9 kPa	—	—	—	—	—	—
Pa	50 psi	345 kPa	3 kpsi	20,685 kPa	3 kpsi	20,685 kPa	3 kpsi	20,685 kPa
Pa	0.02 mpsi	.00013 kPa	0.3 mpsi [5]	.0021 kPa [5]	0.3 mpsi [5]	.0021 kPa [5]	0.3 mpsi [5]	.0021 kPa [5]
Hz	≥ 40 kHz	≥ 40 kHz	≥ 60 kHz	≥ 60 kHz	≥ 60 kHz	≥ 60 kHz	≥ 60 kHz	≥ 60 kHz
sec	≤ 12.5 μ sec	≤ 12.5 μ sec	<5 μ sec	<5 μ sec	≤ 5 μ sec	≤ 5 μ sec	≤ 5 μ sec	≤ 5 μ sec
Hz	2.5 Hz	2.5 Hz	—	—	—	—	—	—
FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS	≤ 1 % FS
g	≤ 0.002 psi/g	≤ 1.4 Pa/(m/s ²)	≤ .002 psi/g	≤ 1.4 Pa/(m/s ²)	≤ .002 psi/g	≤ 1.4 Pa/(m/s ²)	≤ .002 psi/g	≤ 1.4 Pa/(m/s ²)
°C	-65 to +250 °F	-54 to 121 °C	-400 to 650 °F	-240 to 345 °C	-400 to 600 °F	-240 to 315 °C	-400 to 750 °F	-240 to 399 °C
°C	≤ 0.03 %/°F	≤ 0.054 %/°C	≤ 0.04 %/°F	≤ 0.072 %/°C	≤ 0.04 %/°F	≤ 0.072 %/°C	≤ 0.04 %/°F	≤ 0.072 %/°C
°C	3000 °F	1649 °C	3000 °F	1649 °C	3000 °F	1649 °C	3000 °F	1649 °C
pk	500 g pk	4903 m/s ² pk	1000 g pk	9810 m/s ² pk	1000 g pk	9810 m/s ² pk	1000 g pk	9810 m/s ² pk
pk	1000 g pk	9810 m/s ² pk	2000 g pk	19,620 m/s ² pk	2000 g pk	19,620 m/s ² pk	2000 g pk	19,620 m/s ² pk
ve	Positive	Positive	Negative	Negative	Negative	Negative	Negative	Negative
sec	≥ 0.2 sec	≥ 0.2 sec	—	—	—	—	—	—
VDC	24 to 27 VDC	24 to 27 VDC	—	—	—	—	—	—
mA	2 to 20 mA	2 to 20 mA	—	—	—	—	—	—
ms	<100 ohms	<100 ohms	—	—	—	—	—	—
VDC	7 to 14 VDC	7 to 14 VDC	—	—	—	—	—	—
—	—	—	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF
—	—	—	>10 ¹¹ ohms	>10 ¹¹ ohms	>10 ¹¹ ohms	>10 ¹¹ ohms	>10 ¹¹ ohms	>10 ¹¹ ohms
—	—	—	>10 ⁹ ohms	>10 ⁹ ohms	>10 ⁹ ohms	>10 ⁹ ohms	>10 ⁹ ohms	>10 ⁹ ohms
Quartz	Quartz	Quartz	Quartz	Quartz	Quartz	Quartz	Quartz	Quartz
Stainless Steel	Stainless Steel	Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel
Stainless Steel	Stainless Steel	Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel
Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic
10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack
1.2 oz	35 gm	0.717 oz	20.3 gm	0.717 oz	20.3 gm	0.717 oz	20.3 gm	
Model 060A11 (1) (3/4-16 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	Model 060A12 (1) (9/16-18 thread)	
Model 065A36 (3)	Model 065A37 (3)	Model 065A37 (3)	Model 065A37 (3)	Model 065A37 (3)	Model 065A37 (3)	Model 065A37 (3)	Model 065A37 (3)	
E	—	—	—	—	—	—	—	
J	—	—	—	—	—	—	—	
M (M20 × 1.50 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	M (M14 × 1.25 mounting thread)	
—	P	P	P	P	P	P	P	
W	—	—	—	—	—	—	—	

conditioning their measurement signals into a readout instrument to generate their output measurement or that has the capability of operating directly



Charge Output Sensor Systems

The Series 116B are charge output piezoelectric sensors. These units do not contain any built-in circuitry. This enables them to operate to higher temperature extremes. Charge output sensor signals must be externally conditioned by a laboratory style, or in-line, charge amplifier before they can be analyzed or recorded. Examples of charge output pressure measurement systems are shown below.





Low-Noise ICP® Sensor Signal Conditioners — Models 482A21 (single channel) and 482A22 (four channel)

Provides ICP® sensor excitation and conditions the measurement signal for delivery to readout, recording, or analysis instruments.

- Available in single or four channel versions
- Powered by remote, AC power adaptor
- Optional, remote battery pack for DC power
- Powers ICP® sensors and in-line charge converters



Rack Mountable, Multi-Channel Signal Conditioners — Series 481

Condition measurement signals from ICP® or charge output sensors for delivery to readout, recording, or analysis instruments.

- Available in eight or sixteen channel versions
- Building-block architecture permits custom configuration from many available features
- Options include gain, filtering, bank switching, computer control, and more
- Powers ICP® sensors
- Optional built-in charge converters permit direct compatibility with charge output sensors



In-Line Charge Converters — Series 422

Adapt charge output sensors to voltage readout, recording, or analysis instruments

- Convert high impedance charge sensor output signals into low-impedance voltage signals
- Provides fixed charge conversion regardless of cable length or input capacitance
- Permits long distance signal transmission over ordinary coaxial cable
- Versions available for high temperature sensors that may have lower insulation resistance

Model	Conversion	LF Response	Min. Source Resistance
422E11	100 mV/pc	5 Hz (-5 %)	
422E12	10 mV/pc	5 Hz (-5 %)	
422E13	1 mV/pc	5 Hz (-5 %)	
422E35*	1 mV/pc	5 Hz (-10 %)	10k ohm
422E36*	10 mV/pc	1 Hz (-10 %)	10k ohm

*specifically designed for use with sensors that operate at extreme, elevated temperatures, > 400 °F (204 °C)



Dual Mode Amplifier - Model 443B02

Operates as a charge amplifier or ICP® sensor signal conditioner

- Ultra low noise floor
- Long, discharge time constant for quasi-static measurement capability
- Automated drift nulling
- Selectable high-pass and low-pass filtering
- Menu driven display with RS-232 computer control



Low-Noise Cables for Charge Output Sensors

Transmit high-impedance, charge sensor signals to charge converters or charge amplifiers

- Teflon (500 °F, 260 °C) or Inconel (1500 °F, 816 °C) jacket
- Low triboelectric noise characteristic
- Hardline versions available as sperate assemblies or welded directly to sensor



3425 Walden Avenue, Depew, NY 14043-2495 USA

Pressure Division toll free 888-684-0011

24-hour SensorLineSM 716-684-000

Fax 716-686-9129 E-mail pressure@pcb.com

Web site www.pcb.com

ISO 9001 CERTIFIED

A2LA ACCREDITED to ISO 17025

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The Pressure Division of PCB® Piezotronics, Inc. specializes in the development, application, and support of piezoelectric and piezoresistive pressure sensors, transducers, and transmitters for dynamic and static pressure test, measurement, monitoring, and control requirements. This product focus, coupled with the strengths and resources of PCB, permits the Pressure Division to offer exceptional customer service, 24-hour technical assistance, and a **Total Customer Satisfaction** guarantee.

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