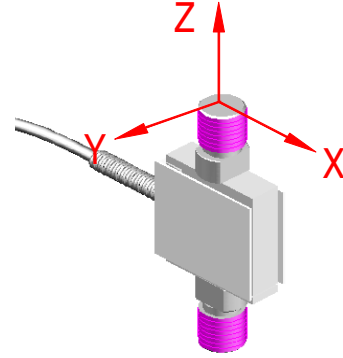FUTEK
ADVANCED SENSOR TECHNOLOGY, INC.

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.

This documentation was generated and completed to the best ability of FUTEK's Engineering Team using FEA Analysis, Empirical data and Multiple Testing Simulations. The information and recommendations on this document are presented in good faith and believed to be correct however, FUTEK Advanced Sensor Technology makes no representations or warranties as to the completeness or accuracy of the information.

Natural Frequency & Frequency Response Equation's:

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

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

*Where β values are obtained by Futek Engineers

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