B-SERIES MOTOR SIZING AND TORQUE CALCULATIONS (Table 8)

MODEL No.	GEAR RATIO	Turns per inch TPI	Rated cap (lbs) P	STATIC TORQUE Ts	UNIT INPUT TORQUE AT RATED CAPACITY — T = RUNNING TORQUE (lb-in) at VARIOUS RPM (Theoretical)								NO LOAD TORQUE To
					50 RPM	115 RPM	172 RPM	345 RPM	600 RPM	870 RPM	1140 RPM	1725 RPM	
B-1	**5:1**	**10**	**2,000**	49	44	43	42	41	40	40	39	38	3
	10:1	**20**		29	26	25	24	23	22	22	21	21	
B 2.5	**6:1**	**24**	**5,000**	41	37	36	35	34	33	33	32	32	5
	24:1	**96**		17	14	13	13	12	11	11	10	10	
B 5	**6:1**	**12.66**	**10,000**	186	170	167	164	160	156	154	152	150	12
	24:1	**50.66**		71	59	57	54	51	48	47	45	43	
B 10	**8:1**	**16.88**	**20,000**	302	269	262	256	247	240	236	233	229	18
	24:1	**50.66**		154	125	118	112	105	98	94	91	87	
B 20	**8:1**	**16**	**40,000**	628	561	546	533	516	502	493	487	479	36
	24:1	**48**		313	254	242	230	215	202	194	189	181	
B 30	**10 2/3:1**	**16**	**60,000**	987	864	838	815	784	761	746	736		48
	32:1	**48**		520	408	384	363	335	312	298	289		
B 50	**10 2/3:1**	**16**	**100,000**	2519	2149	2105	2010	1929	1870	1835	1814		96
	32:1	**48**		1361	1017	948	887	811	755	722	631		
B 75	**10 2/3:1**	**10.66**	**150,000**	3604	3132	3036	2952	2846	2769	2723	2335		156
	32:1	**32**		1781	1384	1303	1232	1141	1074	1035	1010		
B 100	**12:1**	**12**	**200,000**	4622	3844	3696	3567	3413	3307	3248	3212		204
	36:1	**48**		2568	1837	1697	1575	1429	1327	1271	1236		

For RPM's not shown use the next slowest RPM. For speeds less than 50 RPM contact factory.

10. Determine Uni-Lift Running Load Proportion Factor: (f)

$$f = \frac{P_3}{(P \times N)}$$

P = Rated Capacity of Uni-lift
P_3 = Max. system running load N= Number of Uni-lifts

11. Determine Unit Running Torque: (T_1) (lb-in)

$$T_1 = (T \times f) + T_o$$

T_0 = No load torque from chart
T = Running torque from chart

12. Find the System Running Torque: (T_2) (lb-in)

$$T_2 = \frac{(T_1 \times N)}{e_1}$$

e_1 = System Arrangement Efficiency, see page 77

13. Find System Power:

$$\text{System HP} = \frac{(T_2 \times RPM)}{(63025 \times e_2)}$$

e_2 = Reducer Efficiency, see page 77
RPM = Uni-Lift input shaft speed

14. Determine System Starting Torque: (T_{s2})

$$T_{s2} = \frac{((T_s \times f) + T_o) \times N}{e_2}$$

T_s = Static torque from chart

15. Determine Motor Starting Torque: (T_{sm}) (lb in)

$$T_{sm} = \frac{T_{s2}}{(R \times e_2)}$$

R = Gear Reducer Ratio

16. Determine Motor Running Torque: (T_{rm})

$$T_{rm} = \frac{T_2}{(R \times e_1)}$$

- Select a motor with a power rating greater than HP requirement in step 13, a starting torque greater than T_{sm} requirement in step 15, and a motor running torque greater than T_{rm} in step 16.
- Select system torque transmission equipment (reducer, mitre gear boxes, couplings, etc.) with ratings greater than the torque to be transmitted, see step 12 and system arrangements, page 77.
- Size shafting for system starting torque to be transmitted, see step 16, and Table B page 76.

17. Select a Brake Size (required for all ball screw jack applications):

$$T_b = \frac{C}{TPI \times d \times R} \times \frac{(f \times T_{hb} \times N)}{R}$$

C = Motor brake factor R_1 = Reducer ratio
T_b = Motor brake torque T_{hb} = Hold torque (see technical data)
d = Stopping distance   N = Number of Uni-Lifts in the system

C Factor For Motor Brake (ft.-lbs.)

Motor	1140	1725	Motor	1140	1725
1/4	3.2	4.1	3	38	66.5
1/3	4	4.9	5	48.3	87.4
1/2	5.1	6.1	7 1/2	69.4	112
3/4	7.89	9.2	10	126	146
1	9.18	17.8	15	268	273
1 1/2	11.3	21.6	20	306	315
2	29.5	25.6	25	548	596