

# Overhung Load (OHL)

For applications using chain, belt, or pinion connection, please make sure the overhung load exerted on input and output shafts do not exceed the permissible values. This would prevent the reduction in service life caused by bearing damage.

Overhung load (lbs) can be calculated using the following formula: (English)

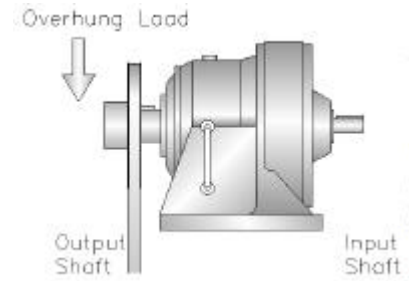
Overhung Load Fr in lbs:

$$= \frac{126,000}{\Phi_{\text{sprocket pitch in inch}} \times \text{rpm}} \leq F_{ro}$$

Overhung load (kgs) can be calculated using the following formula: (Metric)

Overhung Load Fr in kgs:

$$= \frac{1,451,691}{\Phi_{\text{sprocket in mm}} \times \text{rpm}} \leq F_{ro}$$



Connection Coefficient - Fc

Connection Type	Fc
Chain	1
Gear or Pinion	1.25
V-Belt	1.5
Flat-Belt	2.5

Calculated OHL must NOT be greater than the allowable OHL

- Fr:** Actual Overhung Load (lbs or kgs)
- Fro:** Permissible Overhung Load (lbs or kgs)
- Fc:** Connection Coefficient
- Fs:** Load Nature Coefficient
- Fl:** Load Position Coefficient
- rpm:** RPM of Output Shaft

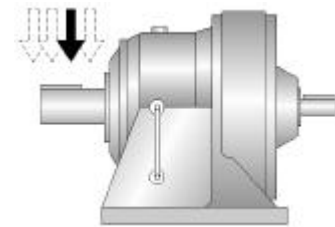
Load Nature Coefficient - Fs

Load Nature	Fs
Uniform	1
Moderate Shock	1 ~ 1.2
Heavy Shock	1.4 ~ 1.6

- ◆ If application overhung load is greater than Fro, select a larger frame size with Fro greater than the overhung load.
- ◆ For high frequency start/stop applications, use larger service factor (FS).
- ◆ Please consult factory for any special application.

## Output Shaft Load Position Coefficient (Fl)

Frame Size		Distance From Oil Seal (inch)																				
Single Reduction 6:1~87:1	Double Reduction 88:1~7569:1	0.25	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	4.5	5	6	7	8	9	10	11	12
		Distance From Oil Seal (mm)																				
		6	13	19	25	32	38	44	51	64	76	89	102	114	127	152	178	203	229	254	279	305
B07	B0707	0.83	1.07	1.56																		
B08	B0807	0.82	0.96	1.29	1.59	1.88																
B09	B0908	0.86	0.97	1.08	1.19	1.30	1.41	1.52	1.64													
B10	B1008	0.86	0.97	1.08	1.19	1.30	1.41	1.52	1.64													
B11	B1109		0.85	0.92	0.97	1.08	1.34	1.59	1.76													
B12	-		0.85	0.92	0.97	1.08	1.34	1.59	1.76													
B13	B1310			0.87	0.92	0.96	1.07	1.25	1.38	1.75												
B14	B1409			0.66	0.73	0.80	0.90	1.00	1.10	1.40	1.60	1.90										
B15	-			0.66	0.73	0.80	0.90	1.00	1.10	1.40	1.60	1.90										
B16	B1611			0.83	0.87	0.90	0.95	1.00	1.11	1.42	1.64	1.96										
B17	B1711			0.86	0.89	0.92	0.96	1.00	1.11	1.42	1.64	1.96										
B18	B1813				0.85	0.87	0.92	0.95	0.98	1.17	1.35	1.60	1.78									
B19	B1911 B1913					0.85	0.88	0.91	0.93	1.00	1.11	1.32	1.46	1.70								
B20	B2011 B2013							0.74	0.77	0.87	0.95	1.05	1.12	1.23	1.32	1.47						
B21	B2113 B2116							0.73	0.77	0.87	0.95	1.05	1.13	1.24	1.33	1.49						
B22	B2213 B2217							0.88	0.90	0.94	0.98	1.02	1.06	1.11	1.17	1.18						
B23	B2316 B2318							0.84	0.85	0.89	0.93	0.97	1.00	1.05	1.11	1.15	1.24	1.30				
B24	B2416 B2418							0.84	0.86	0.90	0.93	0.97	1.00	1.05	1.11	1.14	1.23	1.29				
B25	B2517 B2519								0.83	0.86	0.89	0.93	0.95	0.99	1.04	1.08	1.22	1.36	1.52	1.69		
B26	B2619									0.84	0.88	0.90	0.93	0.97	1.01	1.17	1.29	1.45	1.61	1.77	1.93	
B27	B2719										0.71	0.75	0.80	0.88	0.94	1.09	1.21	1.35	1.50	1.65	1.79	



If overhung load acts on the mid-point of output shaft, Fl = 1

# Overhung Load (OHL)

## Permissible Output Shaft Overhung Load - Fro (lbs)

Frame Size		Output RPM																					
Single Reduction	Double Reduction	~1	2	3	4	5	10	15	20	25	30	35	40	50	60	80	100	125	150	200	250	300	
B07	B0707	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	245	229	216	196			
B08	B0807	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	388	366	333	309	289
B09	B0908	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	730	686	624	580	547	
B10	B1008	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1213	1149	1080	981	913	858	
B11	B1109	1940	1940	1940	1940	1940	1940	1940	1940	1940	1940	1940	1940	1940	1840	1670	1550	1440	1350	1230	1140	1080	
B12	-	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2100	1950	1850	1680	1560	1450	1370	1240	1150	1080	
B13	B1310	3310	3310	3310	3310	3310	3310	3310	3090	2870	2700	2560	2450	2270	2140	1940	1810	1680	1580	1430	1330	1250	
B14	B1409	3600	3600	3600	3600	3600	3600	3500	3310	3310	3310	3220	3090	2890	2730	2510	2340	2190	2070	1903	1781	1684	
B15	-	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3530	3370	3200	2930	2730	2560	2430	2230	2070	1960	
B16	B1611	4960	4960	4960	4960	4960	4960	4830	4410	4410	4370	4140	3970	3700	3480	3150	2930	2710	2560	2310	2150	2030	
B17	B1711	6630	6630	6630	6630	6630	6630	6510	5920	5490	5170	4910	4700	4360	4100	3730	3460	3210	3020	2750	2550	2400	
B18	B1813	9380	9380	9380	9380	9380	9380	8750	7950	7380	6940	6600	6310	5860	5510	5010	4650	4320	4060	3690			
B19	B1911 B1913	13250	13250	13250	13250	13250	13250	12200	11100	10300	9710	9230	8830	8190	7710	7000	6500	6040	5680	5160			
B20	B2011 B2013	18900	18900	18900	18900	18900	18900	18900	18900	18800	17800	17000	16300	15200	14400	13200	12400	11600	11000	10100			
B21	B2113 B2116	23400	23400	23400	23400	23400	23400	22200	20300	19000	18000	17200	16500	15500	14600	13400	12600	11700	11100	10200			
B22	B2213 B2217	27300	27300	27300	27300	27300	26400	23300	21400	20000	19000	18100	17400	16300	15400	14100	13200	12400	11700	10700			
B23	B2316 B2318	34000	34000	34000	34000	34000	32900	29100	26700	24900	23600	22500	21700	20300	19200	17600	16500	15400					
B24	B2416 B2418	37700	37700	37700	37700	37700	34500	32400	29700	27800	26300	25100	24100	22600	21400	19600	18300	17100					
B25	B2517 B2519	46300	46300	46300	46300	46300	44700	39600	36300	34000	32200	30700	29500	27600	26100	24000	22400	21000					
B26	B2619	56400	56400	56400	56400	56400	54600	48300	44300	41500	39300	37500	36000	33700	31900	29300	27400	25600					
B27	B2719	55700	55700	55700	55700	55700	55700	55700	55700	55700	55700	55700											

Values above are for condition of Fc, Fs, Fl = 1

## Permissible Output Shaft Overhung Load - Fro (kgs)

Frame Size		Output RPM																					
Single Reduction	Double Reduction	~1	2	3	4	5	10	15	20	25	30	35	40	50	60	80	100	125	150	200	250	300	
B07	B0707	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	111	104	98	89			
B08	B0807	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	176	166	151	140	131	
B09	B0908	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	331	311	283	263	248	
B10	B1008	550	550	550	550	550	550	550	550	550	550	550	550	550	550	550	550	521	490	445	414	389	
B11	B1109	880	880	880	880	880	880	880	880	880	880	880	880	880	880	835	758	703	653	612	558	517	490
B12	-	998	998	998	998	998	998	998	998	998	998	998	953	885	839	762	708	658	621	562	522	490	
B13	B1310	1501	1501	1501	1501	1501	1501	1501	1402	1302	1225	1161	1111	1030	971	880	821	762	717	649	603	567	
B14	B1409	1633	1633	1633	1633	1633	1633	1588	1501	1501	1501	1461	1402	1311	1238	1139	1061	993	939	863	808	764	
B15	-	1633	1633	1633	1633	1633	1633	1633	1633	1633	1633	1633	1601	1529	1452	1329	1238	1161	1102	1012	939	889	
B16	B1611	2250	2250	2250	2250	2250	2250	2191	2000	2000	1982	1878	1801	1678	1579	1429	1329	1229	1161	1048	975	921	
B17	B1711	3007	3007	3007	3007	3007	3007	2953	2685	2490	2345	2227	2132	1978	1860	1692	1569	1456	1370	1247	1157	1089	
B18	B1813	4255	4255	4255	4255	4255	4255	3969	3606	3348	3148	2994	2862	2658	2499	2273	2109	1960	1842	1674			
B19	B1911 B1913	6010	6010	6010	6010	6010	6010	5534	5035	4672	4404	4187	4005	3715	3497	3175	2948	2740	2576	2341			
B20	B2011 B2013	8573	8573	8573	8573	8573	8573	8573	8573	8528	8074	7711	7394	6895	6532	5987	5625	5262	4990	4581			
B21	B2113 B2116	10614	10614	10614	10614	10614	10614	10070	9208	8618	8165	7802	7484	7031	6623	6078	5715	5307	5035	4627			
B22	B2213 B2217	12383	12383	12383	12383	12383	11975	10569	9707	9072	8618	8210	7893	7394	6985	6396	5987	5625	5307	4853			
B23	B2316 B2318	15422	15422	15422	15422	15422	14923	13200	12111	11295	10705	10206	9843	9208	8709	7983	7484	6985					
B24	B2416 B2418	17101	17101	17101	17101	17101	15649	14697	13472	12610	11930	11385	10932	10251	9707	8891	8301	7757					
B25	B2517 B2519	21002	21002	21002	21002	21002	20276	17962	16466	15422	14606	13925	13381	12519	11839	10886	10161	9526					
B26	B2619	25583	25583	25583	25583	25583	24766	21909	20094	18824	17826	17010	16329	15286	14470	13290	12429	11612					
B27	B2719	25265	25265	25265	25265	25265	25265	25265	25265	25265	25265	25265											

Values above are for condition of Fc, Fs, Fl = 1

# Overhung Load (OHL)

## Permissible Output Shaft Overhung Load - Fro (lbs)

(Ductile Iron Housing w/ High Capacity Double-Row Spherical Roller Bearing)

Frame Size		Output RPM															
Single Reduction	Double Reduction	~10	15	20	25	30	35	40	50	60	80	100	125	150	200	250	300
B13	B1310	4420	4420	4420	4420	4240	4050	3910	3640	3440	3170	2980	2780	2620	2410	2250	2130
B16	B1611	6620	6620	6620	6620	6620	6620	6370	5950	5650	5180	4850	4520	4270	3940	3670	3470
B17	B1711	9660	9660	9660	9660	9450	9010	8650	8100	7660	7030	6590	6150	5810	5350	4990	4740
B18	B1813	12300	12300	12300	12300	12300	11900	11400	10700	10100	9290	8680	8130	7690	7050		
B19	B1911 B1913	13250	13250	13250	13250	13250	13250	13250	13100	12400	11400	10600	9950	8420	8650		

Values above are for condition of Fc, Fs, FI = 1



Double-Row Spherical Roller Bearing

## Permissible Output Shaft Overhung Load - Fro (kgs)

(Ductile Iron Housing w/ High Capacity Double-Row Spherical Roller Bearing)

Frame Size		Output RPM															
Single Reduction	Double Reduction	~10	15	20	25	30	35	40	50	60	80	100	125	150	200	250	300
B13	B1310	2005	2005	2005	2005	1923	1837	1774	1651	1560	1438	1352	1261	1188	1093	1021	966
B16	B1611	3003	3003	3003	3003	3003	3003	2889	2699	2563	2350	2200	2050	1937	1787	1665	1574
B17	B1711	4382	4382	4382	4382	4286	4087	3924	3674	3475	3189	2989	2790	2635	2427	2263	2150
B18	B1813	5579	5579	5579	5579	5579	5398	5171	4853	4581	4214	3937	3688	3488	3198		
B19	B1911 B1913	6010	6010	6010	6010	6010	6010	6010	5942	5625	5171	4808	4513	3819	3924		

Values above are for condition of Fc, Fs, FI = 1



**FCD45**  
Ductile Iron Housing

## Input Shaft Load Position Coefficient (fl)

Frame Size		Distance From Oil Seal (inch)																
Single Reduction	Double Reduction	0.25	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	4.5	5	6	7	8
		Distance From Oil Seal (mm)																
6:1~87:1	88:1~7569:1	6	13	19	25	32	38	44	51	64	76	89	102	114	127	152	178	203
B07	B0707 B0807	0.73	1.06	1.60	2.00													
B08	B0908 B1008	0.73	1.06	1.60	2.00													
B09	B1109 B1409	0.88	1.08	1.59	2.00	2.38												
B10	B1310	0.91	1.09	1.59	2.00	2.38												
B11	B1611 B1711 B1911 B2011		0.87	1.14	1.41	1.67	2.09											
B12	-		0.87	1.14	1.41	1.67	2.09											
B13	B1813 B1913 B2013 B2113 B2213		0.84	1.00	1.23	1.45	1.81	2.13										
B14	B1409		0.84	1.00	1.23	1.45	1.81	2.13										
B15	-		0.84	1.00	1.23	1.45	1.81	2.13										
B16	B2116 B2316 B2416		0.94	0.98	1.05	1.18	1.35	1.52	1.64									
B17	B2217 B2517			0.96	0.99	1.05	1.22	1.39	1.49	1.77	2.05							
B18	B2318 B2418			0.93	0.96	0.99	1.10	1.25	1.35	1.61	1.86	2.17						
B19	B2519 B2619 B2719			0.93	0.95	0.98	1.05	1.16	1.25	1.46	1.67	1.92	2.08					
B20	-				0.93	0.95	0.99	1.04	1.10	1.25	1.39	1.56	1.68	1.85				
B21	-				0.93	0.95	0.99	1.03	1.08	1.22	1.35	1.51	1.61	1.77				
B22	-				0.94	0.96	0.99	1.02	1.04	1.10	1.19	1.33	1.42	1.56				
B23	-				0.84	0.86	0.88	0.93	0.98	1.09	1.21	1.34	1.44	1.58				
B24	-				0.91	0.92	0.95	0.98	0.99	1.09	1.20	1.33	1.42	1.55				
B25	-						0.93	0.94	0.96	1.00	1.06	1.16	1.22	1.31	1.40	1.54	1.72	
B26	-						0.93	0.94	0.96	1.00	1.06	1.16	1.22	1.31	1.40	1.54	1.72	
B27	-							0.93	0.94	0.98	1.22	1.14	1.22	1.35	1.48	1.64	1.92	2.08

If overhung load acts on the mid-point of input shaft, FI = 1

# Overhung Load (OHL)

## Permissible Input Shaft Overhung Load - fro

Frame Size			Permissible OHL in lbs							Permissible OHL in kgs						
Single Reduction	Double Reduction	Reduction Ratio Input Stage	Input RPM							Input RPM						
			1800	1500	1200	1000	900	750	600	1800	1500	1200	1000	900	750	600
B07	B0707 B0807	11~17,25~35	22	22	22	22	22	22	22	10	10	10	10	10	10	10
		21,43	11	11	11	11	11	11	11	11	5	5	5	5	5	5
B08	B0908 B1008	6~17,25~35,51,59	44	33	33	44	44	44	44	20	15	15	20	20	20	20
		21,43	11	11	11	11	11	33	44	5	5	5	5	5	15	20
B09	B1109 B1409	6~17,25~71	66	66	66	66	66	66	66	30	30	30	30	30	30	30
		21,87	44	44	44	44	55	55	66	20	20	20	20	25	25	30
B10	B1310	6~11,17~87	99	99	110	121	132	132	132	45	45	50	55	60	60	60
		13,15	99	99	99	110	110	121	132	45	45	45	50	50	55	60
B11	B1611 B1711 B1911 B2011	6~17	132	154	165	176	198	198	198	60	70	75	80	90	90	90
		21~87	121	110	110	121	132	198	198	55	50	50	55	60	90	90
B12	-	6~17	132	154	165	176	198	198	198	60	70	75	80	90	90	90
		21~87	121	110	110	121	132	198	198	55	50	50	55	60	90	90
B13	B1813 B1913 B2013 B2113 B2213	6~17,21	309	309	309	342	364	386	419	140	140	140	155	165	175	190
		25~87	287	287	287	309	331	353	397	130	130	130	140	150	160	180
B14	B1409	11~17	309	309	309	342	364	386	419	140	140	140	155	165	175	190
		21~87	287	287	287	309	331	353	397	130	130	130	140	150	160	180
B15	-	6,8	309	309	309	342	364	386	419	140	140	140	155	165	175	190
		11	276	220	243	265	276	298	331	125	100	110	120	125	135	150
		25	243	254	265	287	298	309	331	110	115	120	130	135	140	150
		29~87	121	132	132	154	154	154	243	55	60	60	70	70	70	110
B16	B2116 B2316 B2416	8~25,51,59	397	397	441	463	485	485	485	180	180	200	210	220	220	220
		29~43,71,87	243	265	287	309	309	353	397	110	120	130	140	140	160	180
B17	B2217 B2517	11~87	463	463	507	507	529	551	595	210	210	230	230	240	250	270
B18	B2318 B2418	11~87	617	573	617	661	683	750	772	280	260	280	300	310	340	350
B19	B2519 B2619 B2719	11~25	683	683	728	794	816	882	882	310	310	330	360	370	400	400
		29~87	595	573	639	661	705	750	816	270	260	290	300	320	340	370
B20	N / A	11~87	1213	1102	1213	1323	1367	1400	1389	550	500	550	600	620	635	630
B21	N / A	11~87	1290	1146	1224	1378	1422	1532	1631	585	520	555	625	645	695	740
B22	N / A	11~87	1488	1301	1345	1444	1488	1565	1687	675	590	610	655	675	710	765
B23	N / A	11~87			2249	2138	2061	2017	1962			1020	970	935	915	890
B24	N / A	11~87			2491	2271	2271	2381	2513			1130	1030	1030	1080	1140
B25	N / A	11~87			2646	2425	2535	2756	2954			1200	1100	1150	1250	1340
B26	N / A	11~87			2646	2425	2535	2756	2954			1200	1100	1150	1250	1340
B27	N / A	43,59			3307	3307	3307	3307	3307			1500	1500	1500	1500	1500

Values above are for condition of Fc, Fs, FI = 1

### NOTE:

According to formula on the right, you can easily see that the following conditions contribute to higher Overhung Load (OHL):

- ❖ Sprocket teeth or pulley groove installed beyond the mid-point of output shaft.
- ❖ The use of flat belt.
- ❖ Heavy shock load in the application.
- ❖ Relatively small pitch diameter of sprocket or pulley.
- ❖ Low output rpm.

Contact factory if you need help in Overhung Load (OHL) calculation.

$$= \frac{126,000}{\Phi_{\text{sprocket pitch in inch}} \times \text{rpm}}$$

