

SENSORS FOR SEMICONDUCTOR MANUFACTURING

 **PCB PIEZOTRONICS**
AN AMPHENOL COMPANY

 **ENDEVCO**
AN AMPHENOL COMPANY

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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 DC MEMS 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: ± 5 g pk (± 49 m/s² pk)
 Sensitivity ($\pm 5\%$): 1000 mV/g (102 mV/(m/s²))
 Frequency range ($\pm 5\%$): 0.5 to 2000 Hz
 Hermetic stainless steel housing



SEISMIC ICP® ACCELEROMETER

PCB MODELS 393B04, 393B05

Measurement ranges: ± 5 g pk (± 49 m/s² pk),
 ± 0.5 g pk (± 4.9 m/s² pk)
 Sensitivities ($\pm 10\%$): 1000 mV/g (102 mV/(m/s²)),
 10.0 V/g (1.02 V/(m/s²))
 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/s² pk)
 Sensitivity ($\pm 10\%$): 10.0 V/g (1.02 V/(m/s²))
 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/s² pk)
 Sensitivity ($\pm 5\%$): 10.0 V/g (1.02 V/(m/s²))
 Frequency range ($\pm 5\%$): 0.1 to 200 Hz
 Hermetic stainless steel housing



TRIAXIAL CERAMIC SHEAR ICP® ACCELEROMETER

PCB MODEL 356B18

Measurement range: ± 5 g pk (± 49 m/s² pk)
 Sensitivity ($\pm 10\%$): 1000 mV/g (102 mV/(m/s²))
 1/4-28 4-pin connector



SEISMIC ICP® ACCELEROMETERS

PCB SERIES 393B

Measurement range: ± 5 g pK (± 49 m/s² pk)
 Sensitivities from 1000 mV/g (102 mV/(m/s²)) 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: ± 5 g pk (± 49 m/s² pk)
 Sensitivity ($\pm 10\%$): 1000 mV/g (102 mV/(m/s²))
 1/4-28 4-pin connector
 Titanium housing



TRIAXIAL ICP® ACCELEROMETER

PCB MODEL 356A15

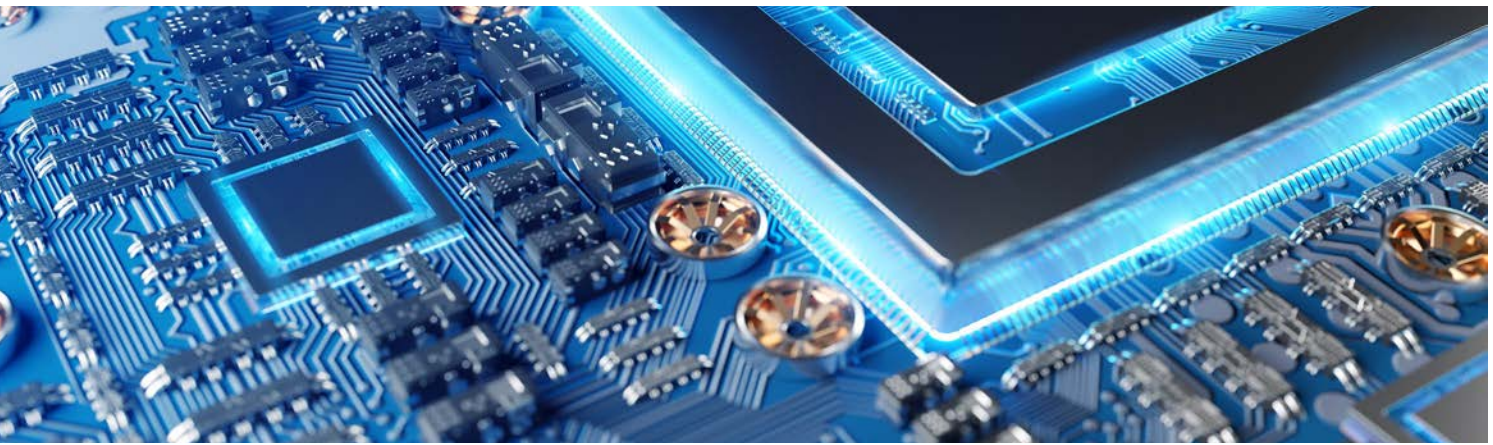
Measurement range: ± 50 g pk
 Sensitivity ($\pm 10\%$): 100 mV/g (10.2 mV/(m/s²))
 Frequency range ($\pm 5\%$): 2 to 5000 Hz
 Hermetic titanium housing



ISOTRON® ACCELEROMETER

ENDEVCO SERIES 7251A

Measurement ranges from ± 500 g (4900 m/s²)
 to ± 10 g (98 m/s²)
 Sensitivities from ($\pm 10\%$): 10 mV/g (1.02 mV/(m/s²))
 to 500 mV/g (51.0 mV/(m/s²))
 Hermetically sealed
 Ground isolated for low base strain sensitivity



HIGH SENSITIVITY VARIABLE CAPACITANCE DC MEMS ACCELEROMETERS

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



DIFFERENTIAL MEMS DC ACCELEROMETERS

PCB SERIES 3741

Six measurement ranges from ± 2 to ± 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

SINGLE AXIS VARIABLE CAPACITANCE ACCELEROMETERS

ENDEVCO SERIES 7290G

Seven measurement ranges from ± 2 to ± 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



TRIAxIAL MEMS DC ACCELEROMETERS

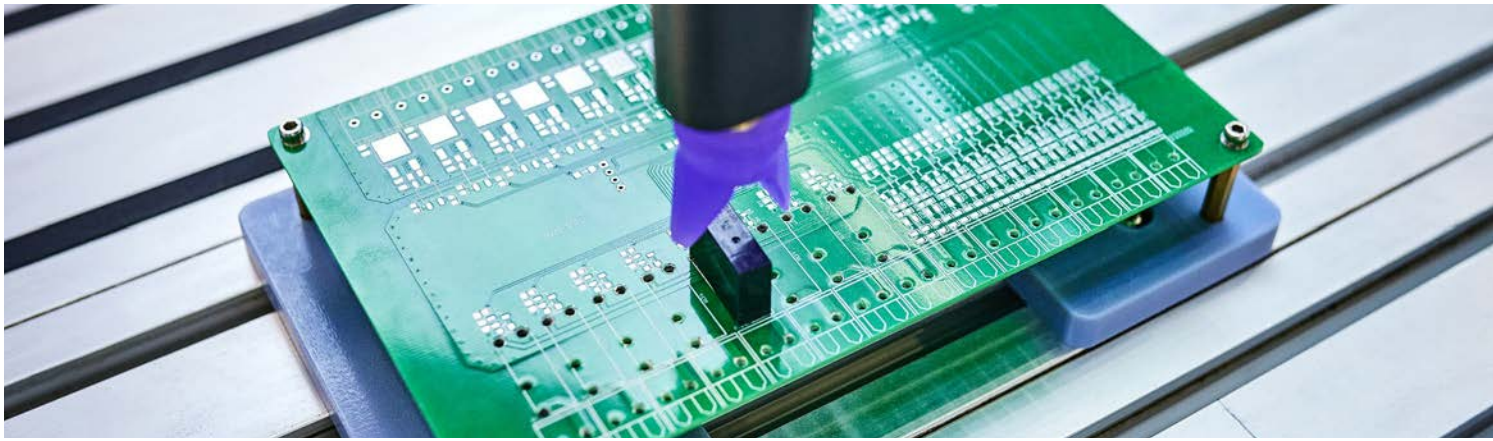
PCB SERIES 3713

Six measurement ranges from ± 2 to ± 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 MEMS DC ACCELEROMETERS

PCB SERIES 3711

Six measurement ranges from ± 2 to ± 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/kb (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



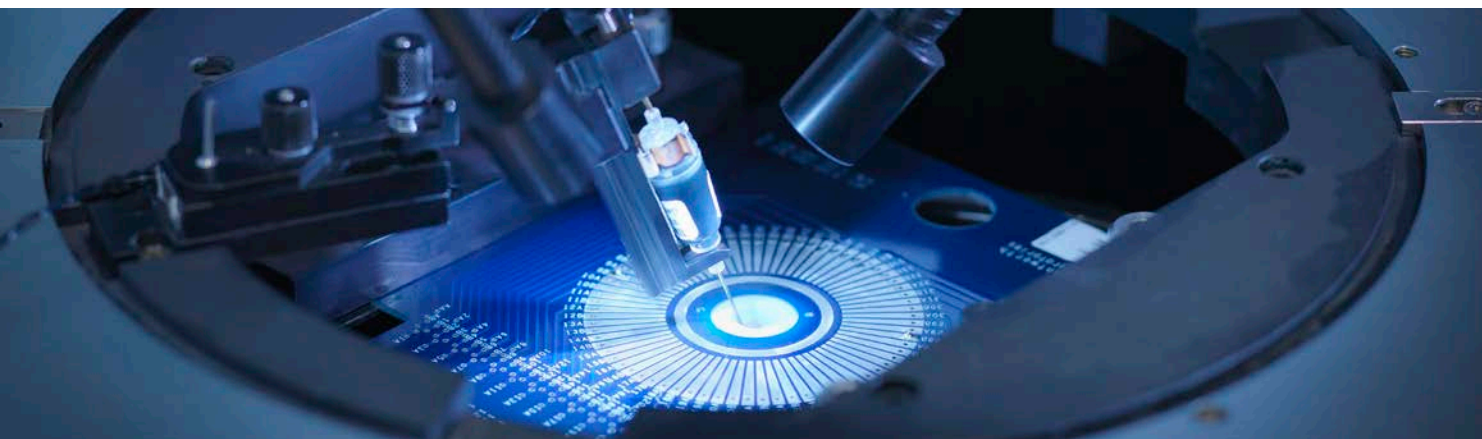
ICP® QUARTZ FORCE RING

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



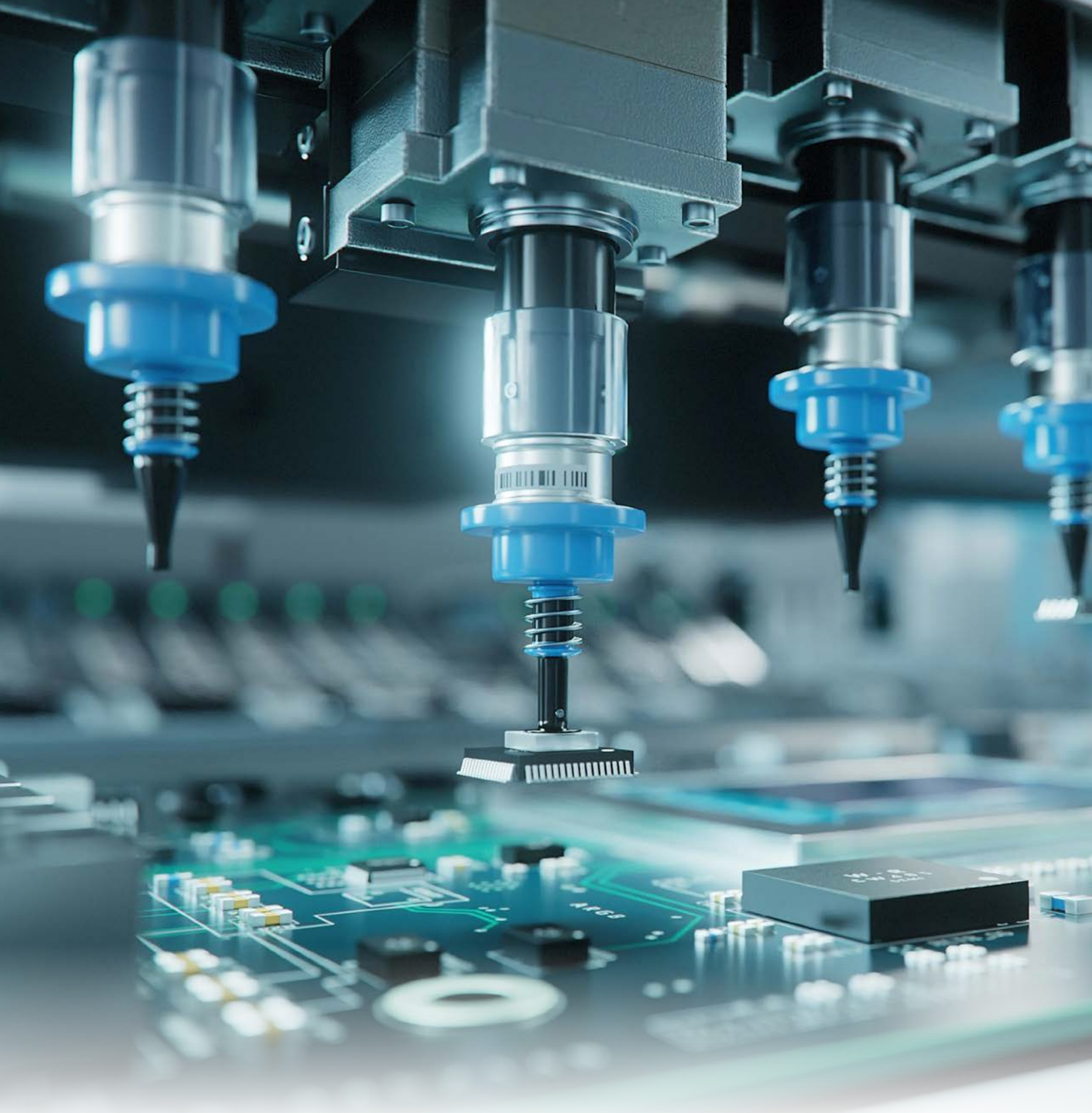
PCB MODEL 202B



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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