

Quartz ICP® Force Rings

Applications:

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

Tips from Techs Preload & Force Rings

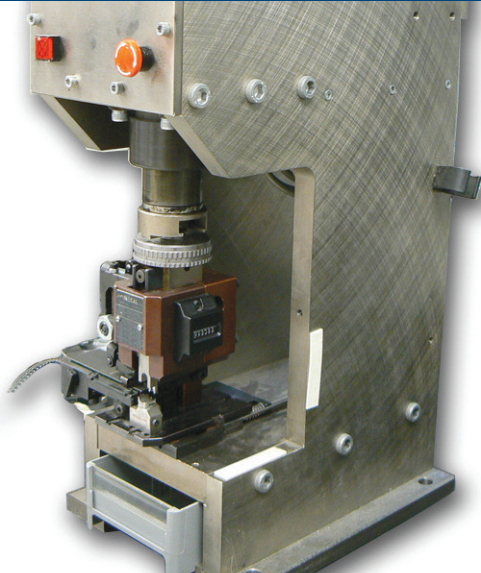
PCB® ring-style 1-component and 3-component force sensors are generally installed between two parts of a test structure with the supplied elastic beryllium-copper stud or customer-supplied bolt. The stud or bolt holds the structure together, and applies preload to the force ring. Typically a component of the force between the two structures is shunted through the mounting stud. The amount of force shunted may be up to 7% of the total force for the beryllium-copper stud supplied with the sensor, and up to 50% for steel studs. Contact a PCB® application specialist for proper pre-load and calibration for your particular application

Quartz ICP® Force Rings

Model Number	201B01	201B02	201B03	201B04	201B05
Measurement Range (Compression)	10 lb 0.04448 kN	100 lb 0.4448 kN	500 lb 2.224 kN	1000 lb 4.448 kN	5000 lb 22.24 kN
Sensitivity	500 mV//lb 112405 mV/kN	50 mV//lb 11240 mV/kN	10 mV//lb 2248 mV/kN	5 mV//lb 1124 mV/kN	1 mV//lb 224.8 mV/kN
Maximum Static Force (Compression)	60 lb 0.267 kN	600 lb 2.67 kN	3000 lb 13.34 kN	6000 lb 26.69 kN	8000 lb 35.59 kN
Broadband Resolution	0.0002 lbs-rms 0.0008896 N-rms	0.002 lbs-rms 0.008896 N-rms	0.01 lbs-rms 0.04448 N-rms	0.02 lbs-rms 0.08896 N-rms	0.10 lbs-rms 0.4448 N-rms
Upper Frequency Limit	90 kHz	90 kHz	90 kHz	90 kHz	90 kHz
Low Frequency Response (-5%)	0.01 Hz	0.006 Hz	0.0002 Hz	0.0001 Hz	0.0003 Hz
Discharge Time Constant	≥ 50 sec	≥ 120 sec	≥ 400 sec	≥ 700 sec	≥ 2000 sec
Non-linearity	≤ 1%	≤ 1%	≤ 1%	≤ 1%	≤ 1%
Temperature Range	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C
Stiffness	12 lb/μin 2.1 kN/μm	12 lb/μin 2.1 kN/μm	12 lb/μin 2.1 kN/μm	12 lb/μin 2.1 kN/μm	12 lb/μin 2.1 kN/μm
Housing Material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic
Electrical Connector	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack
Size (Diameter x Height x Bolt Diameter)	0.65 x 0.31 x 0.25 in 16.5 x 7.87 x 6 mm	0.65 x 0.31 x 0.25 in 16.5 x 7.87 x 6 mm	0.65 x 0.31 x 0.25 in 16.5 x 7.87 x 6 mm	0.65 x 0.31 x 0.25 in 16.5 x 7.87 x 6 mm	0.65 x 0.31 x 0.25 in 16.5 x 7.87 x 6 mm
Weight	10 gm	10 gm	10 gm	10 gm	10 gm
Mounting	10-32 Stud	10-32 Stud	10-32 Stud	10-32 Stud	10-32 Stud
Supplied Accessories					
Mounting Stud	081A11	081A11	081A11	081A11	081A11
Anti-Friction Washer	082B01	082B01	082B01	082B01	082B01
Pilot Bushing	083B01	083B01	083B01	083B01	083B01
Assembly Lubricant	080A82	080A82	080A82	080A82	080A82
Additional Versions					
Metric Mounting Thread	M201B01	M201B02	M201B03	M201B04	M201B05
Additional Accessories					
Mating Cable Connectors	EB	EB	EB	EB	EB
Recommended Cables	002, 003 CE	002, 003 CE	002, 003 CE	002, 003 CE	002, 003 CE



Photo Shown Actual Size















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

						
						
Model Number	202B	203B	204C	205C	206C	207C
Measurement Range (Compression)	10k lb 44.48 kN	20k lb 88.96 kN	40k lb 177.92 kN	60k lb 266.9 kN	80k lb 355.86 kN	100k lb 444.8 kN
Sensitivity	0.50 mV/lb 112.4 mV/kN	0.25 mV/lb 56.2 mV/kN	0.12 mV/lb 27 mV/kN	0.08 mV/lb 17.98 mV/kN	0.06 mV/lb 13.5 mV/kN	0.05 mV/lb 11.24mV/kN
Maximum Static Force (Compression)	15k lb 66.72 kN	25k lb 111.2 kN	50k lb 222.4 kN	70k lb 311.4 kN	90k lb 400.34 kN	110k lb 489.3 kN
Broadband Resolution	0.20 lb-rms 0.890 N-rms	0.4 lb-rms 1.78 N-rms	0.80 lb-rms 3.6 N-rms	1 lb-rms 4.45 N-rms	1.8 lb-rms 8 N-rms	2.0 lb-rms 8.90 N-rms
Upper Frequency Limit	60 kHz	60 kHz	55 kHz	50 kHz	40 kHz	35 kHz
Low Frequency Response (-5%)	0.0003 Hz	0.0003 Hz	0.0003 Hz	0.0003 Hz	0.0003 Hz	0.0003 Hz
Discharge Time Constant	≥ 2000 sec	≥ 2000 sec	≥ 2000 sec	≥ 2000 sec	≥ 2000 sec	≥ 2000 sec
Non-linearity	≤ 1%	≤ 1%	≤ 1%	≤ 1%	≤ 1%	≤ 1%
Temperature Range	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C	-65 to +250 °F -54 to +121 °C
Stiffness	16 lb/µin 2.8 kN/µm	23 lb/µin 4 kN/µm	29 lb/µin 5 kN/µm	40 lb/µin 7 kN/µm	74 lb/µin 13 kN/µm	131 lb/µin 23 kN/µm
Housing Material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic	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
Size (Diameter x Height x Bolt Diameter)	0.87 x 0.39 x 0.375 in 22.1 x 9.91 x 10 mm	1.19 x 0.43 x 0.5 in 27.9 x 10.9 x 12 mm	1.10 x 0.47 x 0.625 in 34 x 12 x 16 mm	1.58 x 0.51 x 0.75 in 40.13 x 12.95 x 20 mm	2.05 x 0.59 x 1 in 52.1 x 15 x 24 mm	2.95 x 0.67 x 1.5 in 74.9 x 17.02 x 36 mm
Weight	19 gm	38 gm	57 gm	77 gm	155 gm	328 gm
Mounting	5/16-24 Stud	3/8-24 Stud	1/2-20 Stud	5/8-18 Stud	7/8-14 Stud	1 1/8-12 Stud
Supplied Accessories						
Mounting Stud	081A12	081A13	081A14	081A15	081A16	081A17
Anti-Friction Washer	082B02	082B03	082B04	082B05	082B06	082B07
Pilot Bushing	083B02	083B03	083B04	083B05	083B06	083B07
Assembly Lubricant	080A82	080A82	080A82	080A82	080A82	080A82
Additional Versions						
Metric Mounting Thread	M202B	M203B	M204C	M205C	M206C	M207C
Additional Accessories						
Mating Cable Connectors	EB	EB	EB	EB	EB	EB
Recommended Cables	002, 003 CE	002, 003 CE	002, 003 CE	002, 003 CE	002, 003 CE	002, 003 CE





Quartz Charge Output Force Rings

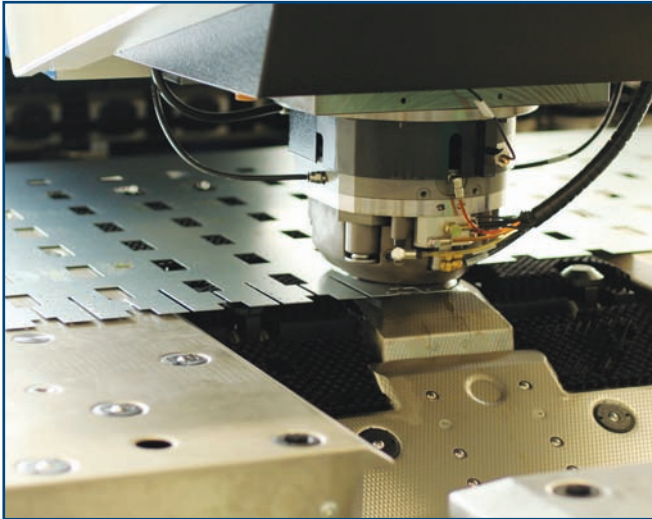
Applications

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



Quartz Charge Output Force Rings

				
Model Number	211B	212B	213B	214B
Measurement Range (Compression)	5000 lb 22.24 kN	10k lb 44.48 kN	20k lb 88.96 kN	40k lb 177.92 kN
Maximum Static Force (Compression)	8000 lb 35.59 kN	15k lb 66.72 kN	25k lb 111.2 kN	50k lb 222.4 kN
Sensitivity	18 pC/lb 4047 pC/kN	18 pC/lb 4047 pC/kN	18 pC/lb 4047 pC/kN	18 pC/lb 4047 pC/kN
Broadband Resolution	[1]	[1]	[1]	[1]
Upper Frequency Limit	90 kHz	60 kHz	60 kHz	55 kHz
Low Frequency Response (-5%)	[2]	[2]	[2]	[2]
Non-linearity	≤ 1%	≤ 1%	≤ 1%	≤ 1%
Temperature Range	-100 to +400 °F -73 to +204 °C	-100 to +400 °F -73 to +204 °C	-100 to +400 °F -73 to +204 °C	-100 to +400 °F -73 to +204 °C
Electrical Connector	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack
Stiffness	12 lb/μin 2.1 kN/μm	16 lb/μin 2.8 kN/μm	23 lb/μin 4 kN/μm	29 lb/μin 5 kN/μm
Housing Material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	Hermetic	Hermetic	Hermetic	Hermetic
Size (Diameter x Height x Bolt Diameter)	0.65 x 0.31 x 0.25 in 16.5 x 7.88 x 6 mm	0.87 x 0.39 x 0.375 in 22.1 x 9.91 x 10 mm	1.1 x 0.43 x 0.5 in 27.9 x 10.9 x 12 mm	1.34 x 0.47 x 0.625 in 34 x 11.9 x 16 mm
Weight	10 gm	19 gm	38 gm	57 gm
Mounting	10-32 Stud	5/16-24 Stud	3/8-24 Stud	1/2-20 Stud
Supplied Accessories				
Mounting Stud	081A11	081A12	081A13	081A14
Anti-Friction Washer	082B01	082B02	082B03	082B04
Pilot Bushing	083B01	083B02	083B03	083B04
Assembly Lubricant	080A82	080A82	080A82	080A82
Additional Versions				
Metric Mounting Thread	M211B	M212B	M213B	M214B
Additional Accessories				
Mating Cable Connectors	EB	EB	EB	EB
Recommended Cable	003 CE	003 CE	003 CE	003 CE
Notes				
[1] Resolution is dependent upon cable length and signal conditioner [2] Low frequency is dependent upon system discharge time constant				






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
- Hermitically Sealed
- Stainless Steel Construction

Quartz Charge Output Force Rings

			
Model Number	215B	216B	217B
Measurement Range (Compression)	60k lb 266.9 kN	80k lb 355.84 kN	100k lb 444.8 kN
Maximum Static Force (Compression)	70k lb 311.4 kN	90k lb 400.34 kN	110k lb 489.3 kN
Sensitivity	18 pC/lb 4047 pC/kN	18 pC/lb 4047 pC/kN	17 pC/lb 3822 pC/kN
Broadband Resolution	[1]	[1]	[1]
Upper Frequency Limit	50 kHz	40 kHz	35 kHz
Low Frequency Response (-5%)	[2]	[2]	[2]
Non-linearity	≤ 1%	≤ 1%	≤ 1%
Temperature Range	-100 to +400 °F -73 to +204 °C	-100 to +400 °F -73 to +204 °C	-100 to +400 °F -73 to +204 °C
Electrical Connector	10-32 Coaxial Jack	10-32 Coaxial Jack	10-32 Coaxial Jack
Stiffness	40 lb/μin 7 kN/μm	74 lb/μin 13 kN/μm	131 lb/μin 23 kN/μm
Housing Material	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	Hermetic	Hermetic	Hermetic
Size (Diameter x Height x Bolt Diameter)	1.58 x 0.51 x 0.75 in 40.13 x 12.95 x 21 mm	2.05 x 0.59 x 1 in 52.9 x 15 x 26 mm	2.95 x 0.67 x 1.5 in 74.43 x 17.02 x 40 mm
Weight	80 gm	155 gm	354 gm
Mounting	5/8-18 Stud	7/8-14 Stud	1 1/8-12 Stud
Supplied Accessories			
Mounting Stud	081A15	081A16	081A17
Anti-Friction Washer	082B05	082B06	082B07
Pilot Bushing	083B05	083B06	083B07
Assembly Lubricant	080A82	080A82	080A82
Additional Versions			
Metric Mounting Thread	M215B	M216B	M217B
Additional Accessories			
Mating Cable Connectors	EB	EB	EB
Recommended Cables	003 CE	003 CE	003 CE

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

Hochwertige Messtechnik und Beratung aus einer Hand



PCB Synotech GmbH
Porschestra. 20 – 30 ▪ 41836 Hückelhoven
Tel.: +49 (0) 24 33/44 44 40 – 0
E-Mail: info@synotech.de ▪ www.synotech.de