5
Appendix

Special Load Guidelines Overhung Load

Reducer/Gearmotor Allowable Overhung Load

When a sprocket, sheave, or gear is mounted on the shaft of a reducer, an overhung load is applied on that shaft. It is necessary to check if the shaft of the Cyclo® HBB Speed Reducer will allow the overhung load. Calculate the overhung load using this formula:

$$\text{Overhung Load} = \frac{126{,}000 \times HP \times Cf \times Lf \times Sf}{D \times N}$$

LEGEND
- **HP:** Horsepower transmitted by shaft
- **Cf:** Load connection factor (Table. 5.1)
- **Lf:** Load location factor (Table 5.3 Input Shaft; Fig. 5.1 Input Shaft)
- **Sf:** Service factor (Determine from Table 5.2 and "How to Select," pages 2.2 and 3.2)
- **D:** Pitch diameter of sprocket, etc.
- **N:** Shaft speed (rpm)

Table 5.1 Load Connection Factor

Type of Connection	Cf
General Purpose Chain	1.0
Machined Gear, Pinion or Synchronous Belt	1.25
V–Belt	1.5
Flat Belt	2.5

Table 5.2 Service Factor

Shock Factor	Sf
No Shock	1.0
Moderate Shock	1.5
Heavy Shock	2.0

Table 5.3 Input Shaft Overhung Load Location Factor, Lf

Model	L (inches)									
	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00
Z6090, Z6095	0.90	1.09	1.52	2.03						
A6100, A6105	0.93	1.09	1.52	2.03						
B6120, B6125		0.87	1.10	1.43	1.77	2.12				
C6140, C6145		0.84	0.98	1.25	1.53	1.83	2.11			
D6160, D6165		0.94	0.97	1.06	1.22	1.36	1.51	1.66		
E6170, E6175			0.95	0.99	1.09	1.23	1.38	1.51	1.79	2.08

Figure 5.1

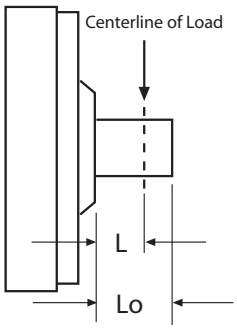

Table 5.4 Input Shaft Allowable Overhung Load (Lf, Cf, Fs =1) **Unit: lbs.**

Model	Ratio	Shaft Speed (RPM)						
		1750	1450	1165	980	870	720	580
Z6090, Z6095	6~17, 25~71, 119	66	66	66	66	66	66	66
	21, 87	44	44	44	44	55	55	66
A6100, A6105	6~11, 17~119	99	99	110	121	132	132	132
	13, 15	99	77	99	110	110	121	132
B6120, B6125	6~17	133	155	166	175	198	198	198
	21~87	121	99	110	121	133	198	198
C6140, C6145	6, 8	308	308	308	342	364	387	418
	11~21	277	220	243	265	277	297	330
	25	243	254	265	288	297	308	330
	29~87	121	133	133	155	155	155	243
D6160, D6165	8~25, 51, 59	398	398	441	463	486	486	486
	29~43, 71, 87	243	265	288	308	308	353	398
E6170, E6175	11~87	463	463	508	508	528	551	596

Special Load Guidelines **Inertia**

Table 5.6 Moment of Inertia on Motor Shaft of Gearmotor[1] Units: lbs•inch^2

Model	Reduction Ratio								
	11	18	21	28	39	46	53	60	74
Z6090, Z6095	–	–	0.475	0.337	0.247	0.245	0.231	0.200	0.150
A6100, A6105	1.737	0.711	0.513	0.331	0.191	0.173	0.149	0.108	0.108
B6120, B6125	5.609	2.213	17.408	1.245	0.735	0.728	0.660	0.496	0.530
C6140, C6145	14.638	5.711	5.130	3.263	2.124	1.662	1.443	1.245	1.019
D6160, D6165	41.724	16.382	13.441	8.721	5.369	4.617	4.036	3.379	2.965
E6170, E6175	87.210	35.226	32.866	22.640	16.142	14.159	12.244	11.457	10.328

Model	Reduction Ratio							
	88	102	123	151	179	207	249	305
Z6090, Z6095	0.142	0.118	0.091	0.088	0.085	0.063	0.083	0.062
A6100, A6105	0.095	0.066	0.059	0.054	0.071	0.048	0.067	0.045
B6120, B6125	0.482	0.340	0.316	0.295	0.400	0.276	0.386	0.263
C6140, C6145	0.913	0.821	0.770	0.708	0.681	0.674	0.650	0.643
D6160, D6165	2.698	2.370	2.226	2.090	2.035	2.028	1.925	1.888
E6170, E6175	9.747	9.166	8.858	8.550	8.413	8.276	8.208	8.140

Table 5.7 Moment of Inertia on Motor Shaft of 3-Phase Integral Motor Units: lbs•inch^2

1/8 HP x 4 Pole		1/4 HP x 4 Pole		1/3 HP x 4 pole		1/2 HP x 4 pole		3/4 HP x 4 pole		1 HP x 4 pole	
Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake
1.11	**1.20**	**1.71**	**1.88**	**1.71**	**1.88**	**2.22**	**2.31**	**3.45**	**3.79**	**4.10**	**4.44**
1/5 HP x 4 Pole		**2 HP x 4 Pole**		**3 HP x 4 pole**		**5 HP x 4 pole**		**7.5 HP x 4 pole**		**10 HP x 4 pole**	
Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake
6.32	**7.11**	**7.28**	**8.03**	**11.4**	**12.7**	**29.0**	**32.7**	**39.0**	**42.7**	**91.6**	**104**
15 HP x 4 Pole		**20 HP x 4 Pole**		**25 HP x 4 pole**		**30 HP x 4 pole**		**40 HP x 4 pole**		**50 HP x 4 pole**	
Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake
128	**140**	**307**	**455**	**769**	**793**	**769**	**793**	**855**	**878**	**1053**	**1097**

Table 5.8 Moment of Inertia on Motor Shaft of 3 Phase, Inverter Duty**, Integral Motor** Units: lbs•inch^2

1/8 HP x 4 Pole		1/4 HP x 4 Pole		1/2 HP x 4 pole		1 HP x 4 pole		2 HP x 4 pole		3 HP x 4 pole	
Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake
1.71	**1.88**	**2.22**	**2.31**	**4.10**	**4.44**	**7.28**	**8.03**	**11.4**	**12.7**	**29.0**	**32.7**
5 HP x 4 Pole		**7.5 HP x 4 Pole**		**10 HP x 4 pole**		**15 HP x 4 pole**		**20 HP x 4 pole**		**25 HP x 4 pole**	
Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake	Standard	w/ Brake
39.0	**42.7**	**91.6**	**104**	**128**	**140**	**307**	**455**	**769**	**-**	**769**	**793**
30 HP x 4 Pole		**40 HP x 4 Pole**									
Standard	w/ Brake	Standard	w/ Brake								
855	**878**	**1053**	**1097**								

Note: [1] Table 5.7 does not include the inertia of the integral motors. Total unit inertia is obtained by adding the reducer inertia to the motor inertia.

Special Load Guidelines **Misc.**

Table 5.9 Actual Reduction Ratio

Model	Nominal Reduction Ratio								
	11	18	21	28	39	46	53	60	74
Z6090, Z6095	–	–	21.80	27.73	38.13	45.07	52.00	58.93	72.80
A6100, A6105	10.50	16.80	21.00	28.00	38.50	45.50	52.50	59.50	73.50
B6120, B6125	10.50	17.12	21.00	28.00	38.50	45.50	52.50	59.50	73.50
C6140, C6145	10.89	17.50	21.00	28.00	38.50	45.50	52.50	59.50	73.50
D6160, D6165	10.75	17.61	20.80	27.73	38.13	45.07	52.00	58.93	72.80
E6170, E6175	10.75	17.51	20.80	27.73	38.13	45.07	52.00	58.93	72.80

Model	Nominal Reduction Ratio							
	88	102	123	151	179	207	249	305
Z6090, Z6095	86.67	100.5	121.3	149.1	176.8	204.5	246.1	301.6
A6100, A6105	87.50	101.5	122.5	150.5	178.5	206.5	248.5	304.5
B6120, B6125	87.50	101.5	122.5	150.5	178.5	206.5	248.5	304.5
C6140, C6145	87.50	101.5	122.5	150.5	178.5	206.5	248.5	304.5
D6160, D6165	86.67	100.5	121.3	149.1	176.8	204.5	246.1	301.6
E6170, E6175	86.67	100.5	121.3	149.1	176.8	204.5	246.1	301.6

Excessive Overloads

Cyclo® HBB Speed Reducers provide 300% momentary intermittent shock load capacity and are warranted for 2 years from date of shipment. Refer to our standard terms and conditions for our complete warranty.

Selection for Applications Involving Shock Loading

For applications involving frequent start-stop, braking or reversing, or quick starting of load having large inertia, consult factory for model selection or recommended modifications.