



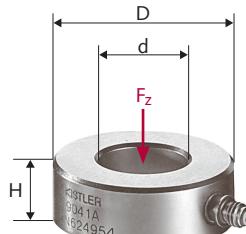
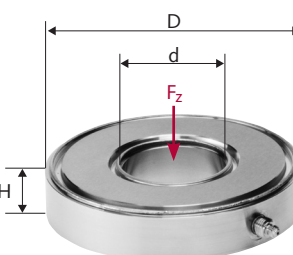
**KISTLER**

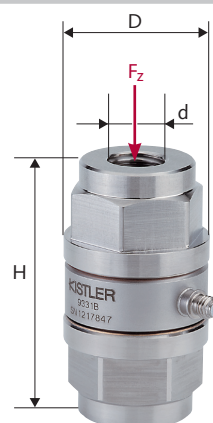
measure. analyze. innovate.

## Force Sensors Selection

**Force Sensing in  
Test & Measurement  
Applications**

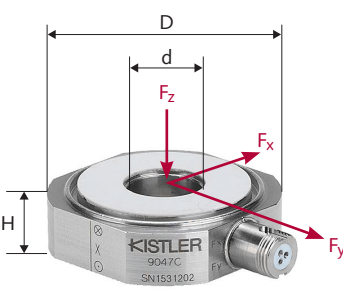
# Force Measurement Selection Chart

Single-Component External Preload	Measuring Range	Dimensions (in)			Sensitivity	Natural Frequency	Rigidity	Operating Temp.	
	Type	lbf	d	D	H	pC / lb	kHz	lbf / μin	°F
 <p>Types 9001A ... 9071A</p>  <p>Types 9081B, 9091B</p>	9001A	0 ... 1,650	0.161	0.406	0.26	-18	180	6.3	-320 ... +392
	9011A	0 ... 3,350	0.256	0.571	0.32	-19	150	9.1	-320 ... +392
	9021A	0 ... 7,850	0.413	0.886	0.39	-19	100	20.0	-320 ... +392
	9031A	0 ... 13,500	0.512	1.122	0.43	-19	80	30.0	-320 ... +392
	9041A	0 ... 20,200	0.669	1.358	0.47	-19	65	40.0	-320 ... +392
	9051A	0 ... 26,900	0.827	1.594	0.51	-19	55	56.0	-320 ... +392
	9061A	0 ... 44,900	1.043	2.067	0.59	-19	45	85.7	-320 ... +392
	9071A	0 ... 89,900	1.594	2.972	0.67	-19	30	165.0	-320 ... +392
	9081B	0 ... 146,500	1.594	3.937	0.87	-10	>18	171.0	-40 ... +392
	9091B	0 ... 269,700	2.835	5.709	1.10	-10	>11	371.0	-40 ... +392

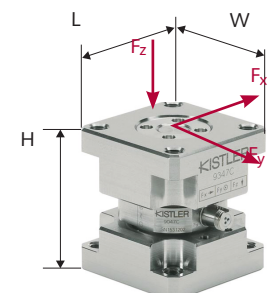
Single-Component Force Link	Measuring Range	Dimensions (in)			Sensitivity	Natural Frequency	Rigidity	Operating Temp.	
	Type	±lbf	d	D	H	pC / lb	kHz	lbf / μin	°F
 <p>Type 9301B</p>	9301B	±550	M5 x v0.8	0.394	0.99	-17	75	1.7	-40 ... +250
	9312A	±1,000	1/4-28	0.551	1.26	-17	70	3.4	-40 ... +250
	9322A	±2,000	3/8-24	0.866	1.61	-17	55	5.1	-40 ... +250
	9332A	±4,000	1/2-20	1.102	2.01	-17	45	7.4	-40 ... +250
	9342A	±7,000	5/8-18	1.340	2.52	-17	40	10.3	-40 ... +250
	9352A	±9,000	3/4-16	1.575	2.99	-17	33	11.7	-40 ... +250
	9362A	±13,000	1-14	2.050	3.5	-17	28	15.6	-40 ... +250
	9372A	±26,000	1 1/4-12	2.953	4.25	-17	22	28.5	-40 ... +250

Piezoelectric Strain	Measuring Range	Dimensions (in)			Sensitivity	Natural Frequency	Type of Mounting	Operating Temp.		
	Type	με	L	W	H	pC/με	kHz	°F		
 <p>Type 9232A...</p>	9232A	-600 ... 600	1.57	0.67	0.59	-80	12	surface	32 ... +160	
	9237B	-800 ... 800	2.05	1.00	1.05	-34		surface	-22 ... +250	
	9241C	-300 ... 500	0.71	0.39	0.39	-15		transverse	-40 ... +395	
	9243B	-1,500 ... 1,500	0.83	M10	-	-	-15	110	longitudinal	-40 ... +395
	9247A	-1,400 ... 1,400	0.93	M5	-	-	-9	200	longitudinal	-40 ... +395



# Force Measurement Selection Chart

3-Component External Preload	Range (±lbf)			Range (Comp. Only)	Dimensions (in)			Sensitivity (pC / lb)		Rigidity (lbf / μin)		Operating Temp.
	Type	Fz	Fx, Fy	lbf	d	D	H	Fz	Fx, Fy	Fz	Fx, Fy	°F
	9017C	±675	±335	0 ... 2,810	0.256	0.748	0.39	-49	-111	8.0	1.7	-40 ... +250
	9027C	±1,800	±900	0 ... 6,295	0.319	1.102	0.47	-17	-35	14.9	5.7	-40 ... +250
	9047C	±6,745	±3,370	0 ... 22,480	0.555	1.772	0.55	-17	-36	8.0	3.4	-40 ... +250
	9067C	±13,490	±6,740	0 ... 44,965	1.043	2.559	0.83	-17	-36	25.7	4.0	-40 ... +250
	9077C	±33,725	±16,860	0 ... 112,410	1.594	4.134	1.02	-9	-19	45.7	10.3	-40 ... +250

Type 9047C

3-Component Force Link	Range (±lbf)			Dimensions (in)			Sensitivity (pC / lb)		Natural Frequency	Rigidity (lbf / μin)		Operating Temp.
	Type	Fz	Fx, Fy	L	W	H	Fz	Fx, Fy	kHz	Fz	Fx, Fy	°F
	9317C	±675	±335	0.98	0.98	1.18	-49	-115	20	5.2	1.1	-40 ... +250
	9327C	±1,800	±900	1.65	1.65	1.65	-17	-35	12	6.4	2.0	-40 ... +250
	9347C	±6,745	±3,370	2.17	2.17	2.36	-17	-35	10	7.4	2.9	-40 ... +250
	9347C	±13,490	±6,745	3.15	3.15	3.54	-17	-34	6	22.8	3.4	-40 ... +250
	9377C	±33,720	±16,860	4.72	4.72	4.92	-9	-17	6	40.0	9.1	-40 ... +250

Type 9347C

PE / IEPE Force Internal Preload	Range (±lbf)			Dimensions (in)			Sensitivity pC/lb [mV / lb]	Time Constant	Natural Frequency	Rigidity	Operating Temp.
	Type	Comp.	Tension	d	D	H		s	kHz	lbf / μin	°F
	9212	+5,000	-500	10-32	0.63	0.50	-50	-	70	5.0	-400 ... +300
	9222	+5,000	-500	10-32	0.63	0.50	-19	-	70	5.0	-320 ... +300
	9712B5	+5	-5	10-32	0.63	0.50	[800]	60	70	5.0	-60 ... +250
	9712B50	+50	-50	10-32	0.63	0.50	[100]	540	70	5.0	-60 ... +250
	9712B250	+250	-250	10-32	0.63	0.50	[20]	820	70	5.0	-60 ... +250
	9712B500	+500	-500	10-32	0.63	0.50	[10]	1,800	70	5.0	-60 ... +250
	9712B5000	+5,000	-500	10-32	0.63	0.50	[1]	1,800	70	5.0	-60 ... +250

Type 9212

Type 9222/9712B5

# Electronics

## Charge Amplifier, IEPE Coupler



Specification	Type 5010B	Type 5015A	Type 5114	Type 5118B2
Technology	Dual-Mode Charge / IEPE	Charge (IEPE option)	IEPE	IEPE
Measuring range	pC ±10 ... 999,000	±2 ... 2,200,000	-	-
Sensor supply current	mA 4	4	2	2
Frequency response, ±5 %	Hz ≈0 ... 180,000	≈0 ... 200,000	0.07 ... 60,000	0.02 ... 40,000
Output voltage	V ±10	±10 ... ±2	±20 p-p	±20 p-p
Accuracy	% <±0.5	<±0.5 ... <±3	-	-
Gain	-	-	1	1, 10, 100
Power	115 VAC	115 / 230 VAC	1 x 9 V or Ext.	4 x 1.5 V (AA) or Ext.
Properties	For charge (pC) and IEPE piezoelectric sensors; dynamic and quasi-static measurement; automatic zero adjustment; RS-232C interface; ultra high accuracy	Single-channel charge amplifier; LCD menu as well as read-out for signal evaluation; peak hold display; statistical capture; built-in IEPE filters; optional Piezotron® (IEPE) input; CE compliant	Provides constant current excitation; monitors condition of sensor and cables; 3.5" digital LCD display AC-DC or battery powered; CE compliant	Selectable gain and low pass; plug-in filters; panel selectable; high-pass filtering, exclusive "Rapid Zero" feature; AC-DC or battery powered; CE compliant

## Preload Information

### Set of Preloading Elements for Force Sensors



#### Characteristics

Standardized high-strength preloading elements; various components for all sizes of force sensors

#### Applications

For installing single and 3-component force sensors; optimized force application and temperature compensation

#### Request data sheets

000-194, 000-192, 000-196, 000-869

Call Kistler for more details.

## Additional Information

Request Kistler brochures for more information.



**General Force**  
brochure  
400-342



**Cutting Force**  
brochures  
960-001 / 960-002



**Torque Sensors**  
brochure  
300-646

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