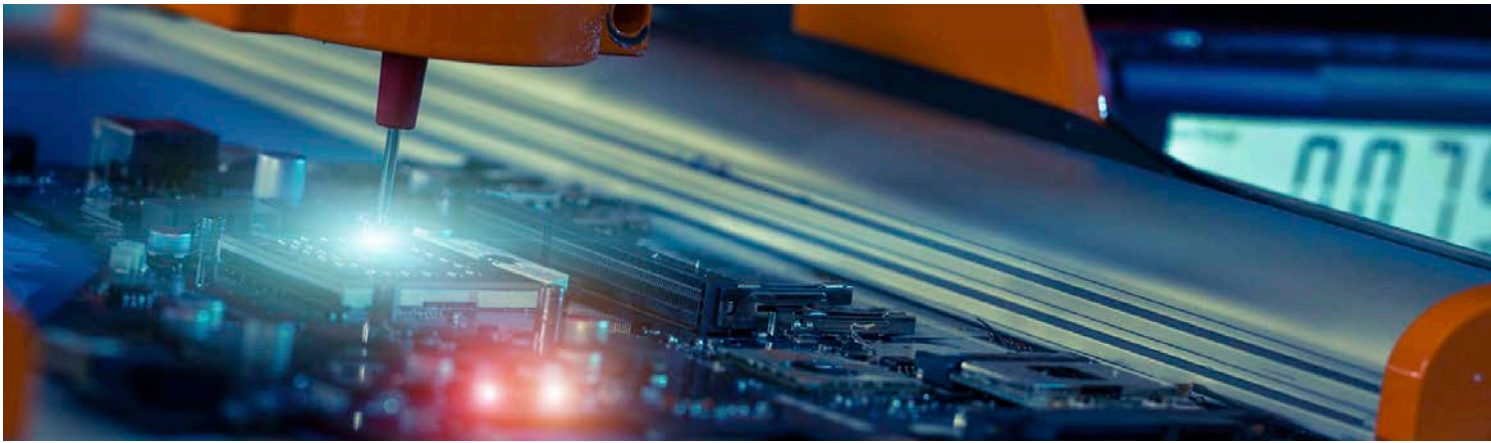


# SENSORS FOR SEMICONDUCTOR MANUFACTURING

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## SENSORS FOR SEMICONDUCTOR MANUFACTURING

The semiconductor industry is constantly evolving to meet high demand for smaller, more powerful, and more energy efficient chips. To fulfill this requirement manufacturers have implemented a range of strategies, from investing in new materials and equipment to improving manufacturing procedures and techniques.

PCB Piezotronics supports manufacturers of lithography systems and semiconductors by providing accurate sensors for monitoring key processes, ensuring that manufacturing is consistent and high-quality throughout the entire production line. We understand that precision is paramount, and we're committed to delivering accurate measurements that make a real difference in product yield, quality, and reliability.

Our sensors are used in a variety of applications for lithography and semiconductor manufacturing, from wafer processing to packaging and assembly to final inspection, and more.

### SENSORS TO MEASURE VIBRATION:

- Uniaxial and triaxial piezoelectric accelerometers
- Uniaxial and triaxial MEMS VC accelerometers

### SENSORS TO MEASURE FORCE:

- Strain sensors
- Charge output force rings
- ICP® quartz force rings

### COMMON APPLICATIONS:

- Lithography
- Wafer handling
- Cutting and dicing
- Etching
- Bonding
- Quality control



## HIGH SENSITIVITY PIEZOELECTRIC ACCELEROMETERS

Measure the smallest vibrations without false trips and alarms where precision matters most. Detect distortion with nanometer-level deflection measurements to ensure quality throughout assembly and optimize end-user experience. Featuring our most user-friendly piezoelectric sensor technology, PCB's high sensitivity accelerometers are ideal for the extremely low frequencies associated with lithography equipment, while being rugged enough to perform in harsh industrial environments.



### SEISMIC ICP® ACCELEROMETER

PCB MODEL 393A03

Measurement range:  $\pm 5$  g pk ( $\pm 49$  m/s<sup>2</sup> pk)  
 Sensitivity ( $\pm 5\%$ ): 1000 mV/g (102 mV/(m/s<sup>2</sup>))  
 Frequency range ( $\pm 5\%$ ): 0.5 to 2000 Hz  
 Hermetic stainless steel housing



### SEISMIC ICP® ACCELEROMETER

PCB MODELS 393B04, 393B05

Measurement ranges:  $\pm 5$  g pk ( $\pm 49$  m/s<sup>2</sup> pk),  
 $\pm 0.5$  g pk ( $\pm 4.9$  m/s<sup>2</sup> pk)  
 Sensitivities ( $\pm 10\%$ ): 1000 mV/g (102 mV/(m/s<sup>2</sup>)),  
 10.0 V/g (1.02 V/(m/s<sup>2</sup>))  
 Frequency range ( $\pm 5\%$ ): 0.06 to 450 Hz, 0.7 to 450 Hz  
 Hermetic titanium housing



### SEISMIC ICP® ACCELEROMETER

PCB MODEL 393B12

Measurement range: 0.5 g pk (4.9 m/s<sup>2</sup> pk)  
 Sensitivity ( $\pm 10\%$ ): 10.0 V/g (1.02 V/(m/s<sup>2</sup>))  
 Frequency range ( $\pm 5\%$ ): 0.15 to 1000 Hz  
 Hermetic stainless steel housing



### SEISMIC ICP® ACCELEROMETER

PCB MODEL 393B31

Measurement range: 0.5 g pk (4.9 m/s<sup>2</sup> pk)  
 Sensitivity ( $\pm 5\%$ ): 10.0 V/g (1.02 V/(m/s<sup>2</sup>))  
 Frequency range ( $\pm 5\%$ ): 0.1 to 200 Hz  
 Hermetic stainless steel housing



### TRIAXIAL CERAMIC SHEAR ICP® ACCELEROMETER

PCB MODEL 356B18

Measurement range:  $\pm 5$  g pk ( $\pm 49$  m/s<sup>2</sup> pk)  
Sensitivity ( $\pm 10\%$ ): 1000 mV/g (102 mV/(m/s<sup>2</sup>))  
1/4-28 4-pin connector



### SEISMIC ICP® ACCELEROMETERS

PCB SERIES 393B

Measurement range:  $\pm 5$  g pK ( $\pm 49$  m/s<sup>2</sup> pk)  
Sensitivities from 1000 mV/g (102 mV/(m/s<sup>2</sup>)) to 10000 mV/g  
Frequency ranges from 0.6-450 Hz to 0.1-200 Hz  
TEDS capable models available



### LOW OUTGASSING TRIAXIAL ICP® ACCELEROMETER

PCB MODEL 356M98

Measurement range:  $\pm 5$  g pk ( $\pm 49$  m/s<sup>2</sup> pk)  
Sensitivity ( $\pm 10\%$ ): 1000 mV/g (102 mV/(m/s<sup>2</sup>))  
1/4-28 4-pin connector  
Titanium housing



### TRIAXIAL ICP® ACCELEROMETER

PCB MODEL 356A15

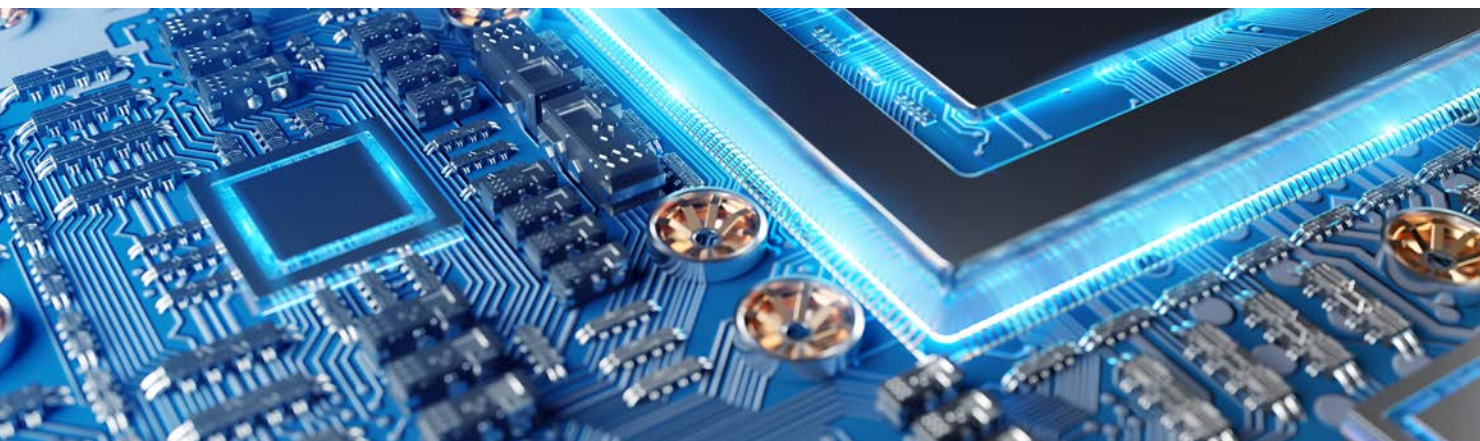
Measurement range:  $\pm 50$  g pk  
Sensitivity ( $\pm 10\%$ ): 100 mV/g (10.2 mV/(m/s<sup>2</sup>))  
Frequency range ( $\pm 5\%$ ): 2 to 5000 Hz  
Hermetic titanium housing



### ISOTRON® ACCELEROMETER

ENDEVCO SERIES 7251A

Measurement ranges from  $\pm 500$  g (4900 m/s<sup>2</sup>)  
to  $\pm 10$  g (98 m/s<sup>2</sup>)  
Sensitivities from ( $\pm 10\%$ ): 10 mV/g (1.02 mV/(m/s<sup>2</sup>))  
to 500 mV/g (51.0 mV/(m/s<sup>2</sup>))  
Hermetically sealed  
Ground isolated for low base strain sensitivity



## HIGH SENSITIVITY VARIABLE CAPACITANCE MEMS ACCELEROMETERS

PCB and Endevco VC MEMS accelerometers can measure to 0 Hz and come in a variety of different packages and configurations to suit your testing needs.



### DIFFERENTIAL VC MEMS ACCELEROMETERS

PCB SERIES 3741

Six measurement ranges from  $\pm 2$  to  $\pm 200$  g

Sensitivities: 1350 to 13.5 mV/g

Frequency ranges: ( $\pm 5\%$ ) 0 to 250, 0 to 1000, or 0 to 1500 Hz

Lightweight, hard-anodized aluminum housing with integral cable



### TRIAXIAL VC MEMS ACCELEROMETERS

PCB SERIES 3711

Six measurement ranges from  $\pm 2$  to  $\pm 200$  g

Sensitivities: 675 to 6.75 mV/g

Frequency ranges ( $\pm 5\%$ ): 0 to 250, 0 to 1000, or 0 to 1500 Hz

Hermetic titanium housing



### SINGLE AXIS VARIABLE CAPACITANCE ACCELEROMETERS

ENDEVCO SERIES 7290G

Seven measurement ranges from  $\pm 2$  to  $\pm 200$  g

Sensitivities: 1000 mV/g to 10 mV/g

Frequency ranges ( $\pm 5\%$ ): 0 to 15, 0 to 30, 0 to 500, 0 to 1000, or 0 to 2000 Hz

Available in single ended and differential operating modes

Lightweight, hard-anodized aluminum housing with integral cable



### SINGLE-AXIS VC MEMS ACCELEROMETERS

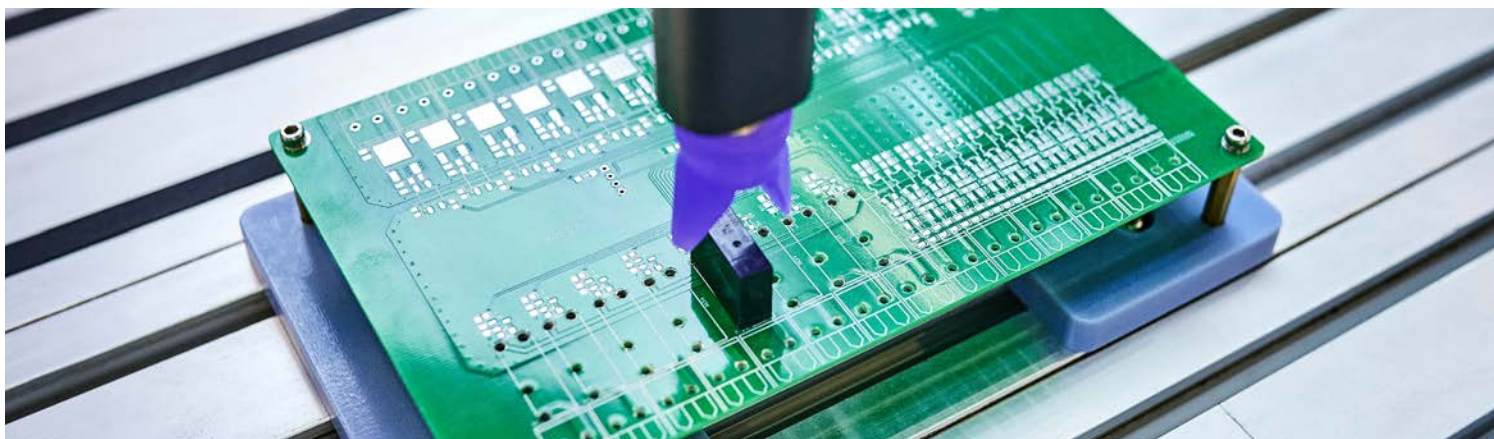
PCB SERIES 3711

Six measurement ranges from  $\pm 2$  to  $\pm 200$  g

Sensitivities: 675 to 6.75 mV/g

Frequency ranges ( $\pm 5\%$ ): 0 to 250, 0 to 1000, or 0 to 1500 Hz

Hermetic titanium housing



## HIGH-PRECISION FORCE SENSORS

Featuring sensitivities as high as 500 mV/lb, ICP® force sensors protect delicate semiconductor components with active force control and monitoring in grinding, cutting, and dicing processes. Their solid state, hermetic construction and low impedance output make them well-suited for continuous, unattended force monitoring in manufacturing environments that require full hermeticity and zero outgassing.



### CHARGE OUTPUT FORCE RINGS

PCB MODELS 211B-217B

Measurement ranges from 5000 lb (22.24 kN) to 100000 lb (444.80 kN)

Sensitivities of 18 pC/lb (4047 pC/kN) or 17 pC/kg (3822 pC/kN)

Temperatures up to 400 °F (204 °C)



### INDUSTRIAL QUARTZ ICP® STRAIN SENSOR

PCB MODEL RHM240A01

Measurement range: 50 pk  $\mu\epsilon$

Sensitivity: ( $\pm 20\%$ ) 100 mV/ $\mu\epsilon$

Broadband resolution: 0.0001  $\mu\epsilon$

RoHS compliant



### ICP® QUARTZ FORCE SENSORS

PCB SERIES 208C

Measurement ranges (compression) from 10 lb (0.0445 kN) to 5000 lb (22.24 kN)

Sensitivities from ( $\pm 15\%$ ): 1 mV/lb (224.82 mV/kN) to 500 mV/lb (112410 mV/kN)

Hermetically sealed

High resolution with low noise floor



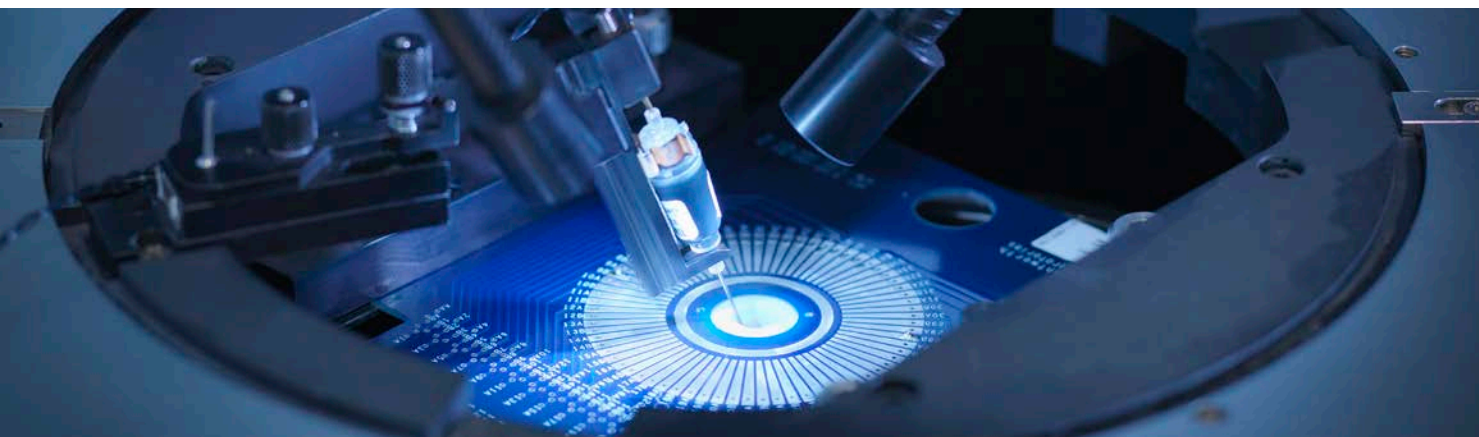
### ICP® QUARTZ FORCE RING

PCB MODEL 201B76

Measurement range (compression): 5000 lb (22.24 kN)

Sensitivity ( $\pm 15\%$ ): 1 mV/lb (224.8 mV/kN)

Low Frequency Response: ( $-5\%$ ) 0.0003 Hz



## ICP® QUARTZ FORCE RINGS



PCB MODELS 201B01-B05



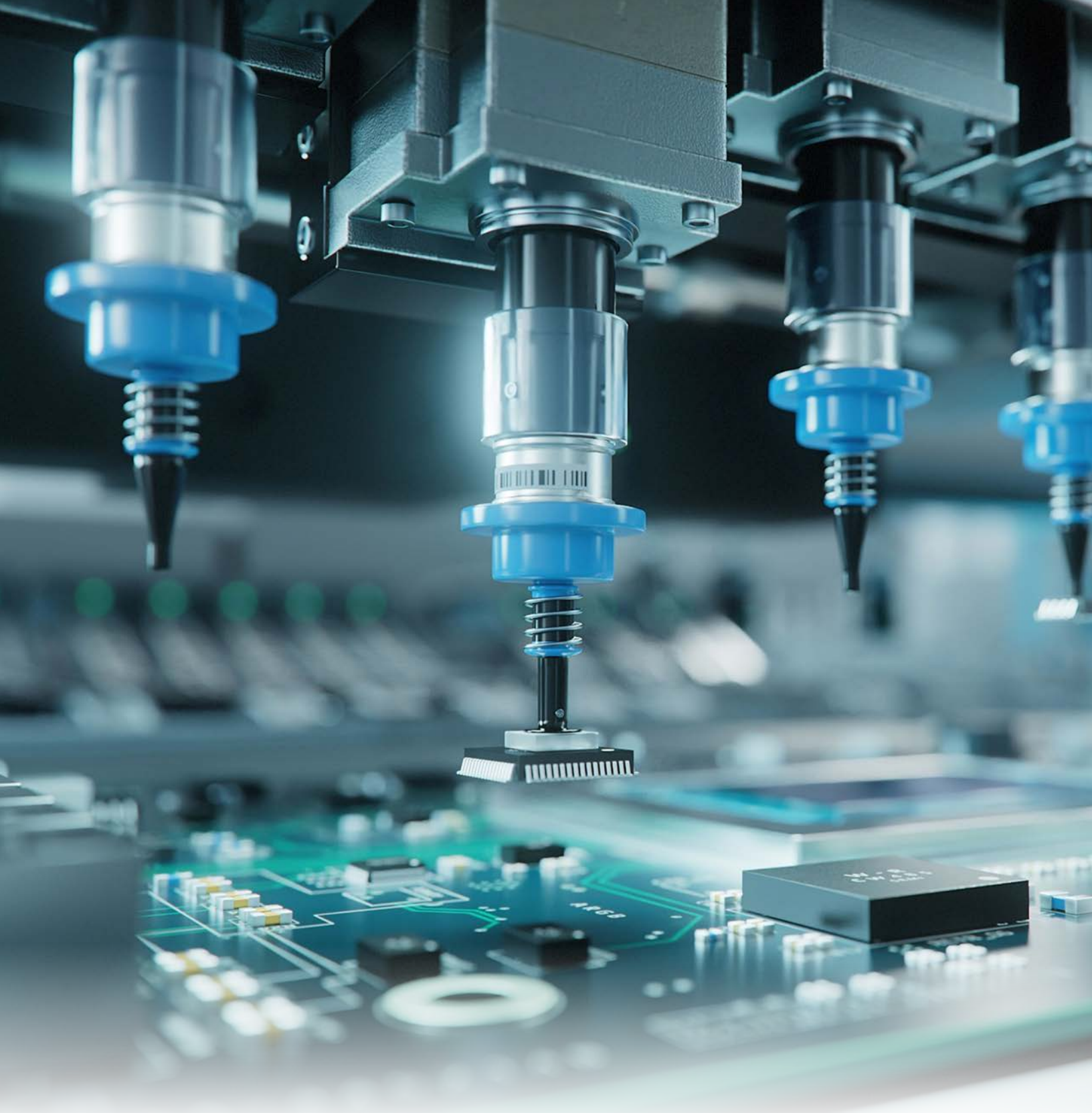
PCB MODEL 202B



PCB MODELS 203B-207C

### SPECIFICATIONS

ICP® output with UNF mounting stud, washer, & pilot bushing	ICP® output with metric mounting stud, washer, & pilot bushing	Sensitivity (mV/lb)	Sensitivity (mV/kN)	Measurement range (lb)	Measurement range (kN)	Mounting stud UNF thread	Mounting stud metric thread
201B01*		500	112405	10	0.0445	10-32	M5 x 0.8
201B02*		50	11240	100	0.4448	10-32	M5 x 0.8
201B03*		10	2248	500	2.224	10-32	M5 x 0.8
201B04*		5	1124	1000	4.448	10-32	M5 x 0.8
201B05*		1	224.8	5000	22.24	10-32	M5 x 0.8
202B	M202B	0.50	112.4	10000	44.48	5/16-24	M8 x 1.0
203B	M203B	0.25	56.2	20000	88.96	3/8-24	M10 x 1.0
204C	M204C	0.12	27.0	40000	177.92	1/2-20	M14 x 1.25
205C	M205C	0.08	18.0	60000	266.90	5/8-18	M16 x 1.5
206C	M206C	0.06	13.5	80000	355.86	7/8-14	M22 x 2.0
207C	M207C	0.05	11.2	100000	444.80	1 1/8-12	M30 x 2.0



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