



# Dynamic Pressure Sensors for High Frequency Measurements

Extremely fast, micro-second response with wide amplitude & frequency range

## Highlights

- Ultra-high frequency > 500 kHz
- Fast rise time < 1 µsec
- Peak pressure and total impulse

## Applications

- Shock tubes and closed bombs
- Time-of-arrival measurements
- Explosion, blast, and shock wave



Series 113B and 102B high frequency dynamic pressure sensors are structured with naturally piezoelectric, stable quartz sensing elements that are well-suited to measure rapidly-changing pressure over wide amplitude and frequency ranges. They feature micro-second response times and high resonant frequency. Solid-state construction, acceleration compensation, hermetically-sealed housings, and laser-welded flush diaphragms provide undistorted high frequency response and durability in adverse environmental conditions. ICP® technology provides a high signal-to-noise ratio and high-level voltage output, capable of driving long cables to a safe zone for data acquisition. Charge output sensors are also available for applications requiring continuous high operating temperatures. Piezoelectric sensors are more stable, robust, and use less costly signal conditioning than comparable piezoresistive types for dynamic pressure measurements.

Typical applications include pulsations, hydraulic and pneumatic pressure fluctuations (e.g. compressors), fluid-borne noise detection, cavitation, high intensity acoustics, closed bomb combustion studies, explosive component performance (e.g detonators, explosive bolts) and airbag testing. A popular application includes measurement of free field, enclosed, and directed (shock tube) air blast resulting from explosions or muzzle blast. Air blast over pressure and reflected pressure measurements can be measured to determine peak pressure, and total impulse of the structural loading imparted on any unit under test (e.g., building, ground transport vehicle, surface or underwater vehicle).

Series 113B and 102B pressure sensors are available with ranges to 15 kpsi (103 MPa) and sensitivities to 100 mV/psi (14.5 mV/kPa). Each sensor is supplied with NIST-traceable, A2LA accredited dynamic calibration to ISO17025. They are 100% in-process tested for resonant frequency, rise time, and acceleration compensation before shipment to the customer.

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



**Model 113B / 102B**  
High Frequency Pressure Sensors



**Series CA102B**  
Ablative coating option 'CA'  
available for flash protection



## Dynamic Pressure Sensors for High Frequency

CE




Model Number	113B28	113B27	113B21	113B26	113B25
Measurement Range (+/- 5 Volt Output)	50 psi 345 kPa	100 psi 690 kPa	200 psi 1380kPa	500 psi 3450 kPa	1000 psi 6895 kPa
Useful Overrange (+/- 10 Volt Output)	100 psi [1] 690 kPa [1]	200 psi [1] 1380 kPa [1]	400 psi [1] 2758 kPa [1]	1 kpsi [1] 6895 kPa [1]	2 kpsi [1] 13,790 kPa [1]
Sensitivity	100 mV/psi 14.5 mV/kPa	50 mV/psi 7.25 mV/kPa	25 mV/psi 3.6 mV/kPa	10 mV/psi 1.45 mV/kPa	5 mV/psi 0.725 mV/kPa
Maximum Pressure	1 kpsi 6895 kPa	1 kpsi 6895 kPa	1 kpsi 6895 kPa	10 kpsi 68,950 kPa	20 kpsi 137,900 kPa
Resolution	0.5 mpsi 0.0034 kPa	1 mpsi 0.007 kPa	1 mpsi 0.007 kPa	2 mpsi 0.014 kPa	20 mpsi 0.1379 kPa
Resonant Frequency	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz
Rise Time (Reflected)	≤ 1 µsec	≤ 1 µsec	≤ 1 µsec	≤ 1 µsec	≤ 1 µsec
Low Frequency Response (-5 %)	0.5 Hz	0.5 Hz	0.5 Hz	0.01 Hz	0.001 Hz
Non-linearity	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]
Acceleration Sensitivity	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )
Temperature Range	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C
Discharge Time Constant (at room temp)	≥ 1 sec	≥ 1 sec	≥ 1 sec	≥ 50 sec	≥ 100 sec
Electrical Connector	10-32 jack	10-32 jack	10-32 jack	10-32 jack	10-32 jack
Housing Material	17-4 Stainless	17-4 Stainless	17-4 Stainless	17-4 Stainless	17-4 Stainless
Diaphragm Material	Invar	Invar	Invar	Invar	Invar
Sealing	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic
<b>Additional Versions</b>					
All Invar Material	113B38	113B37	113B31	113B36	113B35
Stainless Steel Diaphragm	S113B28	S113B27	S113B21	S113B26	S113B25

## Ground Isolated, Dynamic Pressure Sensors for High Frequency



Model Number	102B18	102B16	102B15	102B06
Measurement Range (+/- 5 Volt Output)	50 psi 345 kPa	100 psi 690 kPa	200 psi 1380 kPa	500 psi 3450 kPa
Useful Overrange (+/- 10 Volt Output)	100 psi [1] 690 kPa [1]	200 psi [1] 1380 kPa [1]	400 psi [1] 2758 kPa [1]	1 kpsi [1] 6895 kPa [1]
Sensitivity	100 mV/psi 14.5 mV/kPa	50 mV/psi 7.25 mV/kPa	25 mV/psi 3.6 mV/kPa	10 mV/psi 1.45 mV/kPa
Maximum Pressure	1 kpsi 6895 kPa	1 kpsi 6895 kPa	1 kpsi 6895 kPa	10 kpsi 68,950 kPa
Resolution	0.5 mpsi 0.0034 kPa	1 mpsi 0.007 kPa	1 mpsi 0.007 kPa	2 mpsi 0.014 kPa
Resonant Frequency	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz
Rise Time (Reflected)	≤ 1 µsec	≤ 1 µsec	≤ 1 µsec	≤ 1 µsec
Low Frequency Response (-5 %)	0.5 Hz	0.5 Hz	0.5 Hz	0.01 Hz
Non-linearity	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]
Acceleration Sensitivity	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )
Temperature Range	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C
Discharge Time Constant (at room temp)	≥ 1 sec	≥ 1 sec	≥ 1 sec	≥ 50 sec
Electrical Connector	10-32 jack	10-32 jack	10-32 jack	10-32 jack
Housing Material	17-4 Stainless	17-4 Stainless	17-4 Stainless	17-4 Stainless
Diaphragm Material	Invar	Invar	Invar	Invar
Sealing	Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic
<b>Additional Versions</b>				
Metric Mounting Thread	M102B18	M102B16	M102B15	M102B06

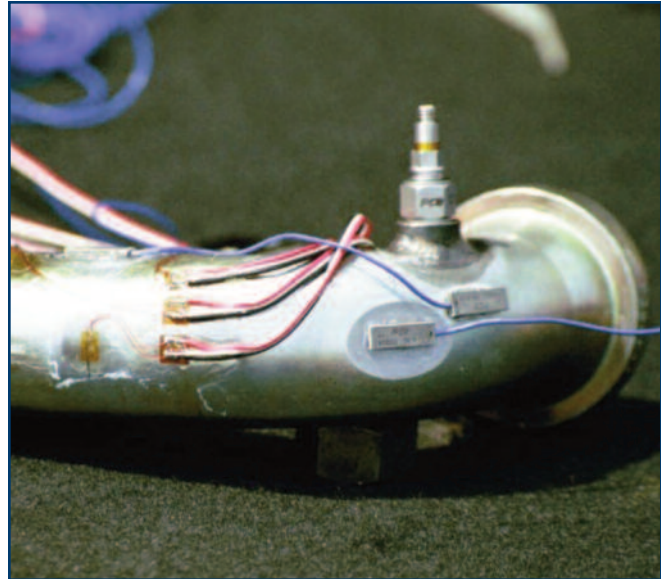
			
102B24	113B22	113B23	113B03
15 kpsi 1034 kPa	5 kpsi 34,475 kPa	10 kpsi 68,950 kPa	15 kpsi 103,420 kPa
15 kpsi [1] 1034 kPa [1]	10 kpsi [1] 68,950 kPa [1]	—	—
1 mV/psi 0.145 mV/kPa	1 mV/psi 0.145 mV/psi	0.5 mV/psi 0.073 mV/kPa	0.44 pC/psi 0.064 pC/kPa
15 kpsi 1034 kPa	15 kpsi 103,420 kPa	15 kpsi 103,420 kPa	15 kpsi 103,420 kPa
20 mpsi 1.38 kPa	20 mpsi 1.38 kPa	40 mpsi 2.76 kPa	10 mpsi [3] 0.68 kPa [3]
≥ 500k Hz	≥ 500k Hz	≥ 500k Hz	≥ 500k Hz
≤ 1 μsec	≤ 1 μsec	≤ 1 μsec	≤ 1 μsec
0.005 Hz	0.001 Hz	0.0005 Hz	—
≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]
≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )
-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-400 to +400 °F -240 to +204 °C
≥ 500 sec	≥ 500 sec	≥ 1000 sec	—
10-32 jack	10-32 jack	10-32 jack	10-32 jack
17-4 Stainless	17-4 Stainless	17-4 Stainless	17-4 Stainless
Invar	Invar	Invar	Invar
Welded Hermetic	Welded Hermetic	Welded Hermetic	Welded Hermetic
113B34	113B32	113B33	—
113B24	S113B22	S113B23	—



Series 113B are ideal for measuring blast “over-pressure.”

Series 113B Dynamic Pressure Sensors for High Frequency
Supplied Accessories
Seal Rings: (3) 065A02 brass, 0.015 in. thick, (1) 065A05 stainless steel, 0.240 in. thick.
Clamp Nuts: (1) 060A03 English 5/16-24 thread, (1) 060A05 metric M7 thread
Notes
[1] For +10 volt output, minimum 24 VDC supply voltage required. Negative 10 volt output may be limited by output bias.
[2] Zero-based, least-squares, straight line method.
[3] Resolution dependent on signal conditioning and cable length used in charge system.

102B04	102B	102B03
1 kpsi 6895 kPa	5 kpsi 34,475 kPa	10 kpsi 68,950 kPa
2 kpsi [1] 13,790 kPa [1]	10 kpsi [1] 68,950 kPa [1]	—
5 mV/psi 0.725 mV/kPa	1 mV/psi 0.145 mV/psi	0.5 mV/psi 0.073 mV/kPa
10 kpsi 68,950 kPa	15 kpsi 103,420 kPa	15 kpsi 103,420 kPa
20 mpsi 1.38 kPa	20 mpsi 1.38 kPa	40 mpsi 2.76 kPa
≥ 500k Hz	≥ 500k Hz	≥ 500k Hz
≤ 1 μsec	≤ 1 μsec	≤ 1 μsec
0.005 Hz	0.001 Hz	0.0005 Hz
≤ 1 % [2]	≤ 1 % [2]	≤ 1 % [2]
≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )	≤ 0.002 psi/g ≤ 0.0014 kPa/(m/s <sup>2</sup> )
-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C	-100 to +275 °F -73 to +135 °C
≥ 100 sec	≥ 500 sec	≥ 1000 sec
10-32 jack	10-32 jack	10-32 jack
17-4 Stainless	17-4 Stainless	17-4 Stainless
Invar	Invar	Invar
Welded Hermetic	Welded Hermetic	Welded Hermetic
M102B04	M102B	M102B03



Series 102B installed on pipe to measure high intensity acoustics. (also shown is Model 740B02 ICP® strain sensor)

Series 102B Ground Isolated, Dynamic Pressure Sensors for High Frequency
Supplied Accessories
Seal Rings: (3) 065A03 brass 0.030 in. thick.
Notes
[1] For +10 volt output, minimum 24 VDC supply voltage required. Negative 10 volt output may be limited by output bias.
[2] Zero-based, least-squares, straight line method.



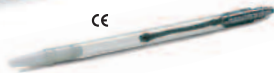
## Additional Sensors for High Frequency Pressure Measurements



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### Series 137

- ICP® free-field blast pencil probes
- Ranges from 50 to 5000 psi (344 to 34,475 kPa)
- Rise time <4 µsec
- Resonant frequency >500k Hz



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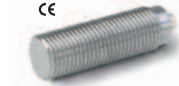
### Series 138

- ICP® underwater blast explosion pressure probes
- Ranges from 1000 to 50k psi (6894 to 344,740 kPa)
- Rise time <1.5 µsec
- Resonant frequency >1M Hz



### Series 132

- Shock wave time-of-arrival ICP® microsensors
- 50 psi (344 kPa) range
- Rise time <3 µsec
- Resonant frequency >1M Hz
- 0.124" (3.15 mm) diameter diaphragm



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### Series 134

- Designed for reflected shock wave pressure measurement
- Unique non-resonating design, Tourmaline sensing element
- Pressure ranges from 1000 to 20k psi (6894 to 137,900 kPa)
- Rise time ≤ 0.2 µsec

## Mounting Adaptors



**061A01** (3/8-24)  
**061A10** (M10)  
**062A01** (1/8-NPT)



**061A59** (3/8-24 Delrin, Ground Isolated)



**064B02** Water Cooled, Flush Mount

## Recommended Signal Conditioners for High Frequency Pressure Sensors



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### Model 482A21

- Single & 4-channel versions
- Unity gain, low-noise, AC and DC powerable
- 1M Hz response



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**TEDS**  
RESISTANCE  
COMPATIBLE

### Series 482C & 483C

- AC-powered
- 4- & 8-channel versions
- Variety of gain & filtering configurations
- Can operate with charge output sensors
- 1M Hz response (482C05 and 483C05 models only)



CE

**TEDS**  
RESISTANCE  
COMPATIBLE

### Series 481A

- AC-powered
- 16-channel
- Many configuration options
- Can operate with charge output sensors
- Daisy-link multiple racks for up to 256 channels
- 1M Hz response (481A20 model only)



3425 Walden Avenue, Depew, NY 14043-2495 USA

Toll-Free in USA 800-828-8840

24-hour SensorLine<sup>SM</sup> 716-684-0001

Fax 716-684-0987 E-mail [info@pcb.com](mailto:info@pcb.com)

[www.pcb.com](http://www.pcb.com)

AS9100 CERTIFIED ■ ISO 9001 CERTIFIED ■ A2LA ACCREDITED to ISO 17025

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