Quartz ICP® Force Rings

For Additional Specification Information Visit wwwpcb.com

Applications:
- Crimping, Stamping, & Press Monitoring
- Machinery Mount Forces
- Mechanical Impedance Testing
- Material Testing
- Tablet & Punch Presses
- Roll Nip Profile
- Balancing
- Force Limited Vibration

Quartz ICP® Force Rings

- Model Number
- Measurement Range (Compression): 10 lb (0.0448 kN) to 5000 lb (22.24 kN)
- Sensitivity: 500 mV/lb (112405 mV/kN) to 1 mV/lb (224.8 mV/kN)
- Maximum Static Force (Compression): 60 lb (0.267 kN) to 8000 lb (35.59 kN)
- Broadband Resolution: 0.0002 lbs-rms (0.0008896 N-rms) to 0.10 lbs-rms (0.4448 N-rms)
- Upper Frequency Limit: 90 kHz
- Low Frequency Response (-5%): 0.01 Hz to 0.10 lbs-rms
- Discharge Time Constant: ≥ 50 sec to ≥ 2000 sec
- Non-linearity: ≤ 1%
- Temperature Range: -65 to +250 °F (-54 to +121 °C)
- Stiffness: 12 lb/µin (2.1 kN/µm)
- Housing Material: Stainless Steel
- Sealing: Hermetic
- Electrical Connector: 10-32 Coaxial Jack
- Size (Diameter x Height x Bolt Diameter): 0.65 x 0.25 in x 0.25 in
- Weight: 10 gm

Supplied Accessories
- Mounting Stud: 081A11
- Anti-Friction Washer: 082B01
- Pilot Bushing: 083B01
- Assembly Lubricant: 080A82
- Metric Mounting Thread: M201B01

Additional Accessories
- Mating Cable Connectors: EB
- Recommended Cables: 002, 003 CE

Applications:
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# Quartz ICP® Force Rings

## Highlights:
- Capacities From 10 lbs to 100k lbs
- Stainless Steel Construction
- Hermetically Sealed
- -65 °F to +250 °F Operation Range

## Quartz ICP® Force Rings

### Specifications:

**Model Number**
- 202B
- 203B
- 204C
- 205C
- 206C
- 207C

**Measurement Range (Compression)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity (Compression)</th>
<th>Sensitivity</th>
<th>Maximum Static Force (Compression)</th>
<th>Broadband Resolution</th>
<th>Upper Frequency Limit</th>
<th>Temperature Range</th>
<th>Material</th>
<th>Sealing</th>
<th>Connector</th>
<th>Size (Diameter x Height x Bolt Diameter)</th>
<th>Weight</th>
<th>Mounting</th>
<th>Supplied Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>202B</td>
<td>10k lb</td>
<td>0.50 mV/lb</td>
<td>44.48 kN</td>
<td>0.12 lbs</td>
<td>60 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>0.87 x 0.39 x 0.375 in</td>
<td>19 gm</td>
<td>5/16-24 Stud</td>
<td>081A12, 081A13, 081A14, 081A15, 081A16, 081A17</td>
</tr>
<tr>
<td>203B</td>
<td>20k lb</td>
<td>0.25 mV/lb</td>
<td>88.96 kN</td>
<td>0.25 lbs</td>
<td>60 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>1.19 x 0.91 x 0.10 in</td>
<td>38 gm</td>
<td>3/8-24 Stud</td>
<td>082B02, 082B03, 082B04, 082B05, 082B06, 082B07</td>
</tr>
<tr>
<td>204C</td>
<td>30k lb</td>
<td>0.12 mV/lb</td>
<td>177.92 kN</td>
<td>0.5 lbs</td>
<td>50 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>2.11 x 0.91 x 0.10 mm</td>
<td>57 gm</td>
<td>1-2/2 Stud</td>
<td>083B02, 083B03, 083B04, 083B05, 083B06, 083B07</td>
</tr>
<tr>
<td>205C</td>
<td>40k lb</td>
<td>0.08 mV/lb</td>
<td>266.9 kN</td>
<td>0.8 lbs</td>
<td>50 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>3.69 x 1.0 x 1.0 mm</td>
<td>77 gm</td>
<td>5/8-18 Stud</td>
<td>080A02, 080A03, 080A04, 080A05, 080A06, 080A07</td>
</tr>
<tr>
<td>206C</td>
<td>50k lb</td>
<td>0.06 mV/lb</td>
<td>355.86 kN</td>
<td>1.1 lbs</td>
<td>40 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>4.95 x 1.0 x 1.0 mm</td>
<td>116 gm</td>
<td>7/8-14 Stud</td>
<td>080A08, 080A09, 080A10, 080A11, 080A12, 080A13</td>
</tr>
<tr>
<td>207C</td>
<td>60k lb</td>
<td>0.05 mV/lb</td>
<td>444.8 kN</td>
<td>1.4 lbs</td>
<td>35 Hz</td>
<td>-65 °F to +250 °F</td>
<td>Stainless Steel</td>
<td>Hermetic</td>
<td>10-32 Coaxial Jack</td>
<td>7.45 x 1.0 x 1.0 mm</td>
<td>128 gm</td>
<td>1-1/8-12 Stud</td>
<td>080A14, 080A15, 080A16, 080A17, 080A18, 080A19</td>
</tr>
</tbody>
</table>

**Discharge Time Constant**
- 2000 sec

**Temperature Ranges**
- 60 Hz
- 60 kHz

**Non-linearity**
- ± 0.20 lb
- ± 0.890 N

**Size**
- 0.87 x 0.39 x 0.375 in
- 22.1 x 9.91 x 10 mm
- 1.19 x 0.91 x 0.10 in
- 27.9 x 10.9 x 12 mm

**Weight**
- 19 gm
- 38 gm

**Supplied Accessories**
- Mounting Stud
- Anti-Friction Washer
- Pilot Bushing
- Assembly Lubricant

**Recommended Cables**
- 002, 003 CE

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# Quartz Charge Output Force Rings

## Applications
- Material Testing
- Crimping, Stamping, & Press Monitoring
- Roll Nip Profiles
- Machinery Process Monitoring
- Stamping & Forming
- Force Limited Vibration Testing

## Quartz Charge Output Force Rings

<table>
<thead>
<tr>
<th>Model Number</th>
<th>211B</th>
<th>212B</th>
<th>213B</th>
<th>214B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range (Compression)</td>
<td>5000 lb</td>
<td>10k lb</td>
<td>20k lb</td>
<td>40k lb</td>
</tr>
<tr>
<td>22.44 kN</td>
<td>44.88 kN</td>
<td>88.96 kN</td>
<td>177.92 kN</td>
<td></td>
</tr>
<tr>
<td>Maximum Static Force (Compression)</td>
<td>8000 lb</td>
<td>15k lb</td>
<td>25k lb</td>
<td>50k lb</td>
</tr>
<tr>
<td>66.72 kN</td>
<td>111.2 kN</td>
<td>222.4 kN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>18 pC/lb</td>
<td>18 pC/lb</td>
<td>18 pC/lb</td>
<td>18 pC/lb</td>
</tr>
<tr>
<td>4047 pC/kN</td>
<td>4047 pC/kN</td>
<td>4047 pC/kN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadband Resolution</td>
<td>[1]</td>
<td>[1]</td>
<td>[1]</td>
<td>[1]</td>
</tr>
<tr>
<td>Upper Frequency Limit</td>
<td>90 kHz</td>
<td>60 kHz</td>
<td>60 kHz</td>
<td>55 kHz</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-100 to +400 °F</td>
<td>-100 to +400 °F</td>
<td>-100 to +400 °F</td>
<td>-100 to +400 °F</td>
</tr>
<tr>
<td>-73 to +204 °C</td>
<td>-73 to +204 °C</td>
<td>-73 to +204 °C</td>
<td>-73 to +204 °C</td>
<td></td>
</tr>
<tr>
<td>Electrical Connector</td>
<td>10-32 Coaxial Jack</td>
<td>10-32 Coaxial Jack</td>
<td>10-32 Coaxial Jack</td>
<td>10-32 Coaxial Jack</td>
</tr>
<tr>
<td>12 lb/µin</td>
<td>23 lb/µin</td>
<td>29 lb/µin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 kN/µm</td>
<td>4 kN/µm</td>
<td>5 kN/µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sealing Material</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Sealing</td>
<td>Hermetic</td>
<td>Hermetic</td>
<td>Hermetic</td>
<td>Hermetic</td>
</tr>
<tr>
<td>Size (Diameter x Height x Bolt Diameter)</td>
<td>0.65 x 0.31 x 0.25 in</td>
<td>0.87 x 0.39 x 0.375 in</td>
<td>1.1 x 0.43 x 0.5 in</td>
<td>1.34 x 0.47 x 0.625 in</td>
</tr>
<tr>
<td>16.5 x 7.88 x 6 mm</td>
<td>22.1 x 9.91 x 10 mm</td>
<td>27.9 x 10.9 x 12 mm</td>
<td>34 x 11.9 x 16 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>10 gm</td>
<td>19 gm</td>
<td>38 gm</td>
<td>57 gm</td>
</tr>
</tbody>
</table>

## Supplied Accessories

<table>
<thead>
<tr>
<th>Supplied Accessories</th>
<th>081A11</th>
<th>081A12</th>
<th>081A13</th>
<th>081A14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Stud</td>
<td>082B01</td>
<td>082B02</td>
<td>082B03</td>
<td>082B04</td>
</tr>
<tr>
<td>Anti-Friction Washer</td>
<td>083B01</td>
<td>083B02</td>
<td>083B03</td>
<td>083B04</td>
</tr>
<tr>
<td>Pilot Bushing</td>
<td>080A82</td>
<td>080A82</td>
<td>080A82</td>
<td></td>
</tr>
</tbody>
</table>

## Additional Versions

<table>
<thead>
<tr>
<th>Metric Mounting Thread</th>
<th>M211B</th>
<th>M212B</th>
<th>M213B</th>
<th>M214B</th>
</tr>
</thead>
</table>

## Additional Accessories

<table>
<thead>
<tr>
<th>Metric Mounting Thread</th>
<th>M211B</th>
<th>M212B</th>
<th>M213B</th>
<th>M214B</th>
</tr>
</thead>
</table>

## Notes

- Resolution is dependent upon cable length and signal conditioner
- Low frequency is dependent upon system discharge time constant

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Quartz Charge Output Force Rings

### Highlights:
- Wide Temperature Operating Range (-100 to +400 °F/-73 to 204 °C)
- Scaling & DTC User Settable Via Charge Amplifier
- Hermetically Sealed
- Stainless Steel Construction

### Model Number
- **215B**
- **216B**
- **217B**

<table>
<thead>
<tr>
<th>Feature</th>
<th>215B</th>
<th>216B</th>
<th>217B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement Range (Compression)</strong></td>
<td>60k lb 206.9 kN</td>
<td>90k lb 355.84 kN</td>
<td>100k lb 448.3 kN</td>
</tr>
<tr>
<td><strong>Maximum Static Force (Compression)</strong></td>
<td>70k lb 311.4 kN</td>
<td>70k lb 400.34 kN</td>
<td>70k lb 311.4 kN</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>18 pC/lb 4047 pC/kN</td>
<td>18 pC/lb 4047 pC/kN</td>
<td>17 pC/lb 3922 pC/kN</td>
</tr>
<tr>
<td><strong>Broadband Resolution</strong></td>
<td>[1]</td>
<td>[1]</td>
<td>[1]</td>
</tr>
<tr>
<td><strong>Upper Frequency Limit</strong></td>
<td>50 kHz 49 kHz</td>
<td>40 kHz 35 kHz</td>
<td>35 kHz</td>
</tr>
<tr>
<td><strong>Low Frequency Response [-5%]</strong></td>
<td>[2]</td>
<td>[2]</td>
<td>[2]</td>
</tr>
<tr>
<td><strong>Non-linearity</strong></td>
<td>≤ 1%</td>
<td>≤ 1%</td>
<td>≤ 1%</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-100 to +400 °F</td>
<td>-100 to +400 °F</td>
<td>-100 to +400 °F</td>
</tr>
<tr>
<td><strong>Electrical Connector</strong></td>
<td>10-32 Coaxial Jack</td>
<td>10-32 Coaxial Jack</td>
<td>10-32 Coaxial Jack</td>
</tr>
<tr>
<td><strong>Stiffness</strong></td>
<td>40 lb/µin 7 kN/µm</td>
<td>74 lb/µin 13 kN/µm</td>
<td>131 lb/µin 23 kN/µm</td>
</tr>
<tr>
<td><strong>Housing Material</strong></td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td><strong>Sealing</strong></td>
<td>Hermetic</td>
<td>Hermetic</td>
<td>Hermetic</td>
</tr>
<tr>
<td><strong>Size (Diameter x Height x Bolt Diameter)</strong></td>
<td>1.58 x 0.75 x 0.75 in 40.13 x 19.95 x 19 mm</td>
<td>2.05 x 0.75 x 0.75 in 52.9 x 19.95 x 19 mm</td>
<td>2.95 x 0.75 x 0.75 in 74.43 x 17.02 x 14 mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>80 gm 155 gm</td>
<td>74 gm 159 gm</td>
<td>354 gm</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>5/8-18 Stud</td>
<td>7/8-14 Stud</td>
<td>1 1/8-12 Stud</td>
</tr>
</tbody>
</table>

### Supplied Accessories
- Mounting Stud
- Anti-Friction Washer
- Pilot Bushing
- Assembly Lubricant

### Additional Versions
- Metric Mounting Thread
- Additional Accessories
- Mating Cable Connectors
- Recommended Cables

### Notes
- [1] Resolution is dependent upon cable length and signal conditioner
- [2] Low frequency is dependent upon system discharge time constant

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