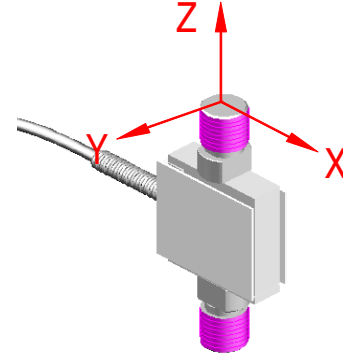**FUTEK**
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Extraneous Load Factors

Equation: $\sigma_{max} \geq$ (A)Fx +(B)Fy +(C)Fz +(D)Mx +(E)My +(F)Mz

Material: Aluminum 2024-T4 (*AL), 17-4 P.H. Stainless Steel

Model #	Capacity (lb)	A	B	C	D	E	F
LRM200 (*AL)	0.2205 (100g)	2966.03	8885.64	23574.22	9282.60	4000.81	12687.74
	0.5512 (250g)	3139.53	8105.63	20995.17	8499.38	4120.48	11653.24
	1	3279.24	6675.12	12470.53	7267.62	4157.53	9209.75
	2	3122.49	5330.91	7150.27	5933.29	3934.84	7121.10
	5	3881.08	4467.68	4810.75	5053.65	3772.85	7366.73
	10	3124.35	3113.15	1775.73	3650.39	3411.58	6151.23
LRM200	25	4181.58	3653.00	1962.25	4576.54	4295.68	6778.39
	50	3508.24	3835.06	1141.52	3916.38	3424.71	5837.89
	100	3243.16	3945.50	907.71	4151.05	3944.03	5964.35

σ_{max} **Table**

Material	Static Load (=60% Y.S.)	Fatigue (Non Reversing Loads)	Fatigue (Full Reversing Loads)
2024-T4/T351	28,000	18,000	15,000
17-4PH S.S	87,000	78,000	62,000*

*Value is 75% of Fatigue Strength based on 10-20 x 10^6 cycles and allow for factors that influence Fatigue such as surface finish, stress concentrations, corrosion, temperature and other variables for the production of the transducer, for infinite Fatigue Life (100 x 10^6) use 75% of values shown.

Deflection & Natural Frequency

Model #	Capacity (lb)	Deflection (in.)	Natural Frequency (Hz)	β
LRM200 (*AL)	0.2205 (100g)	0.008	170	0.0095
	0.5512 (250g)	0.007	300	0.0095
	1	0.004	500	0.0095
	2	0.004	750	0.0095
	5	0.005	1100	0.0095
	10	0.004	1700	0.0095
LRM200	25	0.004	2100	0.0155
	50	0.004	2700	0.0155
	100	0.005	3500	0.0155

*FN results are based on calculation of deflection & weight scene on Sensor arm.

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Natural Frequency & Frequency Response Equation's:

$$\text{Natural Frequency (FN)} = 3.13 \sqrt{\cfrac{1}{\cfrac{\beta}{Capacity} \bullet Deflection}} \text{ (Hz)}$$

$$\text{Frequency Response with load (FR)} = 3.13 \sqrt{\cfrac{1}{\cfrac{\beta + AppliedLoad}{Capacity} \bullet Deflection}} \text{ (Hz)}$$

*Where β values are obtained by Futek Engineers

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