Cone Drive

ACCUDRIVE

SERIES HP SERVO

ACCUDRIVE PRECISION PRODUCTS

Now you can get design flexibility and lasting performance from our complete family of AccuDrive Precision Products.

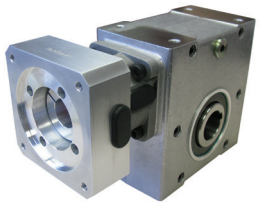
Series W Precision Servo Gearhead

Output torque up to 8,500 lb.in.
Motor adapters to fit servo motors.
Center distance from 38 to 89 mm.
Speed range up to 6,000 RPM input.
Sizes available 38, 51, 64, 76 and 89.
Universal Mounting with shaft mount and flange mount standard.
Gear ratios from 5:1 to 60:1, special ratios available.
Standard backlash, low backlash and ZERO backlash available.

Model RG Right Angle Gearhead

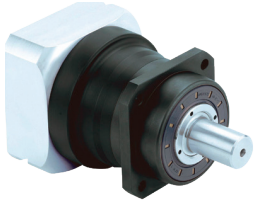
Output torque capacity up to 8,500 lb.in.
Motor sizes (standard), adapters to fit servo motors, NEMA and IEC
Center distance 1.5 to 3.5 inches
Input power ratings up to 27 H.P, speed range up to 4,000 RPM
Sizes available 15, 20, 25, 30 and 35
Universal Mounting with shaft mount and flange mount standard in single reduction type
Gear ratios from 5:1 to 60:1

Series S Servo Gearhead



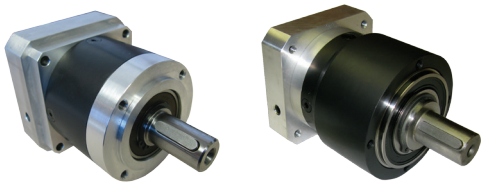
Economical Servo Solution
Output torque up to 7,540 lb.In.
Motor adapters to fit servo motors
Center distance from 1.33 inch up to 3.54 inch
Speed range up to 4,000 RPM
Flexible mounting (hollow output standard with plug in solid shaft)
Ratios from 5:1 to 60:1

Series P In-line Planetary Servo Gearhead



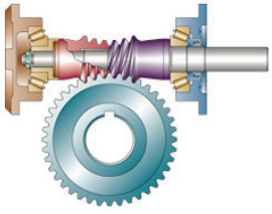
Output torque capacity up to 15,930 lb.in.
Speed range up to 10,000 RPM input.
Sizes available 70, 90, 115, 142 and 190.
Gear ratios from 3:1 to 40:1 available from stock.
Universal Mounting with shaft mount and flange mount standard.
Three arcminutes backlash or better.

Series E & LE In-line Planetary Servo Gearhead



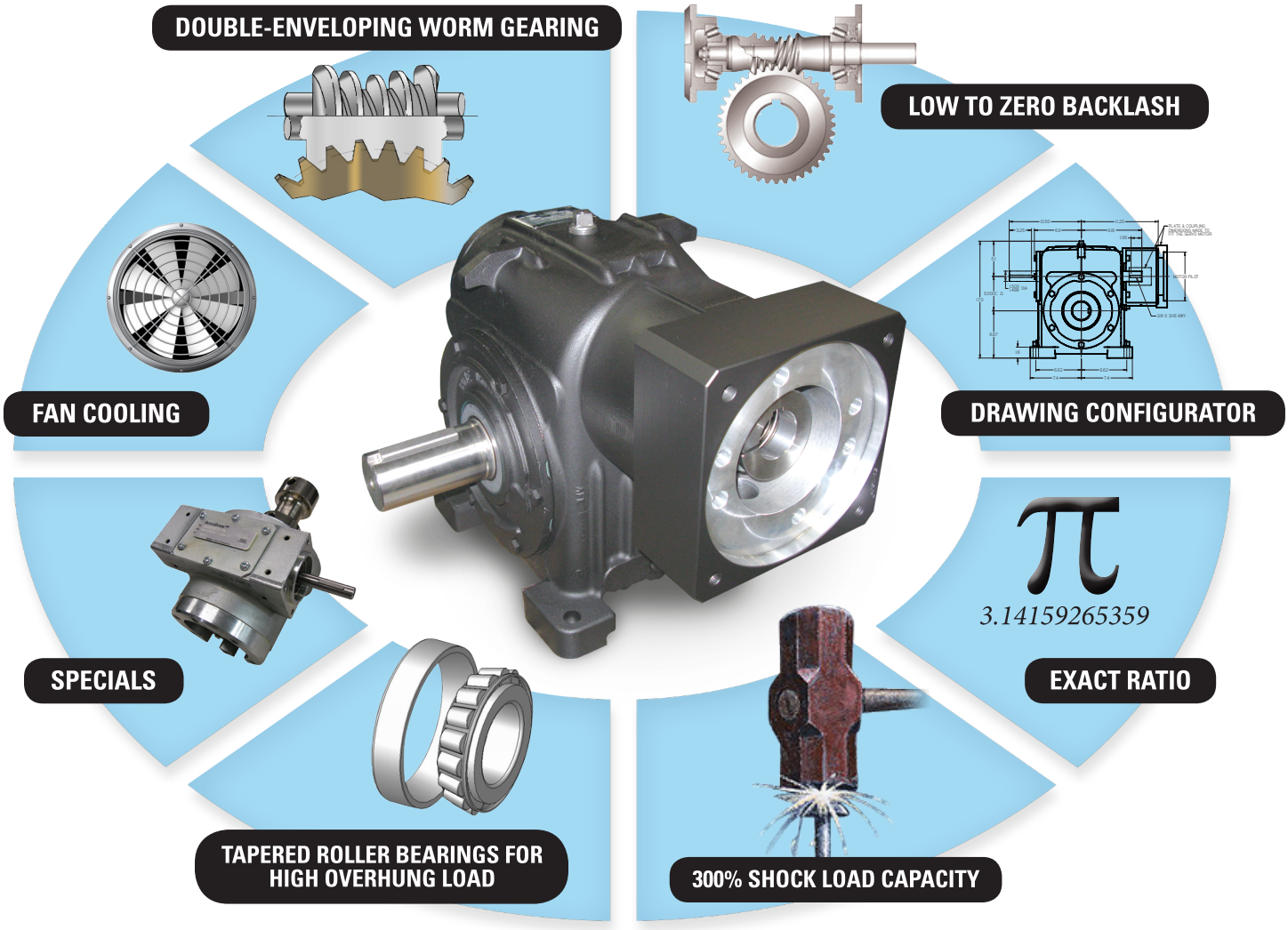
Output torque capacity up to 7,080 lb.in.
Speed range up to 10,000 RPM input.
Sizes 40, 60, 90, 115, 512 and 160 (Series E)
Gear ratios from 3:1 to 64:1 (Series E)
Sizes 50, 70, 90 and 120 (Series LE)
Gear ratios from 3:1 to 100:1 (Series LE)
Universal Mounting with shaft mount and flange mount standard.
Backlash as low as eight arcminutes.

ABSOLUTE ZERO Backlash AccuDrive Gearing

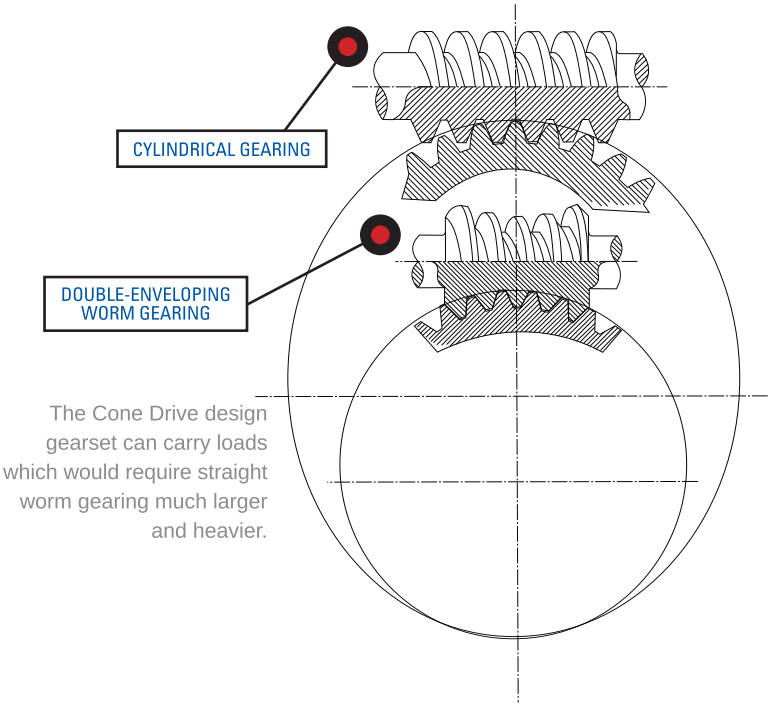


Unique design captures both sides of the gear tooth to completely eliminate backlash. Automatically compensates for wear-guaranteed zero backlash for the life of the gearest. Available for single, double and triple reduction types, gear sets, special designs and the Series W.

Features and Benefits

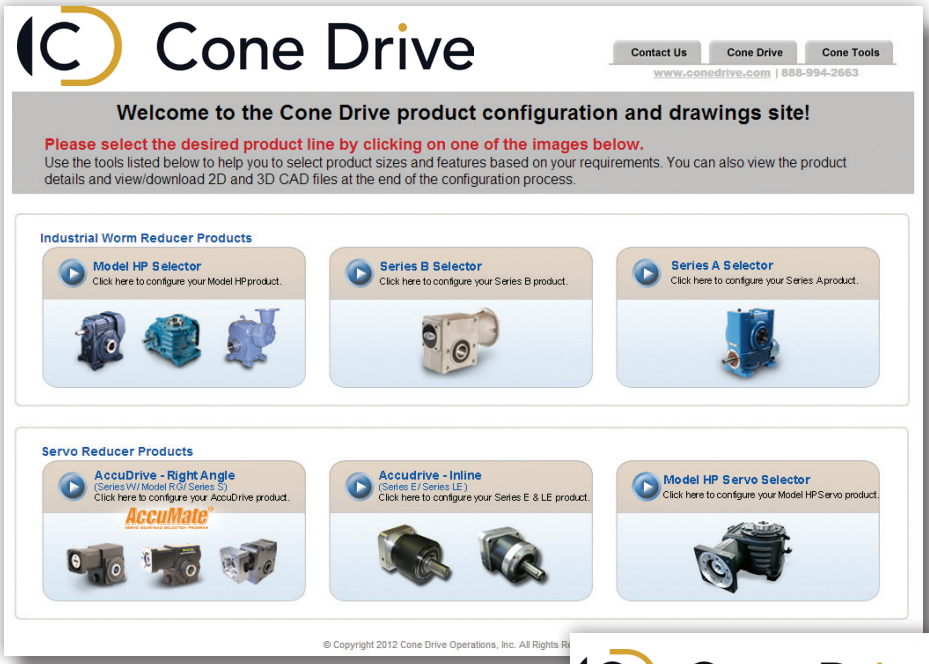


As servo motor capacity increases, Cone Drive is meeting the needs of the marketplace by offering reducers capable of higher torque demands. Only in the Model HP will you get true double-enveloping worm gear technology, unsurpassed in the market where both performance and positional accuracy are demanded.



The Cone Drive design gearset can carry loads which would require straight worm gearing much larger and heavier.

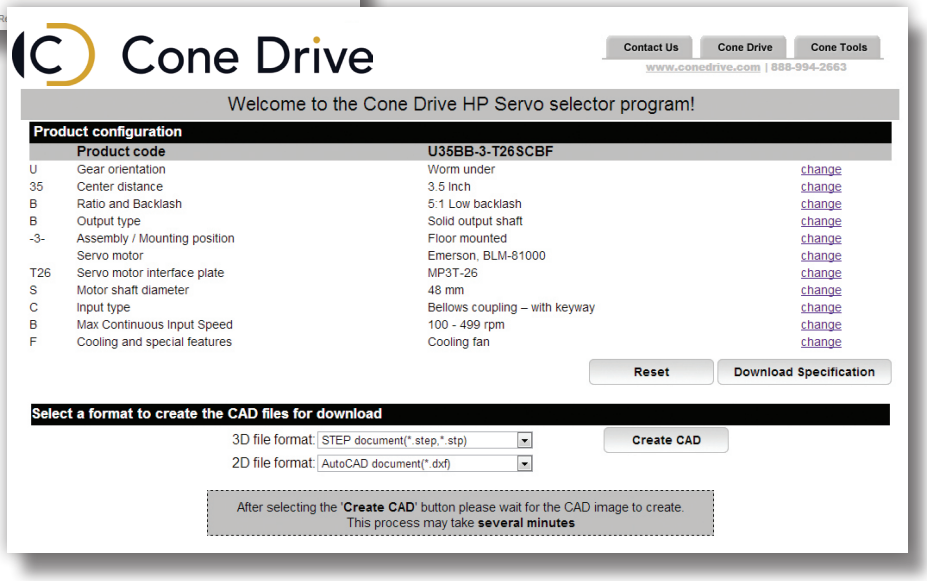
Contents



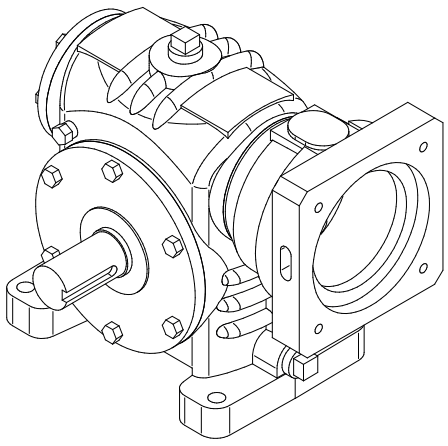
Cone Drive Drawing Downloads

Visit www.Conedrive.com

Download 2-D or 3-D models of standard single reduction reducers



Drawings & Models of Product HP Servo Reducers available.

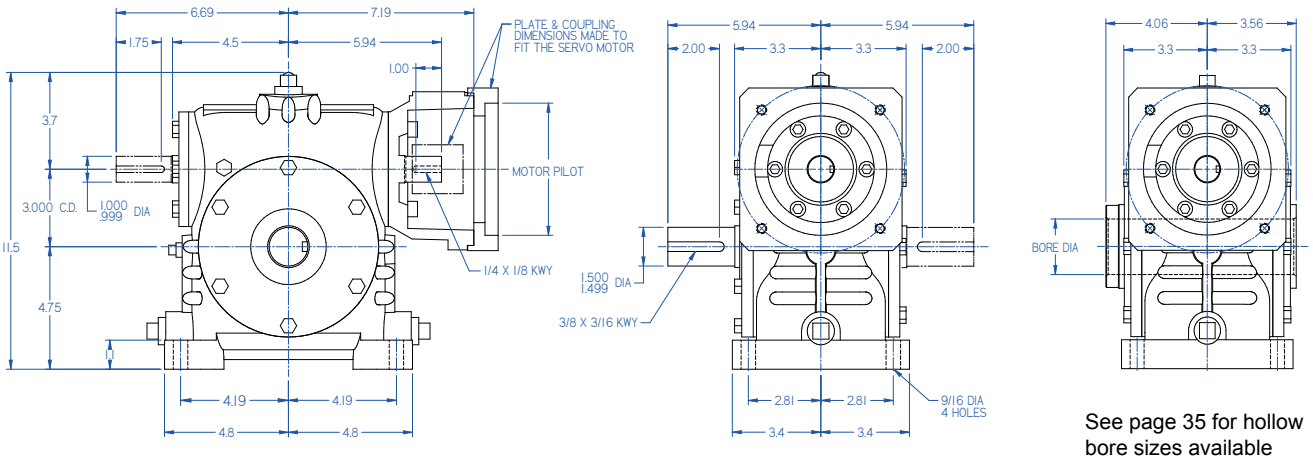


Cone Drive Single Reduction Units - 3.000" C.D.

Size 30 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O

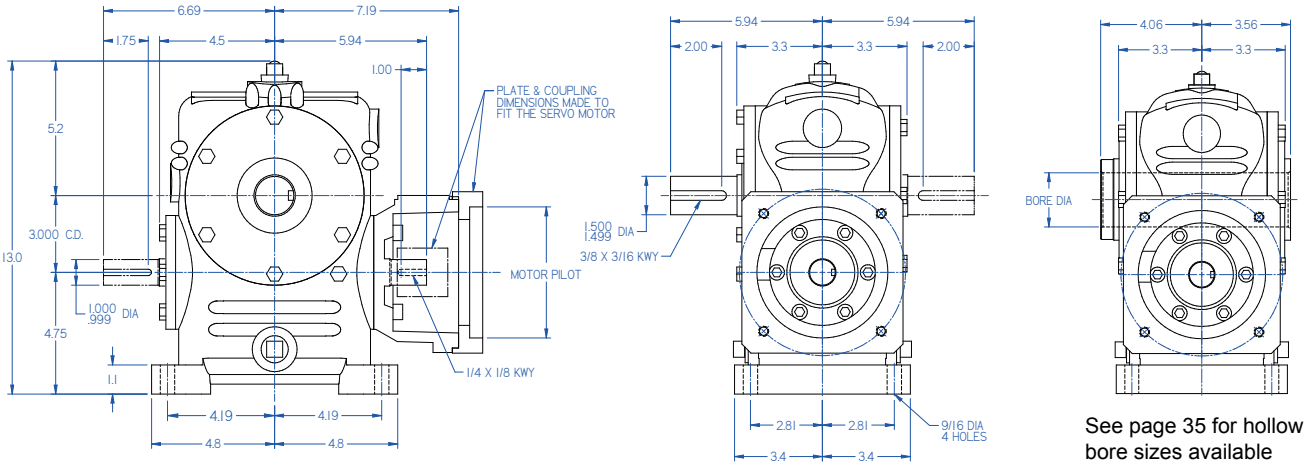
UNIT TYPE O Worm Over Gear net wt. 87 lb net wt.106 lb



See page 35 for hollow bore sizes available

UNIT TYPE U

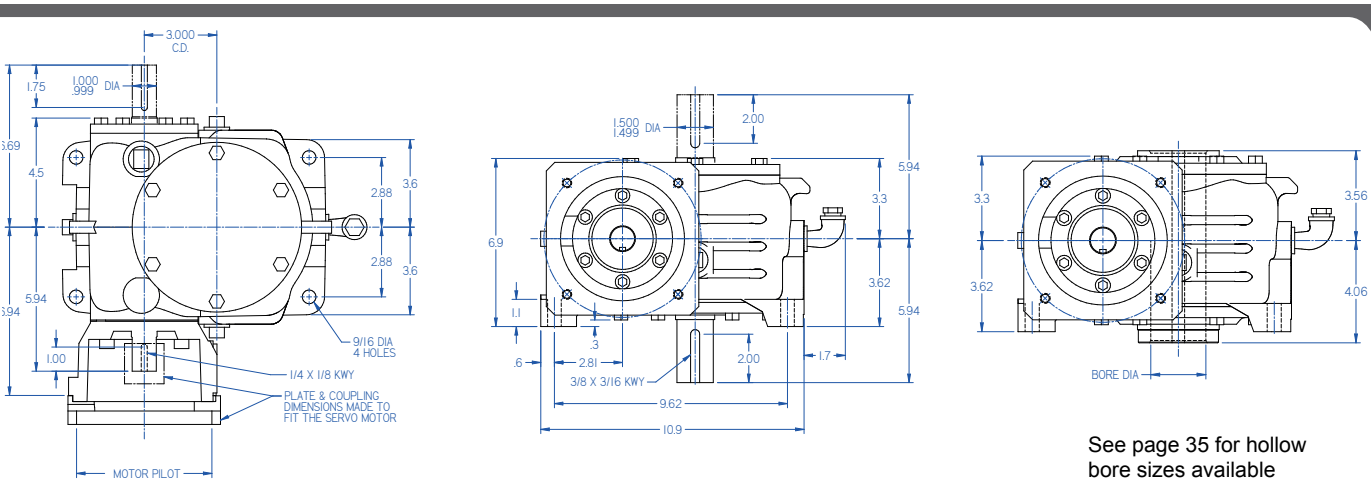
UNIT TYPE U Worm Under Gear net wt. 97 lb net wt.104 lb



See page 35 for hollow bore sizes available

UNIT TYPE V

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 88 lb net wt.103 lb



See page 35 for hollow bore sizes available

Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

Rating Tables for Size 30

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Input Speed (RPM)

Ratio to 1		500		1000		1500		2000		2500		3000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	4,196	474	3,732	422	3,280	371	2,914	329	2,623	296	2,409	272	11,601	1,311
	T_{run}	3,732	422	2,914	329	2,409	272	2,094	237	1,842	208	1,631	184		
	$T_{thermal}$	2,898	327	1,648	186	1,099	124	824	93	580	65	483	55		
	$T_{thermal\ fan}$	NA	NA	2,914	329	2,409	272	2,094	237	1,842	208	1,631	184		
	Efficiency	0.91		0.92		0.92		0.92		0.91		0.91			
10	T_{accel}	5,501	622	5,042	570	4,645	525	4,208	475	3,802	430	3,484	394	13,828	1,562
	T_{run}	5,042	570	4,208	475	3,484	394	3,050	345	2,695	304	2,431	275		
	$T_{thermal}$	3,837	433	2,580	291	1,720	194	1,290	146	928	105	773	87		
	$T_{thermal\ fan}$	NA	NA	4,208	475	3,484	394	3,050	345	2,695	304	2,431	275		
	Efficiency	0.87		0.90		0.90		0.90		0.89		0.89			
15	T_{accel}	6,379	721	5,948	672	5,499	621	5,064	572	4,571	516	4,200	475	13,873	1,567
	T_{run}	5,948	672	5,064	572	4,200	475	3,674	415	3,251	367	2,935	332		
	$T_{thermal}$	4,515	510	3,153	356	2,102	238	1,577	178	1,151	130	959	108		
	$T_{thermal\ fan}$	NA	NA	5,064	572	4,200	475	3,674	415	3,251	367	2,935	332		
	Efficiency	0.84		0.88		0.88		0.88		0.87		0.87			
20	T_{accel}	6,189	699	5,878	664	5,429	613	4,953	560	4,502	509	4,155	469	13,458	1,521
	T_{run}	5,878	664	4,953	560	4,155	469	3,640	411	3,215	363	2,905	328		
	$T_{thermal}$	4,888	552	3,010	340	2,166	245	1,624	184	1,204	136	1,003	113		
	$T_{thermal\ fan}$	NA	NA	4,953	560	4,155	469	3,640	411	3,215	363	2,905	328		
	Efficiency	0.81		0.84		0.85		0.85		0.84		0.84			
25	T_{accel}	6,081	687	5,904	667	5,387	609	4,954	560	4,521	511	4,140	468	12,827	1,449
	T_{run}	5,904	667	4,954	560	4,140	468	3,631	410	3,210	363	2,898	327		
	$T_{thermal}$	5,904	667	3,499	395	2,508	283	1,881	213	1,400	158	1,166	132		
	$T_{thermal\ fan}$	NA	NA	4,954	560	4,140	468	3,631	410	3,210	363	2,898	327		
	Efficiency	0.81		0.83		0.84		0.84		0.83		0.83			
30	T_{accel}	5,778	653	5,426	613	5,165	584	4,738	535	4,321	488	3,963	448	12,329	1,393
	T_{run}	5,426	613	4,738	535	3,963	448	3,472	392	3,070	347	2,768	313		
	$T_{thermal}$	4,895	553	3,235	366	2,293	259	1,720	194	1,294	146	1,078	122		
	$T_{thermal\ fan}$	NA	NA	4,738	535	3,963	448	3,472	392	3,070	347	2,768	313		
	Efficiency	0.74		0.79		0.80		0.80		0.79		0.79			
40	T_{accel}	5,260	594	5,169	584	4,999	565	4,524	511	4,133	467	3,791	428	11,108	1,255
	T_{run}	5,169	584	4,524	511	3,791	428	3,319	375	2,934	331	2,643	299		
	$T_{thermal}$	5,169	584	3,440	389	2,421	273	1,815	205	1,376	155	1,147	130		
	$T_{thermal\ fan}$	NA	NA	4,524	511	3,791	428	3,319	375	2,934	331	2,643	299		
	Efficiency	0.70		0.75		0.76		0.76		0.75		0.75			
50	T_{accel}	5,085	575	5,035	569	4,812	544	4,360	493	3,981	450	3,651	413	9,860	1,114
	T_{run}	5,035	569	4,360	493	3,651	413	3,198	361	2,826	319	2,545	288		
	$T_{thermal}$	5,035	569	3,686	416	2,583	292	1,938	219	1,474	167	1,229	139		
	$T_{thermal\ fan}$	NA	NA	4,360	493	3,651	413	3,198	361	2,826	319	2,545	288		
	Efficiency	0.68		0.72		0.73		0.73		0.72		0.72			
60	T_{accel}	4,849	548	4,749	537	4,552	514	4,186	473	3,824	432	3,508	396	9,694	1,095
	T_{run}	4,749	537	4,186	473	3,508	396	3,074	347	2,715	307	2,443	276		
	$T_{thermal}$	4,749	537	3,828	433	2,675	302	2,007	227	1,531	173	1,276	144		
	$T_{thermal\ fan}$	NA	NA	4,186	473	3,508	396	3,074	347	2,715	307	2,443	276		
	Efficiency	0.64		0.69		0.70		0.70		0.69		0.69			

Cone Drive Single Reduction Units - 3.500" C.D.

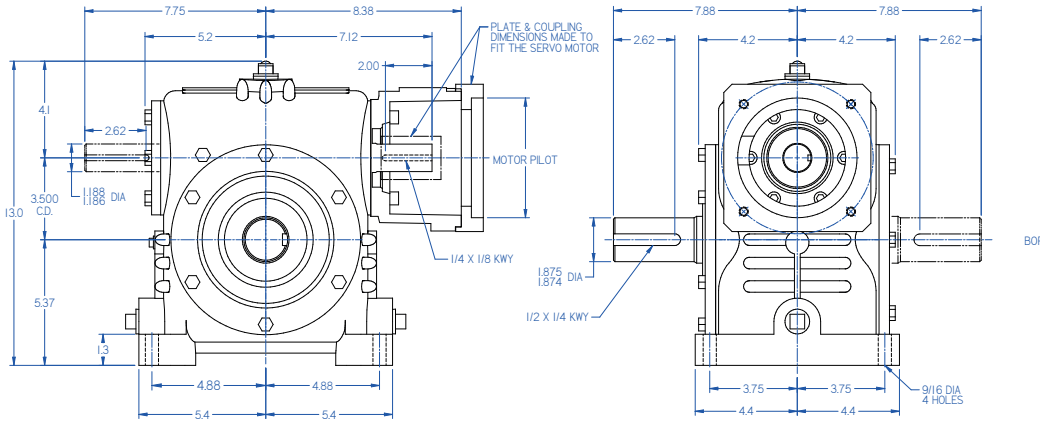
Size 35 Solid Shaft (See pages 36 & 37 for mounting positions)

Hollow Shaft

UNIT TYPE O

UNIT TYPE O Worm Over Gear net wt. 136 lb

net wt. 140 lb

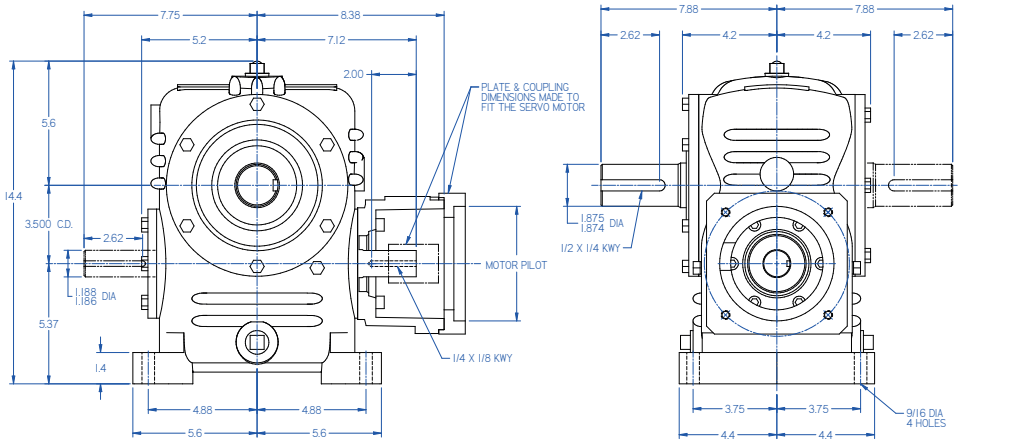


See page 35 for hollow bore sizes available

UNIT TYPE U

UNIT TYPE U Worm Under Gear net wt. 158 lb

net wt. 154 lb

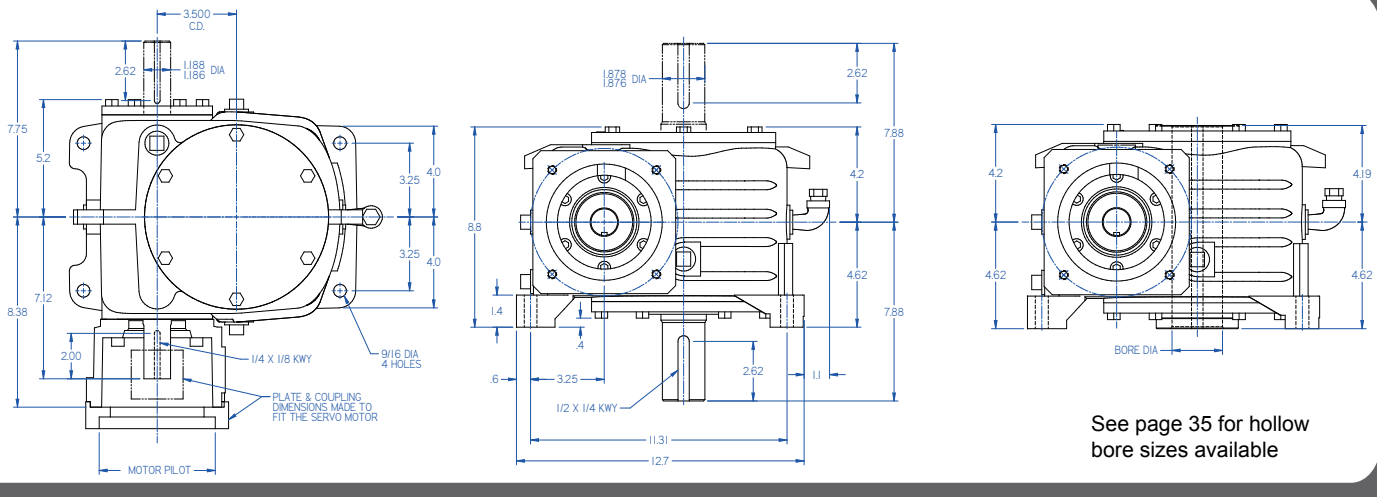


See page 35 for hollow bore sizes available

UNIT TYPE V

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 138 lb

net wt. 137 lb



See page 35 for hollow bore sizes available

Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

Rating Tables for Size 35

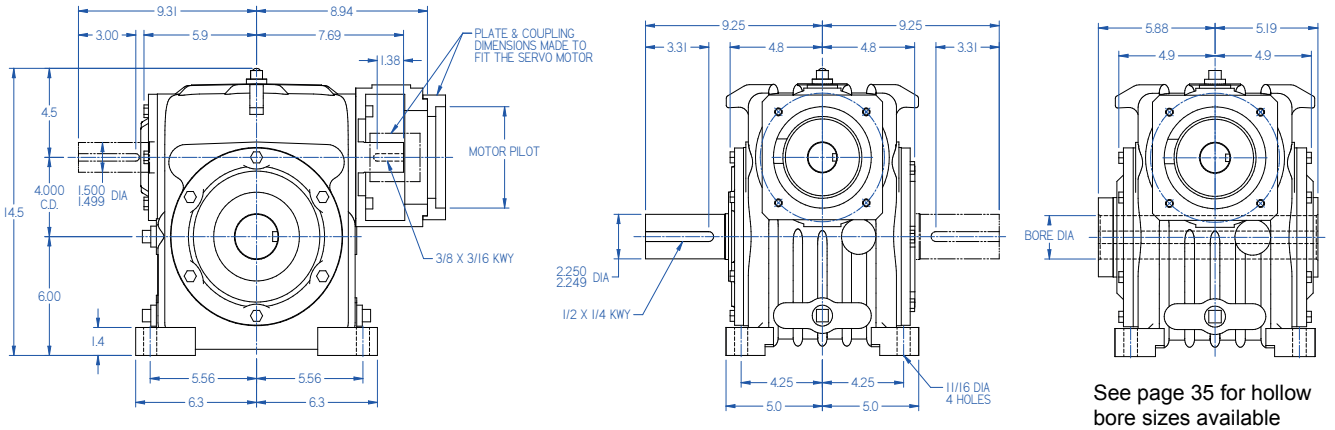
		CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0													
		Input Speed (RPM)													
Ratio to 1		500		1000		1500		2000		2500		3000		E-Stop	
		Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Lb-In	Nm
5	T_{accel}	7,715	872	6,705	758	5,761	651	5,077	574	4,593	519	4,220	477		
	T_{run}	6,705	758	5,077	574	4,220	477	3,614	408	3,142	355	2,750	311		
	$T_{thermal}$	4,155	469	2,363	267	1,575	178	1,181	133	831	94	692	78	21,414	2,419
	$T_{thermal\ fan}$	NA	NA	4,266	482	3,500	395	3,079	348	2,803	317	2,626	297		
	Efficiency	0.91		0.92		0.92		0.92		0.91		0.91			
10	T_{accel}	10,103	1,141	9,111	1,029	8,212	928	7,313	826	6,587	744	6,026	681		
	T_{run}	9,111	1,029	7,313	826	6,026	681	5,246	593	4,630	523	4,092	462		
	$T_{thermal}$	5,500	621	3,698	418	2,465	279	1,849	209	1,330	150	1,108	125	25,495	2,881
	$T_{thermal\ fan}$	NA	NA	5,614	634	4,640	524	4,111	464	3,762	425	3,539	400		
	Efficiency	0.87		0.90		0.90		0.90		0.89		0.89			
15	T_{accel}	11,716	1,324	10,772	1,217	9,729	1,099	8,800	994	7,907	893	7,286	823		
	T_{run}	10,772	1,217	8,800	994	7,286	823	6,337	716	5,567	629	4,963	561		
	$T_{thermal}$	6,472	731	4,520	511	3,013	340	2,260	255	1,650	186	1,375	155	25,578	2,890
	$T_{thermal\ fan}$	NA	NA	5,856	662	4,842	547	4,286	484	3,919	443	3,684	416		
	Efficiency	0.84		0.88		0.88		0.88		0.87		0.87			
20	T_{accel}	11,368	1,284	10,647	1,203	9,628	1,088	8,600	972	7,802	882	7,202	814		
	T_{run}	10,647	1,203	8,600	972	7,202	814	6,270	708	5,505	622	4,923	556		
	$T_{thermal}$	7,007	792	4,314	487	3,105	351	2,328	263	1,726	195	1,438	162	24,776	2,799
	$T_{thermal\ fan}$	NA	NA	5,732	648	4,796	542	4,246	480	3,881	438	3,648	412		
	Efficiency	0.81		0.84		0.85		0.85		0.84		0.84			
25	T_{accel}	11,149	1,260	10,694	1,208	9,535	1,077	8,604	972	7,806	882	7,187	812		
	T_{run}	10,694	1,208	8,604	972	7,187	812	6,260	707	5,490	620	4,923	556		
	$T_{thermal}$	8,758	990	5,015	567	3,595	406	2,696	305	2,006	227	1,672	189	23,615	2,668
	$T_{thermal\ fan}$	NA	NA	5,732	648	4,784	541	4,237	479	3,873	438	3,641	411		
	Efficiency	0.81		0.83		0.84		0.84		0.83		0.83			
30	T_{accel}	10,613	1,199	9,828	1,110	9,162	1,035	8,219	929	7,471	844	6,869	776		
	T_{run}	9,828	1,110	8,219	929	6,869	776	5,984	676	5,246	593	4,707	532		
	$T_{thermal}$	7,017	793	4,637	524	3,287	371	2,465	279	1,855	210	1,546	175	22,698	2,565
	$T_{thermal\ fan}$	NA	NA	5,483	619	4,580	517	4,057	458	3,709	419	3,486	394		
	Efficiency	0.74		0.79		0.80		0.80		0.79		0.79			
40	T_{accel}	9,662	1,092	9,362	1,058	8,849	1,000	7,858	888	7,138	806	6,574	743		
	T_{run}	9,362	1,058	7,858	888	6,574	743	5,715	646	5,010	566	4,496	508		
	$T_{thermal}$	7,670	867	4,931	557	3,470	392	2,602	294	1,972	223	1,644	186	20,451	2,311
	$T_{thermal\ fan}$	NA	NA	5,234	591	4,376	494	3,873	438	3,536	400	3,321	375		
	Efficiency	0.70		0.75		0.76		0.76		0.75		0.75			
50	T_{accel}	9,339	1,055	9,120	1,030	8,517	962	7,565	855	6,875	777	6,332	715		
	T_{run}	9,120	1,030	7,565	855	6,332	715	5,506	622	4,826	545	4,329	489		
	$T_{thermal}$	8,731	987	5,283	597	3,703	418	2,777	314	2,113	239	1,761	199	18,152	2,051
	$T_{thermal\ fan}$	NA	NA	5,048	570	4,216	476	3,729	421	3,402	384	3,194	361		
	Efficiency	0.68		0.72		0.73		0.73		0.72		0.72			
60	T_{accel}	8,906	1,006	8,602	972	8,076	912	7,273	822	6,604	746	6,082	687		
	T_{run}	8,602	972	7,273	822	6,082	687	5,288	597	4,636	524	4,156	470		
	$T_{thermal}$	8,602	972	5,487	620	3,835	433	2,876	325	2,195	248	1,829	207	17,848	2,017
	$T_{thermal\ fan}$	NA	NA	4,843	547	4,053	458	3,594	406	3,284	371	3,087	349		
	Efficiency	0.64		0.69		0.70		0.70		0.69		0.69			

Cone Drive Single Reduction Units - 4.000" C.D.

Size 40 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O Worm Over Gear net wt. 195 lb net wt. 205 lb

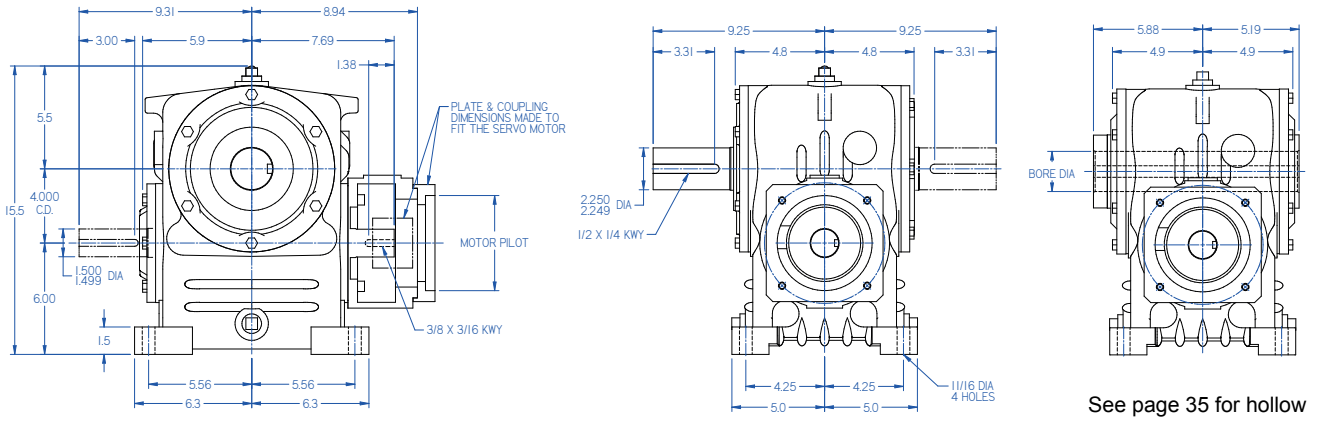
UNIT TYPE O



See page 35 for hollow bore sizes available

UNIT TYPE U Worm Under Gear net wt. 207 lb net wt. 217 lb

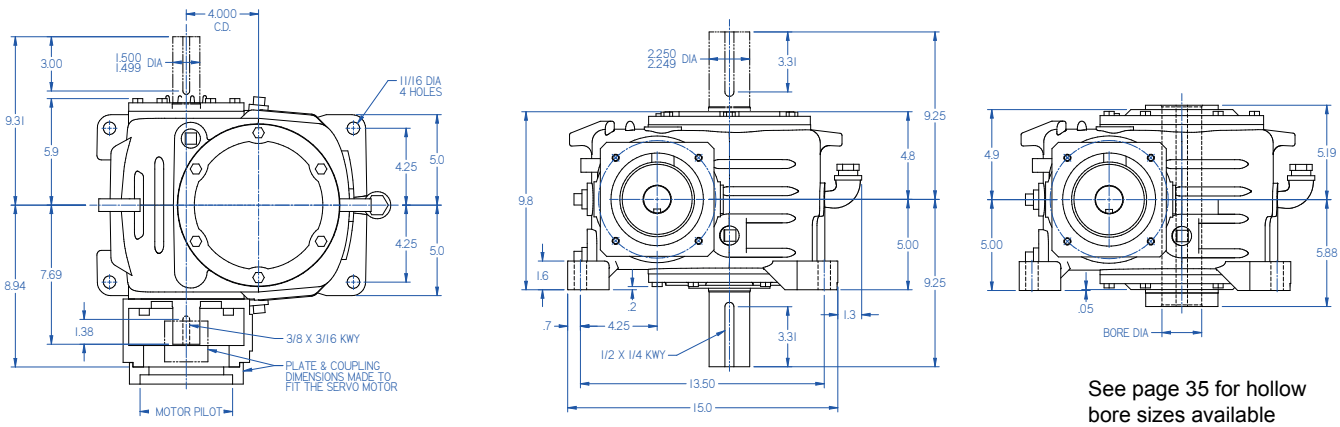
UNIT TYPE U



See page 35 for hollow bore sizes available

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 190 lb net wt. 200 lb

UNIT TYPE V



See page 35 for hollow bore sizes available

Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

Rating Tables for Size 40

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Input Speed (RPM)

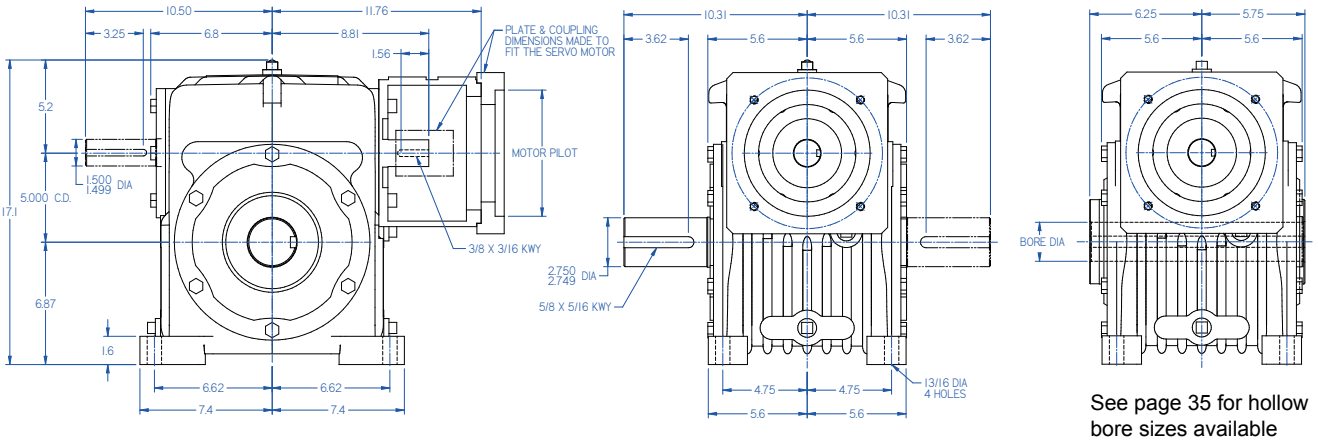
Ratio to 1		500		1000		1500		2000		2500		3000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	11,434	1,292	9,694	1,095	8,182	924	7,243	818	6,523	737	5,946	672	31,779	3,591
	T_{run}	9,694	1,095	7,243	818	5,946	672	5,065	572	4,280	484	3,813	431		
	$T_{thermal}$	7,442	841	4,513	510	3,008	340	2,256	255	1,488	168	1,240	140		
	$T_{thermal\ fan}$	NA	NA	6,013	679	4,480	506	3,517	397	2,917	330	2,526	285		
	Efficiency	0.94		0.95		0.95		0.95		0.94		0.94			
10	T_{accel}	15,087	1,705	13,382	1,512	11,807	1,334	10,433	1,179	9,404	1,063	8,664	979	38,176	4,313
	T_{run}	13,382	1,512	10,433	1,179	8,664	979	7,456	842	6,498	734	5,657	639		
	$T_{thermal}$	8,550	966	6,311	713	4,207	475	3,155	357	2,185	247	1,821	206		
	$T_{thermal\ fan}$	NA	NA	8,012	905	5,940	671	4,619	522	3,796	429	3,261	368		
	Efficiency	0.90		0.93		0.93		0.93		0.92		0.92			
15	T_{accel}	17,557	1,984	15,843	1,790	14,060	1,589	12,577	1,421	11,372	1,285	10,444	1,180	38,371	4,335
	T_{run}	15,843	1,790	12,577	1,421	10,444	1,180	8,994	1,016	7,874	890	6,901	780		
	$T_{thermal}$	9,537	1,078	7,204	814	4,803	543	3,602	407	2,565	290	2,138	242		
	$T_{thermal\ fan}$	NA	NA	8,366	945	6,187	699	4,812	544	3,955	447	3,398	384		
	Efficiency	0.87		0.91		0.91		0.91		0.90		0.90			
20	T_{accel}	17,067	1,928	15,679	1,771	13,904	1,571	12,330	1,393	11,225	1,268	10,348	1,169	37,299	4,214
	T_{run}	15,679	1,771	12,330	1,393	10,348	1,169	8,935	1,010	7,803	882	6,856	775		
	$T_{thermal}$	9,975	1,127	6,358	718	4,645	525	3,483	394	2,543	287	2,119	239		
	$T_{thermal\ fan}$	NA	NA	8,205	927	6,847	774	6,054	684	5,530	625	5,195	587		
	Efficiency	0.84		0.87		0.88		0.88		0.87		0.87			
25	T_{accel}	16,756	1,893	15,752	1,780	13,825	1,562	12,356	1,396	11,265	1,273	10,333	1,167	35,628	4,025
	T_{run}	15,752	1,780	12,356	1,396	10,333	1,167	8,913	1,007	7,792	880	6,852	774		
	$T_{thermal}$	12,469	1,409	7,295	824	5,298	599	3,974	449	2,918	330	2,432	275		
	$T_{thermal\ fan}$	NA	NA	8,209	927	6,818	770	6,017	680	5,488	620	5,150	582		
	Efficiency	0.84		0.86		0.87		0.87		0.86		0.86			
30	T_{accel}	15,957	1,803	14,523	1,641	13,277	1,500	11,825	1,336	10,785	1,219	9,899	1,118	34,305	3,876
	T_{run}	14,523	1,641	11,825	1,336	9,899	1,118	8,539	965	7,462	843	6,564	742		
	$T_{thermal}$	9,542	1,078	6,492	733	4,638	524	3,479	393	2,597	293	2,164	244		
	$T_{thermal\ fan}$	NA	NA	7,878	890	6,548	740	5,777	653	5,266	595	4,939	558		
	Efficiency	0.77		0.82		0.83		0.83		0.82		0.82			
40	T_{accel}	14,587	1,648	13,865	1,567	12,857	1,453	11,300	1,277	10,340	1,168	9,481	1,071	31,107	3,515
	T_{run}	13,865	1,567	11,300	1,277	9,481	1,071	8,180	924	7,141	807	6,281	710		
	$T_{thermal}$	10,275	1,161	6,737	761	4,765	538	3,574	404	2,695	304	2,246	254		
	$T_{thermal\ fan}$	NA	NA	7,523	850	6,258	707	5,529	625	5,044	570	4,734	535		
	Efficiency	0.73		0.78		0.79		0.79		0.78		0.78			
50	T_{accel}	14,124	1,596	13,549	1,531	12,409	1,402	10,910	1,233	9,974	1,127	9,151	1,034	27,778	3,138
	T_{run}	13,549	1,531	10,910	1,233	9,151	1,034	7,896	892	6,890	778	6,063	685		
	$T_{thermal}$	11,630	1,314	7,125	805	5,014	567	3,761	425	2,850	322	2,375	268		
	$T_{thermal\ fan}$	NA	NA	7,263	821	6,037	682	5,326	602	4,850	548	4,547	514		
	Efficiency	0.71		0.75		0.76		0.76		0.75		0.75			
60	T_{accel}	13,499	1,525	12,812	1,448	11,768	1,330	10,507	1,187	9,597	1,084	8,805	995	27,339	3,089
	T_{run}	12,812	1,448	10,507	1,187	8,805	995	7,602	859	6,629	749	5,832	659		
	$T_{thermal}$	11,573	1,308	7,329	828	5,137	580	3,853	435	2,932	331	2,443	276		
	$T_{thermal\ fan}$	NA	NA	6,983	789	5,807	656	5,127	579	4,670	528	4,380	495		
	Efficiency	0.67		0.72		0.73		0.73		0.72		0.72			

Cone Drive Single Reduction Units - 5.000" C.D.

Size 50 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O

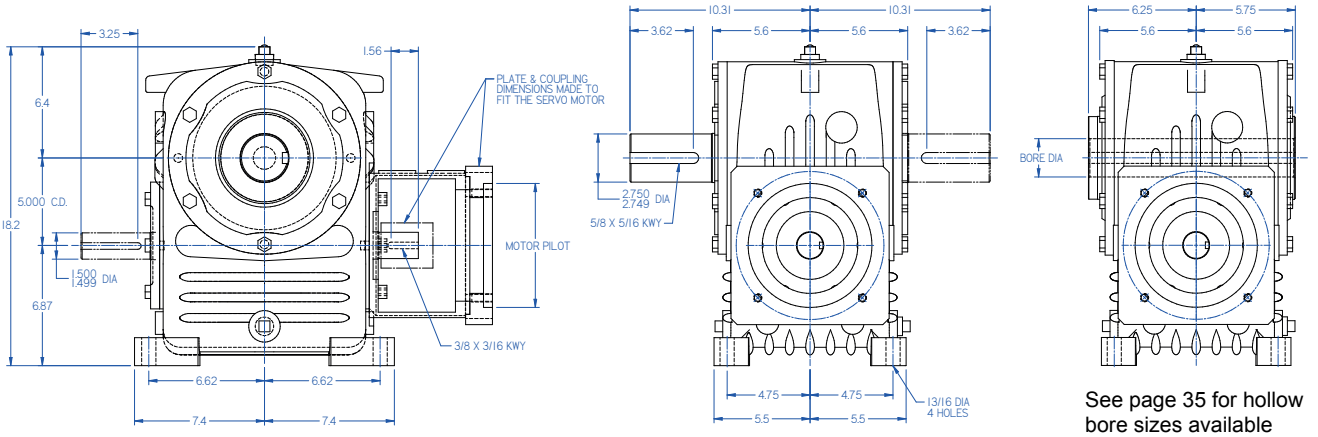
UNIT TYPE O Worm Over Gear net wt. 335 lb net wt. 347 lb



See page 35 for hollow bore sizes available

UNIT TYPE U

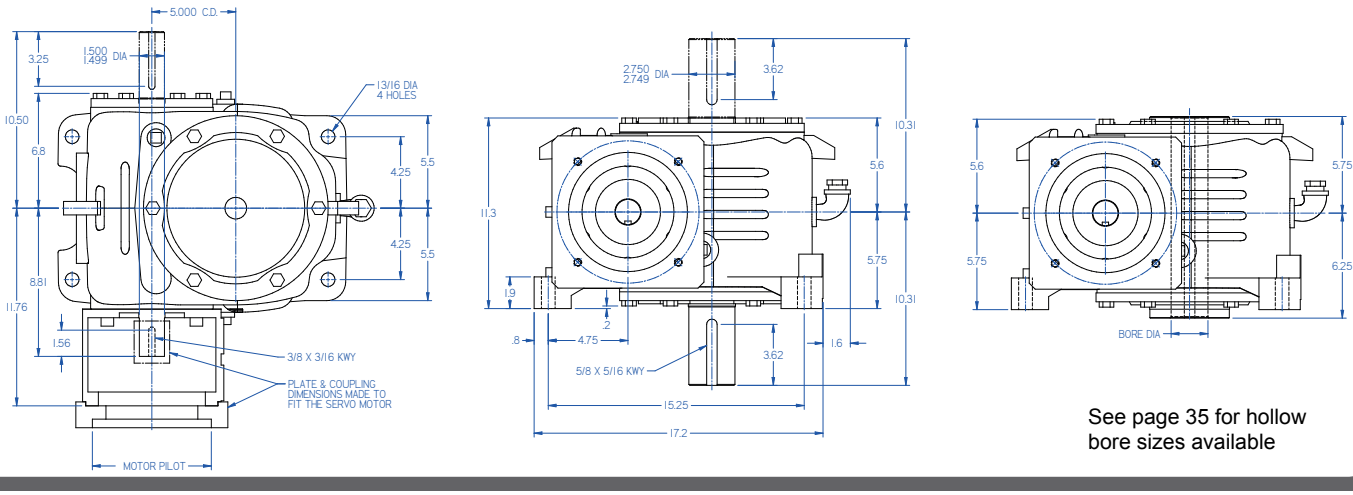
UNIT TYPE U Worm Under Gear net wt. 350 lb net wt. 362 lb



See page 35 for hollow bore sizes available

UNIT TYPE V

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 340 lb net wt. 352 lb



See page 35 for hollow bore sizes available

Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

Rating Tables for Size 50

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Ratio to 1		Input Speed (RPM) 500		1000		1500		2000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	22,124	2,500	17,987	2,032	14,898	1,683	13,201	1,492	62,288	7,038
	T_{run}	17,987	2,032	13,201	1,492	10,671	1,206	8,755	989		
	$T_{thermal}$	10,406	1,176	6,310	713	4,207	475	3,155	356		
	$T_{thermal\ fan}$	NA	NA	8,892	1,005	6,534	738	5,266	595		
	Efficiency	0.94		0.95		0.95		0.95			
10	T_{accel}	29,437	3,326	25,169	2,844	21,570	2,437	19,114	2,160	74,758	8,447
	T_{run}	25,169	2,844	19,114	2,160	15,661	1,769	13,297	1,502		
	$T_{thermal}$	11,956	1,351	8,824	997	5,883	665	4,412	499		
	$T_{thermal\ fan}$	NA	NA	13,614	1,538	9,817	1,109	7,741	875		
	Efficiency	0.90		0.93		0.93		0.93			
15	T_{accel}	34,261	3,871	29,878	3,376	25,691	2,903	23,076	2,607	75,146	8,490
	T_{run}	29,878	3,376	23,076	2,607	18,906	2,136	16,121	1,821		
	$T_{thermal}$	13,335	1,507	10,074	1,138	6,716	759	5,037	569		
	$T_{thermal\ fan}$	NA	NA	15,399	1,740	11,433	1,292	8,954	1,012		
	Efficiency	0.87		0.91		0.91		0.91			
20	T_{accel}	33,308	3,763	29,578	3,342	25,451	2,876	22,605	2,554	72,937	8,241
	T_{run}	29,578	3,342	22,605	2,554	18,724	2,116	15,979	1,805		
	$T_{thermal}$	13,948	1,576	8,890	1,004	6,494	734	4,871	550		
	$T_{thermal\ fan}$	NA	NA	15,100	1,706	11,920	1,347	9,894	1,118		
	Efficiency	0.84		0.87		0.88		0.88			
25	T_{accel}	32,759	3,701	29,720	3,358	25,314	2,860	22,631	2,557	69,670	7,872
	T_{run}	29,720	3,358	22,631	2,557	18,729	2,116	15,977	1,805		
	$T_{thermal}$	17,435	1,970	10,200	1,152	7,408	837	5,556	628		
	$T_{thermal\ fan}$	NA	NA	15,066	1,702	12,454	1,407	10,921	1,234		
	Efficiency	0.84		0.86		0.87		0.87			
30	T_{accel}	31,196	3,525	27,460	3,103	24,312	2,747	21,658	2,447	67,082	7,579
	T_{run}	27,460	3,103	21,658	2,447	17,944	2,027	15,308	1,730		
	$T_{thermal}$	13,342	1,507	9,078	1,026	6,486	733	4,864	550		
	$T_{thermal\ fan}$	NA	NA	14,511	1,640	11,966	1,352	10,459	1,182		
	Efficiency	0.77		0.82		0.83		0.83			
40	T_{accel}	28,519	3,222	26,214	2,962	23,544	2,660	20,725	2,342	60,736	6,862
	T_{run}	26,214	2,962	20,725	2,342	17,191	1,942	14,681	1,659		
	$T_{thermal}$	14,367	1,623	9,420	1,064	6,663	753	4,997	565		
	$T_{thermal\ fan}$	NA	NA	13,839	1,564	11,423	1,291	10,009	1,131		
	Efficiency	0.73		0.78		0.79		0.79			
50	T_{accel}	27,613	3,120	25,567	2,889	22,699	2,565	20,012	2,261	54,236	6,128
	T_{run}	25,567	2,889	20,012	2,261	16,605	1,876	14,183	1,602		
	$T_{thermal}$	16,262	1,837	9,963	1,126	7,011	792	5,258	594		
	$T_{thermal\ fan}$	NA	NA	13,358	1,509	11,032	1,246	9,662	1,092		
	Efficiency	0.71		0.75		0.76		0.76			
60	T_{accel}	26,391	2,982	24,176	2,732	21,553	2,435	19,248	2,175	53,379	6,031
	T_{run}	24,176	2,732	19,248	2,175	15,978	1,805	13,657	1,543		
	$T_{thermal}$	16,183	1,828	10,248	1,158	7,183	812	5,387	609		
	$T_{thermal\ fan}$	NA	NA	12,837	1,450	10,611	1,199	9,297	1,050		
	Efficiency	0.67		0.72		0.73		0.73			
70	T_{accel}	26,001	2,938	24,492	2,767	21,276	2,404	19,006	2,147	52,659	5,950
	T_{run}	24,492	2,767	19,006	2,147	15,789	1,784	13,486	1,524		
	$T_{thermal}$	19,760	2,233	11,383	1,286	7,971	901	5,978	675		
	$T_{thermal\ fan}$	NA	NA	12,691	1,434	10,489	1,185	9,198	1,039		
	Efficiency	0.68		0.71		0.72		0.72			

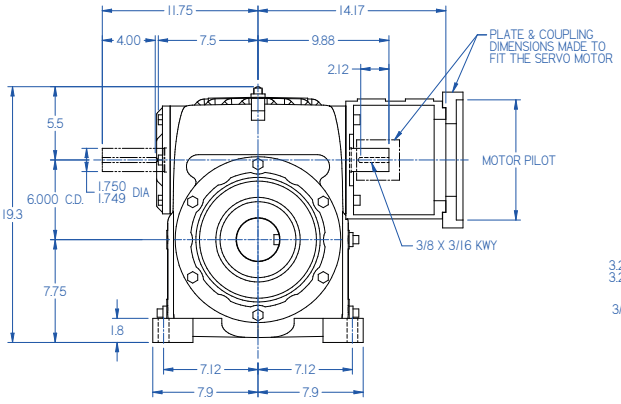
Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

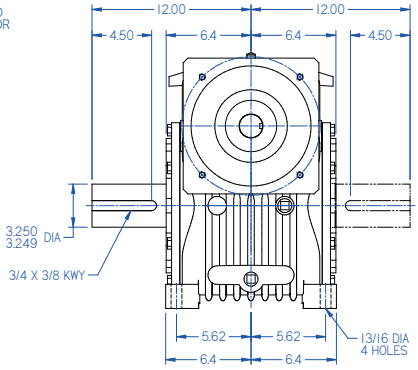
Cone Drive Single Reduction Units - 6.000" C.D.

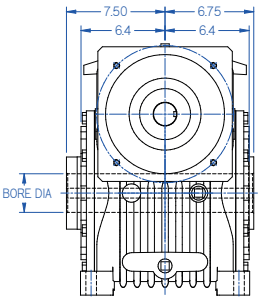
Size 60 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O Worm Over Gear net wt. 443 lb net wt. 458 lb

UNIT TYPE O



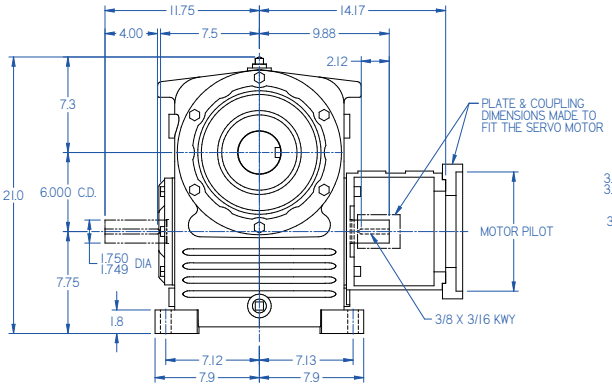


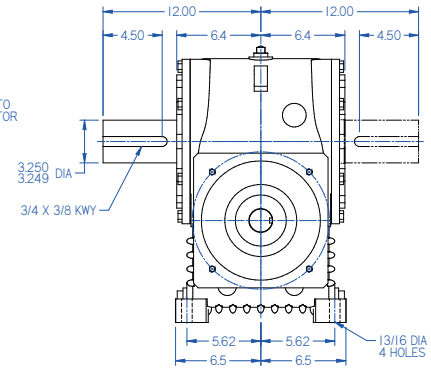


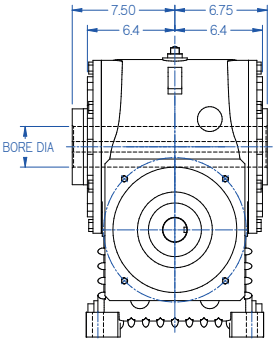
See page 35 for hollow bore sizes available

UNIT TYPE U Worm Under Gear net wt. 451 lb net wt. 466 lb

UNIT TYPE U



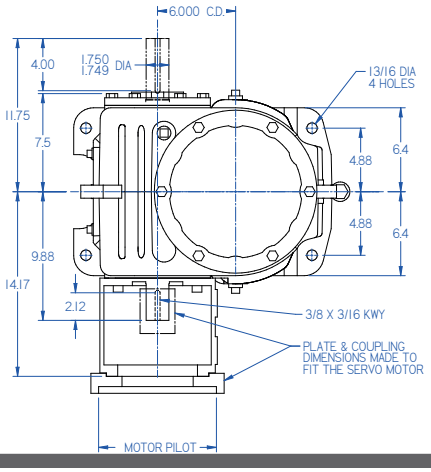


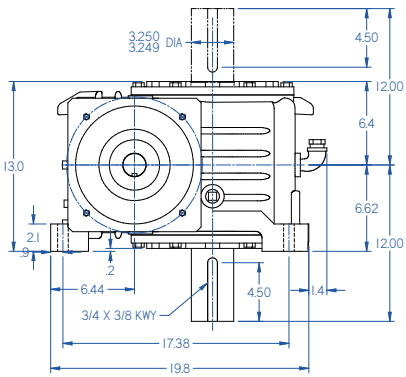


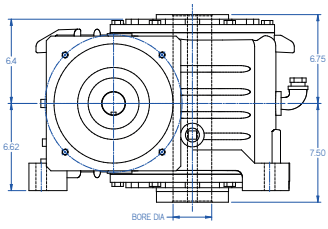
See page 35 for hollow bore sizes available

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 473 lb net wt. 488 lb

UNIT TYPE V







See page 35 for hollow bore sizes available

Sales: 1-888-994-2663
Sales Fax: 1-888-907-2663
Traverse City, MI. 49685

Rating Tables for Size 60

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Input Speed (RPM)

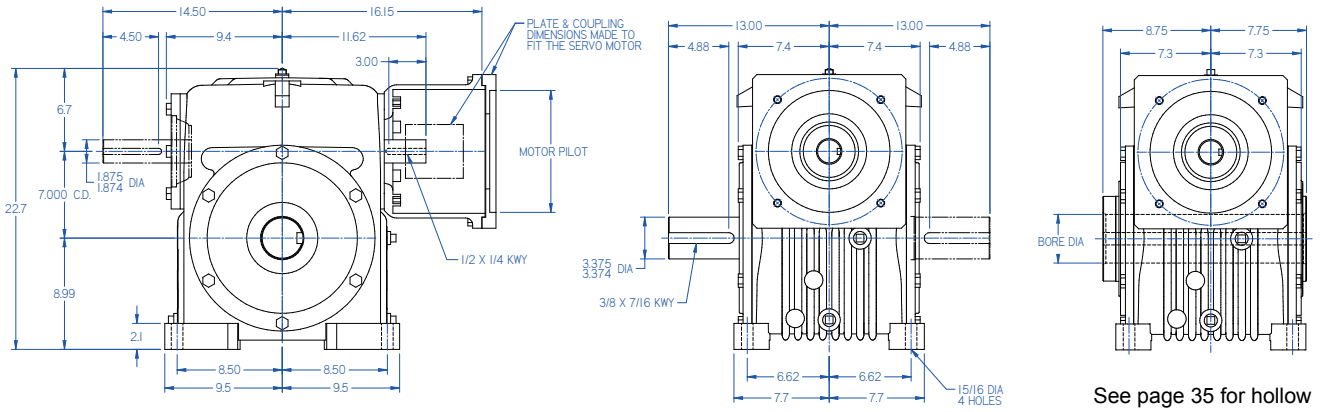
Ratio to 1		500		1000		1500		2000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	33,764	3,815	26,430	2,986	21,915	2,476	19,291	2,180	96,440	10,896
	T_{run}	26,430	2,986	19,291	2,180	15,314	1,730	12,537	1,416		
	$T_{thermal}$	13,917	1,572	8,439	953	5,626	636	4,219	477		
	$T_{thermal\ fan}$	NA	NA	13,124	1,483	9,642	1,089	7,719	872		
	Efficiency	0.94		0.95		0.95		0.95			
10	T_{accel}	44,810	5,063	36,881	4,167	31,176	3,522	27,673	3,127	115,237	13,020
	T_{run}	36,881	4,167	27,673	3,127	22,362	2,527	18,341	2,072		
	$T_{thermal}$	15,989	1,807	11,802	1,333	7,868	889	5,901	667		
	$T_{thermal\ fan}$	NA	NA	20,042	2,264	14,452	1,633	11,407	1,289		
	Efficiency	0.90		0.93		0.93		0.93			
15	T_{accel}	52,165	5,894	43,869	4,957	37,186	4,201	33,295	3,762	115,843	13,089
	T_{run}	43,869	4,957	33,295	3,762	26,993	3,050	22,326	2,522		
	$T_{thermal}$	17,834	2,015	13,473	1,522	8,982	1,015	6,736	761		
	$T_{thermal\ fan}$	NA	NA	22,030	2,489	16,626	1,878	13,308	1,504		
	Efficiency	0.87		0.91		0.91		0.91			
20	T_{accel}	50,717	5,730	43,491	4,914	36,707	4,147	32,612	3,685	112,626	12,725
	T_{run}	43,491	4,914	32,612	3,685	26,737	3,021	22,190	2,507		
	$T_{thermal}$	18,654	2,108	11,890	1,343	8,686	981	6,514	736		
	$T_{thermal\ fan}$	NA	NA	21,595	2,440	17,568	1,985	15,184	1,716		
	Efficiency	0.84		0.87		0.88		0.88			
25	T_{accel}	49,885	5,636	43,706	4,938	36,473	4,121	32,638	3,688	107,581	12,155
	T_{run}	43,706	4,938	32,638	3,688	26,676	3,014	22,180	2,506		
	$T_{thermal}$	23,318	2,635	13,642	1,541	9,908	1,119	7,431	840		
	$T_{thermal\ fan}$	NA	NA	21,694	2,451	17,577	1,986	15,156	1,712		
	Efficiency	0.84		0.86		0.87		0.87			
30	T_{accel}	47,593	5,377	40,297	4,553	35,029	3,958	31,273	3,533	103,585	11,704
	T_{run}	40,297	4,553	31,273	3,533	25,559	2,888	21,263	2,402		
	$T_{thermal}$	17,843	2,016	12,140	1,372	8,674	980	6,505	735		
	$T_{thermal\ fan}$	NA	NA	20,805	2,351	16,890	1,908	14,603	1,650		
	Efficiency	0.77		0.82		0.83		0.83			
40	T_{accel}	43,508	4,916	38,557	4,356	33,974	3,839	29,922	3,381	93,938	10,614
	T_{run}	38,557	4,356	29,922	3,381	24,473	2,765	20,373	2,302		
	$T_{thermal}$	19,214	2,171	12,598	1,423	8,911	1,007	6,683	755		
	$T_{thermal\ fan}$	NA	NA	19,799	2,237	16,114	1,821	13,968	1,578		
	Efficiency	0.73		0.78		0.79		0.79			
50	T_{accel}	42,126	4,760	37,605	4,249	32,799	3,706	28,869	3,262	83,886	9,478
	T_{run}	37,605	4,249	28,869	3,262	23,624	2,669	19,668	2,222		
	$T_{thermal}$	21,748	2,457	13,325	1,505	9,377	1,059	7,032	795		
	$T_{thermal\ fan}$	NA	NA	19,139	2,162	15,561	1,758	13,441	1,519		
	Efficiency	0.71		0.75		0.76		0.76			
60	T_{accel}	40,262	4,549	35,600	4,022	31,104	3,514	27,784	3,139	82,560	9,328
	T_{run}	35,600	4,022	27,784	3,139	22,741	2,569	18,932	2,139		
	$T_{thermal}$	21,642	2,445	13,705	1,548	9,607	1,085	7,205	814		
	$T_{thermal\ fan}$	NA	NA	18,411	2,080	14,997	1,694	12,981	1,467		
	Efficiency	0.67		0.72		0.73		0.73			
70	T_{accel}	39,666	4,482	35,989	4,066	30,705	3,469	27,435	3,100	81,188	9,173
	T_{run}	35,989	4,066	27,435	3,100	22,457	2,537	18,704	2,113		
	$T_{thermal}$	26,427	2,986	15,224	1,720	10,660	1,204	7,995	903		
	$T_{thermal\ fan}$	NA	NA	18,181	2,054	14,818	1,674	12,834	1,450		
	Efficiency	0.68		0.71		0.72		0.72			

Cone Drive Single Reduction Units - 7.000" C.D.

Size 70 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O Worm Over Gear net wt. 635 lb net wt. 660 lb

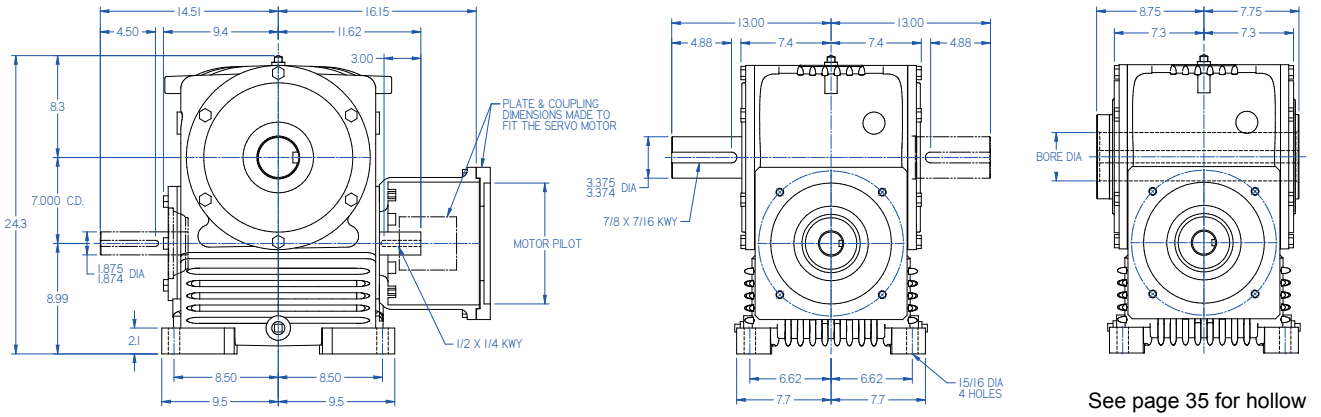
UNIT TYPE O



See page 35 for hollow bore sizes available

UNIT TYPE U Worm Under Gear net wt. 705 lb net wt. 730 lb

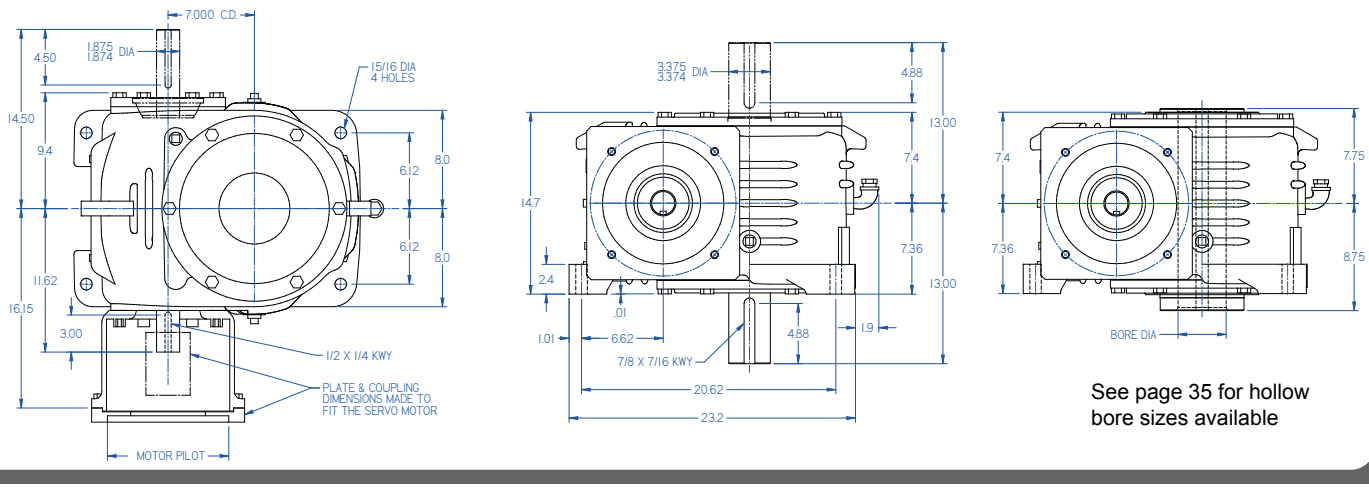
UNIT TYPE U



See page 35 for hollow bore sizes available

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 700 lb net wt. 725 lb

UNIT TYPE V



See page 35 for hollow bore sizes available

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Rating Tables for Size 70

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Input Speed (RPM)

Ratio to 1		500		1000		1500		2000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	51,738	5,846	39,085	4,416	32,497	3,672	28,207	3,187	151,356	17,101
	T_{run}	39,085	4,416	28,207	3,187	21,699	2,452	18,117	2,047		
	$T_{thermal}$	17,127	1,935	10,386	1,173	6,924	782	5,193	587		
	$T_{thermal\ fan}$	NA	NA	17,664	1,996	12,987	1,467	10,473	1,183		
	Efficiency	0.94		0.95		0.95		0.95			
10	T_{accel}	70,257	7,938	56,035	6,331	47,428	5,359	41,841	4,727	182,157	20,581
	T_{run}	56,035	6,331	41,841	4,727	33,447	3,779	27,301	3,085		
	$T_{thermal}$	19,678	2,223	14,525	1,641	9,683	1,094	7,262	821		
	$T_{thermal\ fan}$	NA	NA	27,119	3,064	19,523	2,206	15,449	1,746		
	Efficiency	0.90		0.93		0.93		0.93			
15	T_{accel}	81,955	9,260	67,104	7,582	56,788	6,416	50,401	5,695	183,429	20,725
	T_{run}	67,104	7,582	50,401	5,695	40,645	4,592	33,283	3,760		
	$T_{thermal}$	21,949	2,480	16,581	1,873	11,054	1,249	8,290	937		
	$T_{thermal\ fan}$	NA	NA	31,493	3,558	22,540	2,547	17,809	2,012		
	Efficiency	0.87		0.91		0.91		0.91			
20	T_{accel}	79,835	9,020	66,386	7,501	56,309	6,362	49,385	5,580	178,049	20,117
	T_{run}	66,386	7,501	49,385	5,580	40,291	4,552	32,937	3,721		
	$T_{thermal}$	22,958	2,594	14,633	1,653	10,689	1,208	8,017	906		
	$T_{thermal\ fan}$	NA	NA	32,831	3,709	24,492	2,767	19,077	2,155		
	Efficiency	0.84		0.87		0.88		0.88			
25	T_{accel}	78,380	8,856	66,803	7,548	55,958	6,322	49,496	5,592	170,073	19,216
	T_{run}	66,803	7,548	49,496	5,592	40,255	4,548	32,984	3,727		
	$T_{thermal}$	28,698	3,242	16,789	1,897	12,194	1,378	9,145	1,033		
	$T_{thermal\ fan}$	NA	NA	32,849	3,711	25,030	2,828	20,109	2,272		
	Efficiency	0.84		0.86		0.87		0.87			
30	T_{accel}	74,782	8,449	61,666	6,967	53,819	6,081	47,478	5,364	163,756	18,502
	T_{run}	61,666	6,967	47,478	5,364	38,604	4,362	31,671	3,578		
	$T_{thermal}$	21,960	2,481	14,941	1,688	10,675	1,206	8,006	905		
	$T_{thermal\ fan}$	NA	NA	31,560	3,566	24,324	2,748	19,842	2,242		
	Efficiency	0.77		0.82		0.83		0.83			
40	T_{accel}	68,363	7,724	58,939	6,659	52,130	5,890	45,459	5,136	148,264	16,752
	T_{run}	58,939	6,659	45,459	5,136	36,951	4,175	30,321	3,426		
	$T_{thermal}$	23,646	2,672	15,504	1,752	10,967	1,239	8,225	929		
	$T_{thermal\ fan}$	NA	NA	30,124	3,404	24,089	2,722	20,518	2,318		
	Efficiency	0.73		0.78		0.79		0.79			
50	T_{accel}	66,192	7,479	57,553	6,503	50,330	5,687	43,876	4,957	132,398	14,959
	T_{run}	57,553	6,503	43,876	4,957	35,671	4,030	29,288	3,309		
	$T_{thermal}$	26,766	3,024	16,399	1,853	11,540	1,304	8,655	978		
	$T_{thermal\ fan}$	NA	NA	29,134	3,292	23,302	2,633	19,833	2,241		
	Efficiency	0.71		0.75		0.76		0.76			
60	T_{accel}	63,264	7,148	54,423	6,149	47,730	5,393	42,243	4,773	130,305	14,722
	T_{run}	54,423	6,149	42,243	4,773	34,338	3,880	28,208	3,187		
	$T_{thermal}$	26,635	3,009	16,867	1,906	11,823	1,336	8,867	1,002		
	$T_{thermal\ fan}$	NA	NA	27,968	3,160	22,382	2,529	19,048	2,152		
	Efficiency	0.67		0.72		0.73		0.73			
70	T_{accel}	62,327	7,042	55,082	6,223	47,117	5,324	41,711	4,713	128,352	14,502
	T_{run}	55,082	6,223	41,711	4,713	33,924	3,833	27,870	3,149		
	$T_{thermal}$	32,524	3,675	18,736	2,117	13,119	1,482	9,839	1,112		
	$T_{thermal\ fan}$	NA	NA	27,658	3,125	22,173	2,505	18,894	2,135		
	Efficiency	0.68		0.71		0.72		0.72			

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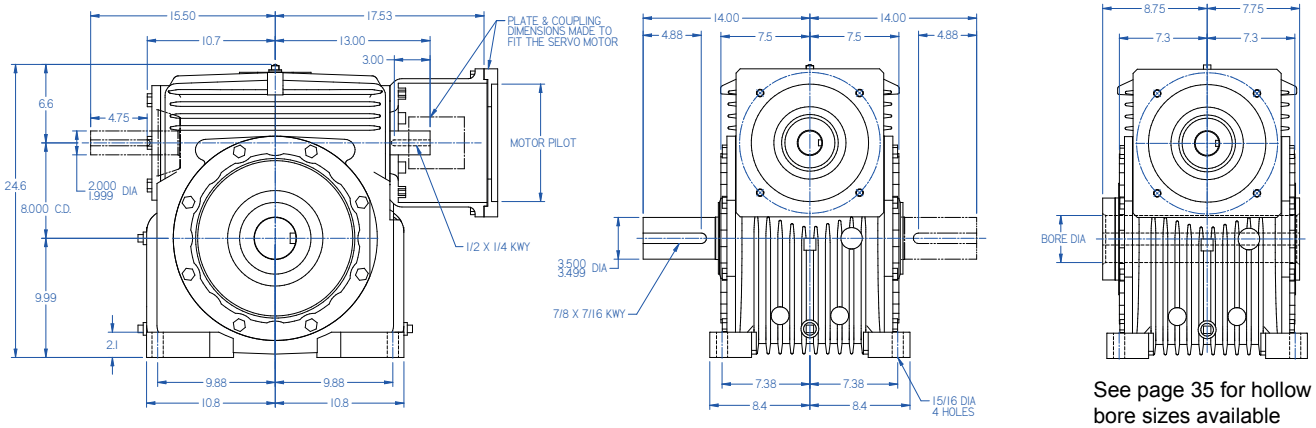
Cone Drive Single Reduction Units - 8.000" C.D.

Size 80 Solid Shaft (See pages 36 & 37 for mounting positions) Hollow Shaft

UNIT TYPE O

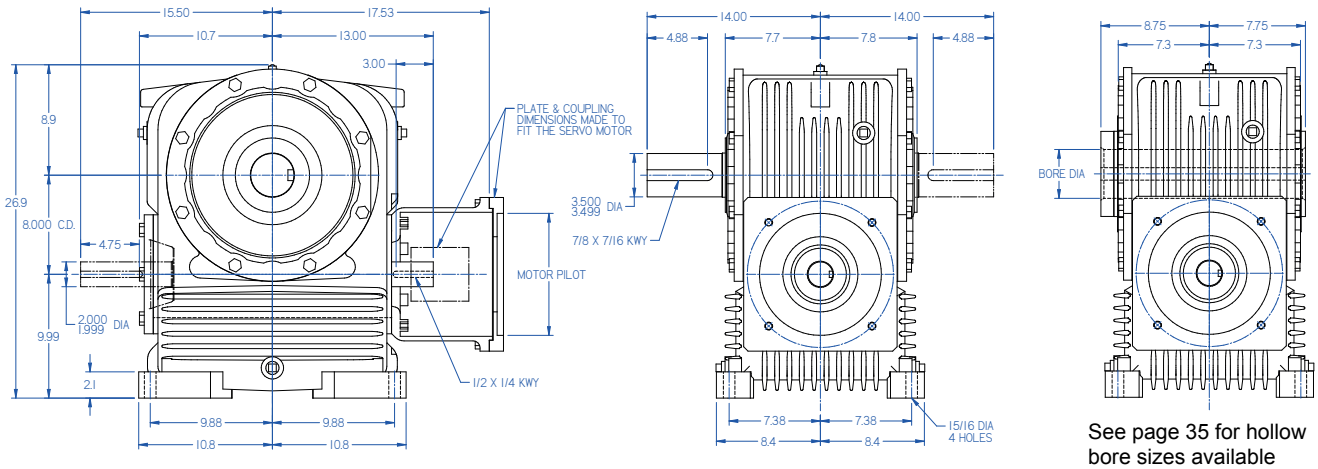
UNIT TYPE O Worm Over Gear net wt. 795 lb net wt. 825 lb



See page 35 for hollow bore sizes available

UNIT TYPE U

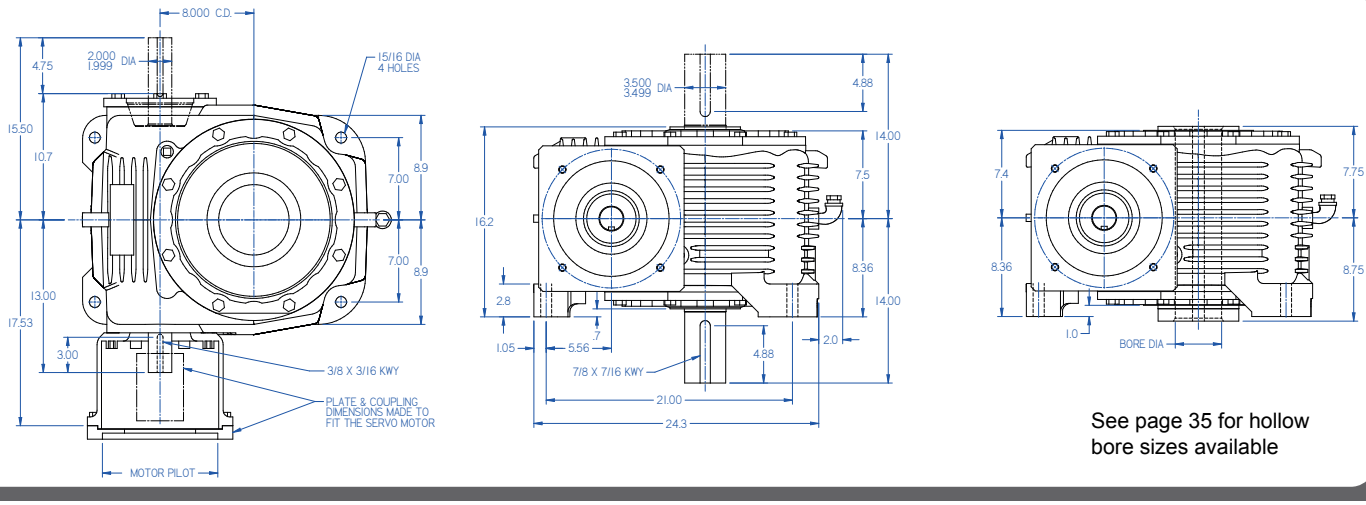
UNIT TYPE U Worm Under Gear net wt. 985 lb net wt. 1015 lb



See page 35 for hollow bore sizes available

UNIT TYPE V

UNIT TYPE V Worm Horizontal Gear Shaft Vertical net wt. 830 lb net wt. 860 lb



See page 35 for hollow bore sizes available

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Rating Tables for Size 80

CONE DRIVE OUTPUT TORQUE RATINGS FOR SERVICE FACTOR 1.0

Input Speed (RPM)

Ratio to 1		500		1000		1500		2000		E-Stop	
		Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm	Lb-In	Nm
5	T_{accel}	74,253	8,389	55,542	6,275	45,664	5,159	39,484	4,461	222,770	25,170
	T_{run}	55,542	6,275	39,484	4,461	30,028	3,393	25,086	2,834		
	$T_{thermal}$	29,135	3,292	17,667	1,996	11,778	1,331	8,834	998		
	$T_{thermal\ fan}$	NA	NA	26,475	2,991	19,634	2,218	15,774	1,782		
	Efficiency	0.94		0.95		0.95		0.95			
10	T_{accel}	102,849	11,620	81,012	9,153	68,451	7,734	60,210	6,803	269,095	30,404
	T_{run}	81,012	9,153	60,210	6,803	47,494	5,366	39,147	4,423		
	$T_{thermal}$	33,475	3,782	24,708	2,792	16,472	1,861	12,354	1,396		
	$T_{thermal\ fan}$	NA	NA	40,708	4,599	29,621	3,347	23,448	2,649		
	Efficiency	0.90		0.93		0.93		0.93			
15	T_{accel}	120,456	13,610	97,073	10,968	82,137	9,280	73,120	8,261	271,438	30,668
	T_{run}	97,073	10,968	73,120	8,261	58,058	6,560	47,674	5,386		
	$T_{thermal}$	37,337	4,219	28,206	3,187	18,804	2,125	14,103	1,593		
	$T_{thermal\ fan}$	NA	NA	47,267	5,340	34,752	3,926	28,240	3,191		
	Efficiency	0.87		0.91		0.91		0.91			
20	T_{accel}	117,120	13,233	96,045	10,852	81,220	9,177	71,511	8,080	263,040	29,720
	T_{run}	96,045	10,852	71,511	8,080	57,594	6,507	47,236	5,337		
	$T_{thermal}$	39,054	4,413	24,892	2,812	18,184	2,054	13,638	1,541		
	$T_{thermal\ fan}$	NA	NA	47,939	5,416	38,063	4,301	32,052	3,621		
	Efficiency	0.84		0.87		0.88		0.88			
25	T_{accel}	115,207	13,017	96,657	10,921	80,600	9,107	71,680	8,099	251,677	28,436
	T_{run}	96,657	10,921	71,680	8,099	57,699	6,519	47,264	5,340		
	$T_{thermal}$	48,817	5,516	28,560	3,227	20,743	2,344	15,557	1,758		
	$T_{thermal\ fan}$	NA	NA	48,060	5,430	38,070	4,301	32,096	3,626		
	Efficiency	0.84		0.86		0.87		0.87			
30	T_{accel}	109,921	12,419	89,338	10,094	77,639	8,772	68,785	7,772	242,328	27,379
	T_{run}	89,338	10,094	68,785	7,772	55,429	6,263	45,247	5,112		
	$T_{thermal}$	37,356	4,221	25,416	2,872	18,160	2,052	13,620	1,539		
	$T_{thermal\ fan}$	NA	NA	46,180	5,218	36,594	4,135	30,856	3,486		
	Efficiency	0.77		0.82		0.83		0.83			
40	T_{accel}	100,486	11,353	85,391	9,648	75,206	8,497	65,775	7,432	219,403	24,789
	T_{run}	85,391	9,648	65,775	7,432	53,104	6,000	43,366	4,900		
	$T_{thermal}$	40,225	4,545	26,374	2,980	18,656	2,108	13,992	1,581		
	$T_{thermal\ fan}$	NA	NA	44,056	4,978	34,950	3,949	29,476	3,330		
	Efficiency	0.73		0.78		0.79		0.79			
50	T_{accel}	97,295	10,993	83,385	9,421	72,612	8,204	63,464	7,170	195,924	22,136
	T_{run}	83,385	9,421	63,464	7,170	51,289	5,795	41,892	4,733		
	$T_{thermal}$	45,531	5,144	27,896	3,152	19,630	2,218	14,723	1,663		
	$T_{thermal\ fan}$	NA	NA	42,579	4,811	33,782	3,817	28,474	3,217		
	Efficiency	0.71		0.75		0.76		0.76			
60	T_{accel}	92,991	10,507	78,850	8,909	68,861	7,780	61,063	6,899	192,827	21,787
	T_{run}	78,850	8,909	61,063	6,899	49,372	5,578	40,348	4,559		
	$T_{thermal}$	45,309	5,119	28,693	3,242	20,112	2,272	15,084	1,704		
	$T_{thermal\ fan}$	NA	NA	40,903	4,621	32,515	3,674	27,436	3,100		
	Efficiency	0.67		0.72		0.73		0.73			
70	T_{accel}	91,614	10,351	79,808	9,017	67,977	7,680	60,294	6,812	189,939	21,460
	T_{run}	79,808	9,017	60,294	6,812	48,778	5,511	39,844	4,502		
	$T_{thermal}$	55,326	6,251	31,872	3,601	22,317	2,521	16,737	1,891		
	$T_{thermal\ fan}$	NA	NA	40,337	4,557	32,052	3,621	27,028	3,054		
	Efficiency	0.68		0.71		0.72		0.72			

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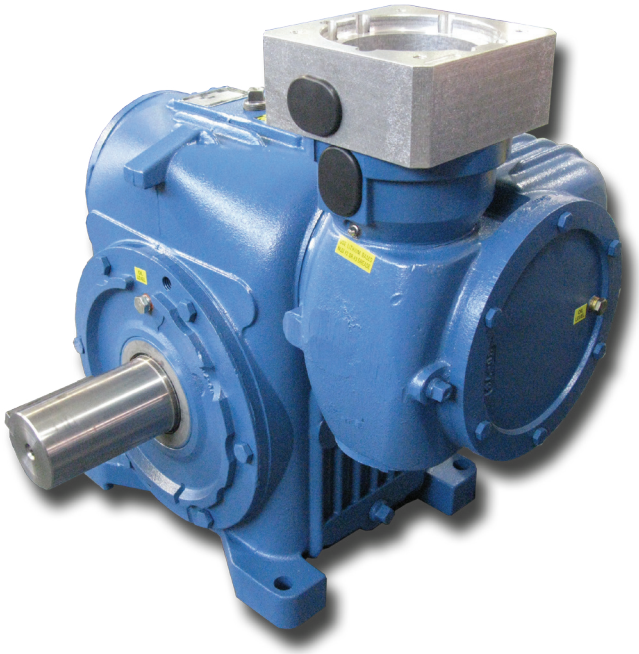
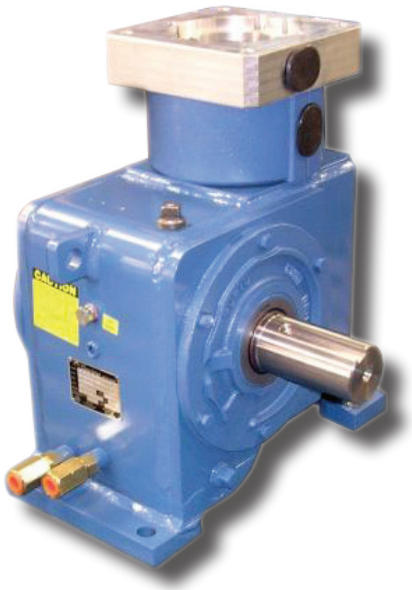
MULTIPLE REDUCTION AND SPECIAL SERVO REDUCERS

The Model HP double reduction reducers can also be fitted with a servo motor adapter interface.

- Size range includes 30 - 60 up to 60 - 120
- Output torque up to 475,150 lb-in
- All standard double reduction configurations.





Cone Drive offers many modified or special designs with servo motor interface as well with features including:

- Fabricated housings
- Internal water cooling
- Planetary driven worm reducers
- Custom ratio combinations
- Low and absolute zero backlash

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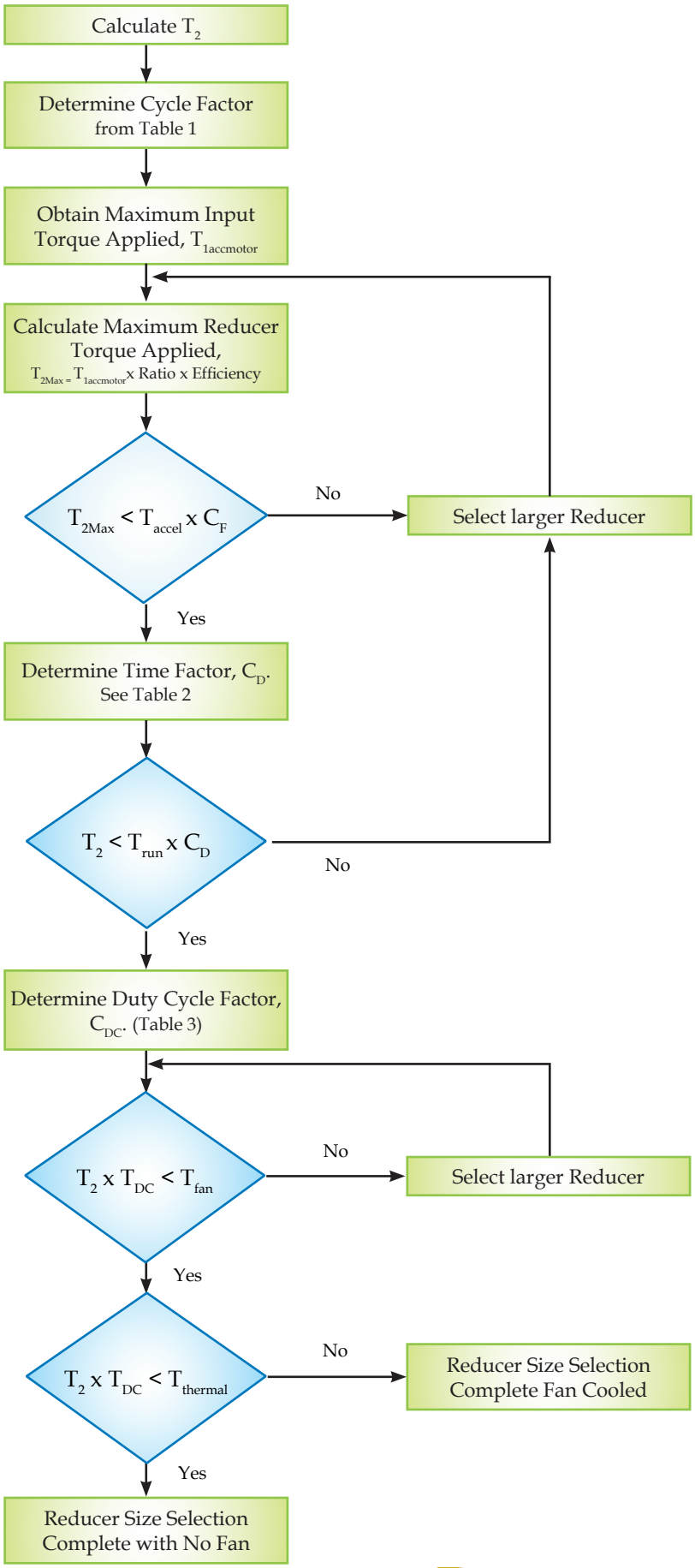

Calculate T_2
Determine Cycle Factor from Table 1
Obtain Maximum Input Torque Applied, $T_{1accmotor}$
Calculate Maximum Reducer Torque Applied, $T_{2Max} = T_{1accmotor}$ x Ratio x Efficiency
$T_{2Max} < T_{accel} \times C_F$
No
Select larger Reducer
Yes
Determine Time Factor, C_D. See Table 2
$T_2 < T_{run} \times C_D$
No
Yes
Determine Duty Cycle Factor, C_{DC}. (Table 3)
$T_2 \times T_{DC} < T_{fan}$
No
Select larger Reducer
Yes
$T_2 \times T_{DC} < T_{thermal}$
No
Reducer Size Selection Complete Fan Cooled
Yes
Reducer Size Selection Complete with No Fan

Selection Criteria

Definitions

T_{accel} → Acceleration Torque - The mechanical output torque rating for periods of acceleration and decelaration.

T_{run} → Run Torque - The mechanical output torque rating for continous operation

$T_{thermal}$ → Thermal Torque - The thermal output torque rating is based on the maximum recommended temperature rise of 120 degrees F. The Thermal Torque rating should be applied for duty cycles above 50%. For duty cycles below 50%, Table 3 can be used to adjust the thermal rating.

T_{FAN} → Thermal Torque with Fan - The thermal output torque rating with integrated fan cooling

$T_{E\text{-}Stop}$ → E-Stop Torque - The maximum allowable occasional and momentary output torque

C_F → Cycle Factor from Table 1

C_D → Time Factor from Table 2

C_{DC} → Duty Cycle Factor from Table 3

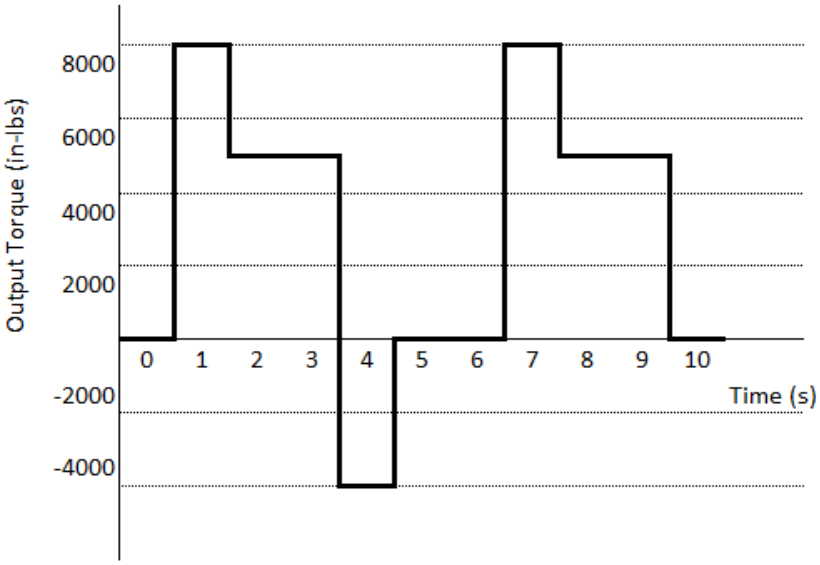
$T_{1accmotor}$ → Maximum input torque from the motor during acceleration or deceleration

T_{2max} → Maximum reducer output torque based on motor torque

T_2 → Average output torque

Average Output Torque, T_2

Figure 1



Use magnitude only for T_2 calculation

Do not include dwell time in T_2 calculation

Example Calculation from Figure 1

$$T2 = \frac{(8{,}000 \times 1 + 5{,}000 \times 2 + 4{,}000 \times 1 + 8{,}000 \times 1 + 5{,}000 \times 2)}{(1 + 2 + 1 + 1 + 2)}$$

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Cycle and Run Time Factors

Table 1 - Cycle Factor, C_F

Cycles / Hour	Cycle Factor,C_F
1 - 500	1
1000	1
1500	0.83
2500	0.71
3500	0.63
Above 3500	Contact Cone Drive
Note: Use linear interpolation between cycle rates	

Table 2 - Time Factor, C_D

Run Time per Day (Hrs)	Time Factor, C_D
1 - 10	1
24	0.75
Note: Use linear interpolation between run times	

Duty Cycle

Table 3 - Duty Cycle

Duty Cycle (%)	Duty Cycle Factor, C_{DC}
10	0.6
20	0.7
30	0.8
40	0.9
50 - 100	1.0

Duty Cycle = Percentage of Run Time over a given 1/2 hour.

$$\text{Duty Cycle} = \frac{\text{Run Time}}{\text{Run Time + Dwell Time}}$$

WK² Rotational Inertia of Reducer

Referred to high speed (input) shaft

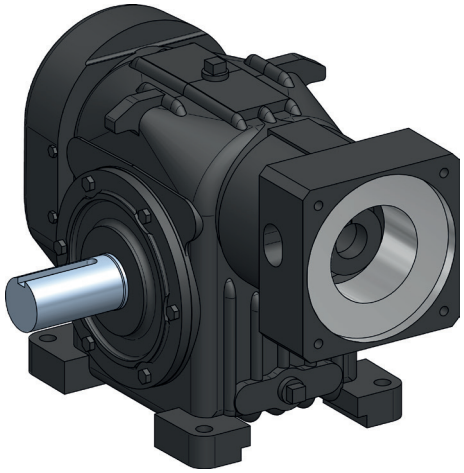
Single extended worm - SOLID single extended low speed (output) shaft

Ratio		Unit Size						
		30	35	40	50	60	70	80
5	(lb-in²)	2.62	5.8	9.86	20.2	52	102	168
	(kg-cm²)	7.67	16.97	28.85	59.11	152.15	298.45	491.57
10	(lb-in²)	1.8	3.36	6.52	12.6	29.5	48.4	92.2
	(kg-cm²)	5.27	9.83	19.08	36.87	86.32	141.62	269.78
15	(lb-in²)	1.65	2.9	5.9	11.2	25.3	38.4	78
	(kg-cm²)	4.83	8.49	17.26	32.77	74.03	112.36	228.23
20	(lb-in²)	1.59	2.74	5.69	10.7	23.9	34.9	73
	(kg-cm²)	4.65	8.02	16.65	31.31	69.93	102.12	213.6
25	(lb-in²)	1.57	2.67	5.59	10.5	23.2	33.3	70.7
	(kg-cm²)	4.59	7.81	16.36	30.72	67.88	97.44	206.87
30	(lb-in²)	1.55	2.63	5.53	10.3	22.8	32.4	69.5
	(kg-cm²)	4.54	7.7	16.18	30.14	66.71	94.8	203.36
40	(lb-in²)	1.54	2.59	5.48	10.2	22.5	31.5	68.2
	(kg-cm²)	4.51	7.58	16.03	29.85	65.84	92.17	199.55
50	(lb-in²)	1.53	2.57	5.45	10.2	22.3	31.1	67.7
	(kg-cm²)	4.48	7.52	15.95	29.85	65.25	91	198.09
60	(lb-in²)	1.53	2.56	5.44	10.1	22.2	30.9	67.4
	(kg-cm²)	4.48	7.49	15.92	29.55	64.96	90.41	197.21
70	(lb-in²)	-	-	-	10.1	22.2	30.8	67.2
	(kg-cm²)	-	-	-	29.55	64.96	90.12	196.63

ADDITIONAL WK² FOR COUPLING
ADD DIRECTLY TO REDUCER FIGURES

See couplings listed on page 38 - 45

Coupling	Moment of Inertia (lb - in²)
GAM KLC50	0.8
GAM KLC125	2.6
GAM KM270	7.5
GAM KM400	8.2
GAM KM600	16.1
GAM KM900	30.8
R&W EK2 300	2.7
R&W EK2 450	6.2
R&W EK2 800	64.9



WK² for DOUBLE EXTENDED SOLID output shaft

	Unit Size						
	30	35	40	50	60	70	80
(lb - in²)	0.511	1.29	4.05	7.83	18.2	27.7	31.69
(kg - cm²)	1.495	3.775	11.85	22.91	53.25	81.05	92.725

(Divide the values in the table above by the square of the ratio
then add to the low speed output reducer values)

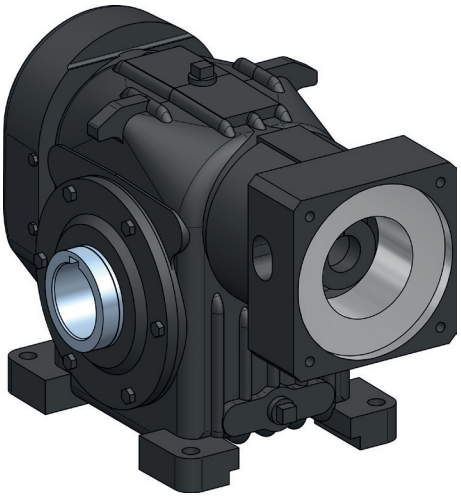
WK² for DOUBLE EXTENDED high speed (input) shaft

	Unit Size						
	30	35	40	50	60	70	80
(lb - in²)	0.103	0.241	0.727	0.775	1.62	3.11	3.94
(kg - cm²)	0.301	0.705	2.127	2.268	4.74	9.1	11.528

(Add directly to the solid or hollow output shaft assembly values)

Single extended worm - HOLLOW low speed (output) shaft

Ratio		Unit Size						
		30	35	40	50	60	70	80
5	(lb-in²)	3.99	7.58	12.8	27.5	64.4	133	206
	(kg-cm²)	11.7	22.2	37.5	80.5	188.4	389.2	602.8
10	(lb-in²)	2.14	3.8	7.25	14.4	32.6	56.1	102
	(kg-cm²)	6.26	11.1	21.2	42.1	95.39	164.2	298.5
15	(lb-in²)	1.8	3.1	6.23	12	26.7	41.8	82.1
	(kg-cm²)	5.27	9.07	18.2	35.1	78.12	122.3	240.2
20	(lb-in²)	1.68	2.86	5.87	11.2	24.6	36.8	75.3
	(kg-cm²)	4.92	8.37	17.2	32.8	71.98	107.7	220.3
25	(lb-in²)	1.62	2.74	5.7	10.8	23.7	34.5	72.2
	(kg-cm²)	4.74	8.02	16.7	31.6	69.35	101	211.3
30	(lb-in²)	1.59	2.68	5.61	10.6	23.2	33.2	70.4
	(kg-cm²)	4.65	7.84	16.4	31	67.88	97.14	206
40	(lb-in²)	1.56	2.62	5.53	10.3	22.7	32	68.8
	(kg-cm²)	4.56	7.67	16.2	30.1	66.42	93.63	201.3
50	(lb-in²)	1.55	2.59	5.48	10.2	22.4	31.4	68
	(kg-cm²)	4.54	7.58	16	29.9	65.54	91.88	199
60	(lb-in²)	1.54	2.58	5.46	10.2	22.3	31.1	67.5
	(kg-cm²)	4.51	7.55	16	29.9	65.25	91	197.5
70	(lb-in²)	-	-	-	10.2	22.2	30.9	67.3
	(kg-cm²)	-	-	-	29.9	64.96	90.41	196.9



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Output Torque at 2,000 RPM and Torsional Stiffness

Output Torque 2,000 RPM

	Ratios	Output Torque	Unit Size						
			30	35	40	50	60	70	80
Output Torque (1) T_{accel}	5	lb-in	2,914	5,077	7,243	13,201	19,291	28,207	39,484
		Nm	329	574	818	1,492	2,180	3,187	4,461
	10	lb-in	4,208	7,313	10,433	19,114	27,673	41,841	60,210
		Nm	475	826	1,179	2,160	3,127	4,727	6,803
	15	lb-in	5,064	8,800	12,577	23,076	33,295	50,401	73,120
		Nm	572	994	1,421	2,607	3,762	5,695	8,261
	20	lb-in	4,953	8,600	12,330	22,605	32,612	49,385	71,511
		Nm	560	972	1,393	2,554	3,685	5,580	8,080
	25	lb-in	4,954	8,604	12,356	22,631	32,638	49,496	71,680
		Nm	560	972	1,396	2,557	3,688	5,592	8,099
	30	lb-in	4,738	8,219	11,825	21,658	31,273	47,478	68,785
		Nm	535	929	1,336	2,447	3,533	5,364	7,772
	40	lb-in	4,524	7,858	11,300	20,725	29,922	45,459	65,775
		Nm	511	888	1,277	2,342	3,381	5,136	7,432
	50	lb-in	4,360	7,565	10,910	20,012	28,869	43,876	63,464
		Nm	493	855	1,233	2,261	3,262	4,957	7,170
	60	lb-in	4,186	7,273	10,507	19,248	27,784	42,243	61,063
		Nm	473	822	1,187	2,175	3,139	4,773	6,899
	70	lb-in				19,006	27,435	41,711	60,294
		Nm				2,147	3,100	4,713	6,812

1.) The acceleration output torques are based on an input speed of 2,000 RPM. For all speeds and continuous run output torque ratings, see rating tables for individual reducers.

Reducer Torsional Stiffness

		Unit Size						
		30	35	40	50	60	70	80
Torsional Rigidity	lb-in / degree	19,900	27,400	34,950	105,100	175,300	245,500	315,700
	lb-in / arcminute	332	457	583	1,752	2,922	4,092	5,262
	Nm / arcminute	37.5	51.6	65.8	197.9	330.1	462.3	594.5

Efficiency

The values shown in the following table are approximate. Overall reducer efficiencies have been determined and substantiated by extensive dynamometer testing. They are for a complete reducer and include all losses within the unit from oil churning, oil seals and bearings. The efficiencies shown are based on the catalog ratings with the unit at normal operating temperature and with an approved lubricant. Varying conditions such as extremely cold or hot ambient temperatures, and excessively high or low loading will affect the efficiency of the reducer. **If the reducer is required to start under load, consideration must be given to the starting efficiency, which would be less than the running efficiency.** For additional information on efficiency under abnormal temperatures and loading and for starting efficiencies, please contact Cone Drive.

Efficiency (Percent) - Single Reduction										
Reducer Size	Input RPM	Ratio								
		5:1	10:1	15:1	20:1	25:1	30:1	40:1	50:1	60:1	70:1
30 and 35	3,000	91	89	87	84	83	80	76	73	70	69
	2,500	91	89	87	84	83	80	76	73	70	69
	2,000	92	90	88	85	84	81	77	74	71	70
	1,750	92	90	88	85	84	81	77	74	71	70
	1,500	92	90	88	85	84	81	77	74	71	70
	1,150	92	90	88	84	84	81	77	74	71	70
	870	92	89	87	83	83	80	76	73	70	69
	580	91	87	85	83	81	76	73	71	67	66
	300	91	86	82	79	78	73	68	65	62	61
	200	90	85	81	78	76	71	64	61	60	59
	100	89	83	80	76	72	69	62	55	54	53
	50	85	80	77	72	68	65	58	51	50	49
	10	81	76	72	66	62	58	50	45	44	39
	5	81	75	70	64	59	56	48	42	38	34

Efficiency (Percent) - Single Reduction										
Reducer Size	Input RPM	Ratio								
		5:1	10:1	15:1	20:1	25:1	30:1	40:1	50:1	60:1	70:1
40 Thru 80	3,000	94	92	90	87	86	82	78	75	72	71
	2,500	94	92	90	87	86	82	78	75	72	71
	2,000	95	93	91	88	87	83	79	76	73	72
	1,750	95	93	91	88	87	83	79	76	73	72
	1,500	95	93	91	88	87	83	79	76	73	72
	1,150	95	93	91	87	87	83	79	76	73	72
	870	95	92	90	86	86	82	78	75	72	71
	580	94	90	88	86	84	78	75	73	69	68
	300	94	89	85	81	80	75	70	67	64	63
	200	93	88	84	80	78	73	66	63	62	61
	100	92	86	82	78	74	71	64	57	56	55
	50	88	82	79	74	70	67	60	53	52	51
	10	84	78	74	68	64	60	52	46	45	40
	5	83	77	72	66	61	58	49	43	39	35

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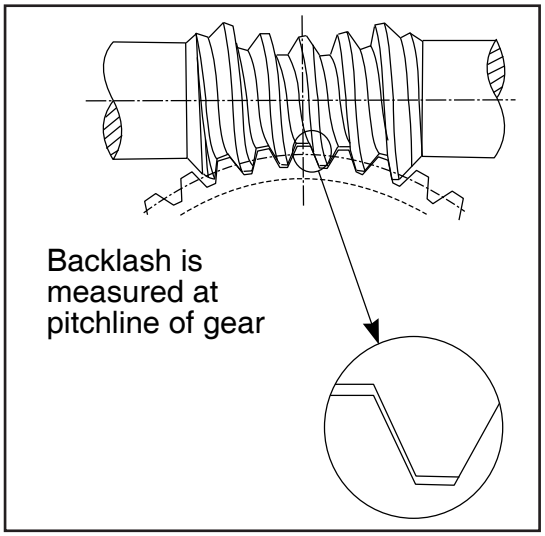
Backlash

The inherent accuracy of Cone Drive's standard product line fulfills a broad range of precision drive requirements. But, for those applications that demand more precision we have a low backlash gear set to suit your needs. As Cone Drive's manufacturing processes lend themselves to generating precision gearing, these low backlash gear sets and reducers can be obtained at very little additional expense.

A standard Cone Drive gear unit provides about half the backlash of other standard gear units. Cone Drive also offers low backlash and zero backlash gearing.



Measuring Backlash:

Backlash is measured at the pitchline of the gear by rotating the output shaft while holding the input shaft stationary. Bearings are set at zero end play for measurement, then adjusted afterwards accordings to loading, speed and duty cycle.

Double Enveloping:

Cone Drive's unique double-enveloping worm gear sets are double throated. This allows each element to envelope the other to provide area contact between the worm and gear. This design provides more output torque then cylindrical worm gearing for a given center distance. Double enveloping worm gearing also provides multiple tooth contact which will substantially reduce wear and allow extended life of the gear set.

Cone Drive's Low Backlash Gear Sets and Reducers offer:

- Accuracy
- Minimum Backlash
- Smooth Motion

Application Assistance:

To assure optimum performance, Cone Drive's application engineers are available to provide further explanations of precision characteristics under operating conditions. All reducers provided with low backlash gear sets require a review of loading speed and duty cycle so that bearings and lubrication can be given proper consideration.

Backlash

The following chart lists the backlash for standard reducers. Backlash is defined as the amount of movement at the pitch line of the gear with the worm locked and the gear set on exact center distance. When the gear set is assembled into a machine or reducer, the assembled backlash may fall outside of the limits shown in the table depending on worm and gear bearing looseness, and the actual center distance on which the gear set is mounted. Backlash is measured at the pitch line of the gear and is not dependent on ratio. Backlash is generally not measured at the worm because the amount of rotation of the worm with gear locked is a function of ratio.

STANDARD BACKLASH - ASSEMBLED REDUCERS

UNIT SIZE	Input RPM											
	100 - 499			500 - 999			1,000 - 2,000			2,001 - 3,000		
	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES
30	0.009	0.22	13	0.009	0.22	13	0.011	0.26	16	0.013	0.31	19
35	0.010	0.20	12	0.010	0.20	12	0.012	0.25	15	0.014	0.29	17
40	0.010	0.18	11	0.011	0.20	12	0.013	0.23	14	0.015	0.27	16
50	0.011	0.16	9	0.012	0.17	10	0.014	0.20	12	0.016	0.23	14
60	0.012	0.14	9	0.013	0.16	9	0.015	0.18	11	0.017	0.20	12
70	0.013	0.13	8	0.015	0.15	9	0.018	0.18	11	0.019	0.19	12
80	0.014	0.12	7	0.016	0.14	8	0.019	0.17	10	0.020	0.18	11

Nominal Backlash values in inches, degrees, and arcminutes for standard backlash reducers.
Backlash in inches is measured at pitch line.

LOW BACKLASH - ASSEMBLED REDUCERS

UNIT SIZE	Input RPM											
	100 - 499			500 - 999			1,000 - 2,000			2,001 - 3,000		
	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES	INCHES	DEGREES	ARC MINUTES
30	0.003	0.07	4	0.003	0.07	4	0.005	0.12	7	0.007	0.17	10
35	0.003	0.06	4	0.003	0.06	4	0.005	0.10	6	0.007	0.14	9
40	0.003	0.05	3	0.004	0.07	4	0.006	0.11	6	0.008	0.14	9
50	0.003	0.04	3	0.004	0.06	3	0.006	0.09	5	0.008	0.11	7
60	0.003	0.04	2	0.004	0.05	3	0.006	0.07	4	0.008	0.10	6
70	0.003	0.03	2	0.005	0.05	3	0.008	0.08	5	0.009	0.09	6
80	0.003	0.03	2	0.005	0.04	3	0.008	0.07	4	0.009	0.08	5

Nominal Backlash values in inches, degrees, and arcminutes for low backlash reducers.
Backlash in inches is measured at pitch line.

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Overhung Loads

The solid and hollow output shaft overhung load (OHL) capacities are tabulated for HP Servo reducers based on input speed of 2,000 RPM. For speeds other than 2,000 RPM contact Cone Drive Application Engineering. The OHL for both the solid and hollow output shaft is based on the load acting on the center of the solid output shaft keyway zero backlash gearing.

Overhung Load (lb)

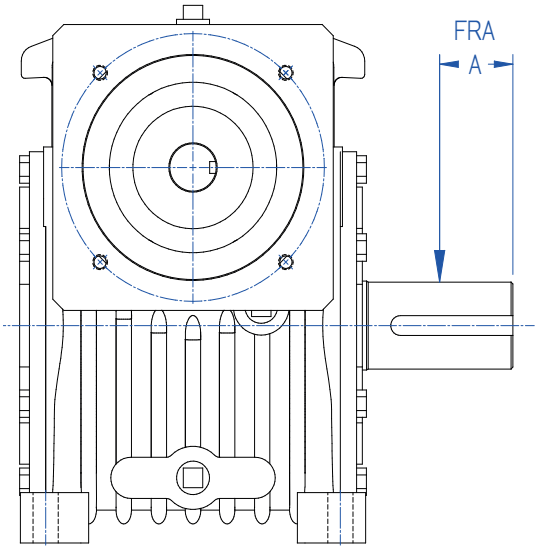
$$P = \frac{HP \times 126{,}000 \times K}{N \times D}$$

P = equivalent overhung load (lb)
HP = power transmitted by shaft (HP)
N = speed of shaft (rpm)
D = pitch diameter of sprocket, etc (in)
K = factor (see table for factor values)

Overhung Load Factors

Component	K (factor)
Chain Sprocket	1.00
Spur or helical pinion	1.25
Timing belt pulley	1.50
V-Belt sheave	1.50
Flat belt pulley	2.00

Unit Size	Dimension "A" (Inches)
30	1.00
35	1.31
40	1.66
50	1.81
60	2.25
70	2.44
80	2.44



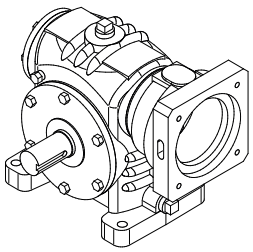
Location of OHL other than the centerline of the keyway

In the case where the OHL is located beyond the center of the keyway, the allowable OHL is adjusted by following equation:

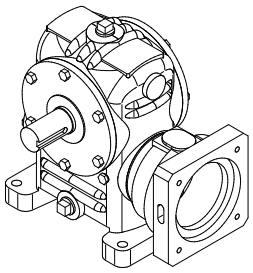
$$FR_{adj} = FRA \times \frac{A}{A + \Delta A}$$

FR_{adj} = adjusted overhung load (lb)
FRA = allowable OHL at the center of the keyway (lb)
A = location at center of keyway (in)
ΔA = location of load beyond the center of keyway(in)

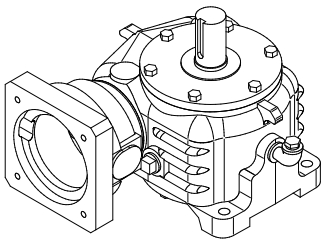
Solid Output Shaft Overhung Load Ratings



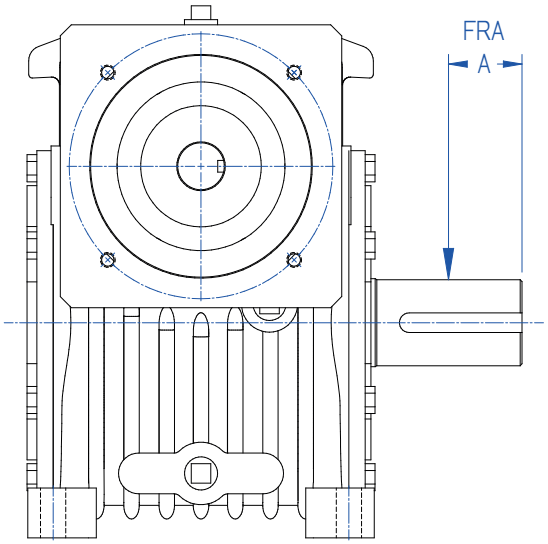
Reducer Type O
Worm Over Gear



Reducer Type U
Worm Under Gear



Reducer Type V
Gear Vertical



SOLID OUTPUT SHAFTS (Overhung Load Values shown in Lb.)

UNIT SIZE	REDUCER MODEL	TYPE OF LOAD	OUTPUT RPM @ 2000 RPM INPUT					
			600	400	200	100	80	50
30	All Models	OHL (FRA)	830	795	1,280	1,640	1,790	1,850
	Type O & V	Thrust	620	600	830	830	830	830
	Type U		510	510	510	510	510	510
35	All Models	OHL (FRA)	1,305	1,220	1,930	2,450	2,675	3,245
	Type O & V	Thrust	940	880	1,460	1,835	1,835	1,835
	Type U		940	880	1,110	1,110	1,110	1,110
40	All Models	OHL (FRA)	1,495	1,395	2,015	2,575	2,815	3,455
	Type O & V	Thrust	1,280	1,195	1,870	2,540	2,540	2,540
	Type U		1,280	1,195	1,525	1,525	1,525	1,525
50	All Models	OHL (FRA)	N/A	1,815	2,830	3,620	3,965	4,875
	Type O & V	Thrust	N/A	1,400	2,210	3,645	3,915	3,915
	Type U		N/A	1,400	2,210	2,270	2,270	2,270
60	All Models	OHL (FRA)	N/A	2,220	3,115	3,990	4,380	5,420
	Type O & V	Thrust	N/A	2,045	3,265	5,000	5,490	5,490
	Type U		N/A	2,045	3,095	3,095	3,095	3,095
70	All Models	OHL (FRA)	N/A	3,620	5,190	6,590	7,185	8,745
	Type O & V	Thrust	N/A	2,465	3,820	5,865	5,865	5,865
	Type U		N/A	2,465	3,300	3,300	3,300	3,300
80	All Models	OHL (FRA)	N/A	3,540	5,230	6,970	7,655	9,445
	Type O & V	Thrust	N/A	2,330	5,085	5,935	5,935	5,935
	Type U		N/A	2,330	3,300	3,300	3,300	3,300

600 RPM is @ 3,000 RPM Input
25,000 hours L10 Life used where rating is bearing limited
Ratings based on reducer operating at service factor 1
Contact Cone Drive for applications that exceed listed ratings

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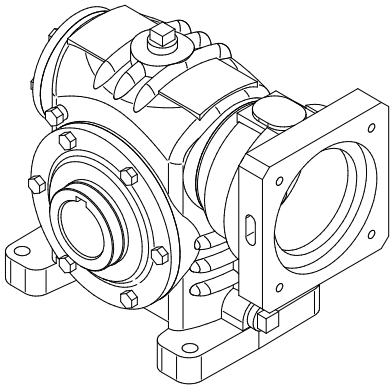
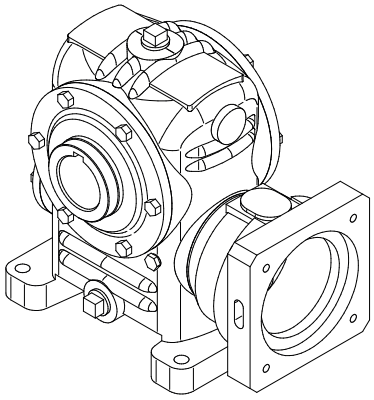
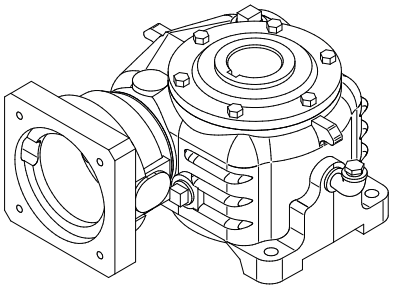
Hollow Output Shaft Overhung Load Ratings



Reducer
Type O
Worm Over Gear



Reducer
Type U
Worm Under Gear



Reducer
Type V
Gear Vertical

HOLLOW OUTPUT SHAFTS (Overhung Load Values shown in Lb.)

UNIT SIZE	REDUCER MODEL	TYPE OF LOAD	OUTPUT RPM @ 2,000 RPM INPUT					
			600	400	200	100	80	50
30	All Models	OHL (FRA)	1,330	1,465	1,815	1,850	1,850	1,850
	Type O & V	Thrust	830	830	830	830	830	830
	Type U		510	510	510	510	510	510
35	All Models	OHL (FRA)	1,615	1,765	2,190	2,775	3,015	3,500
	Type O & V	Thrust	1,835	1,835	1,835	1,835	1,835	1,835
	Type U		1,110	1,110	1,110	1,110	1,110	1,110
40	All Models	OHL (FRA)	2,420	2,650	3,265	4,110	4,460	4,560
	Type O & V	Thrust	2,540	2,540	2,540	2,540	2,540	2,540
	Type U		1,525	1,525	1,525	1,525	1,525	1,525
50	All Models	OHL (FRA)	N/A	3,170	4,230	5,345	5,810	5,910
	Type O & V	Thrust	N/A	2,085	3,070	3,915	3,915	3,915
	Type U		N/A	2,085	2,270	2,270	2,270	2,270
60	All Models	OHL (FRA)	N/A	3,350	4,565	5,770	6,285	7,615
	Type O & V	Thrust	N/A	2,325	3,630	5,430	5,490	5,490
	Type U		N/A	2,325	3,095	3,095	3,095	3,095
70	All Models	OHL (FRA)	N/A	5,385	6,650	8,390	9,110	10,955
	Type O & V	Thrust	N/A	5,625	5,865	5,865	5,865	5,865
	Type U		N/A	3,300	3,300	3,300	3,300	3,300
80	All Models	OHL (FRA)	N/A	4,705	5,735	7,405	8,100	9,880
	Type O & V	Thrust	N/A	4,790	5,935	5,935	5,935	5,935
	Type U		N/A	3,300	3,300	3,300	3,300	3,300

600 RPM is @ 3,000 RPM Input
25,000 hours L10 Life used where rating is bearing limited
Ratings based on reducer operating at service factor 1
Contact Cone Drive for applications that exceed listed ratings

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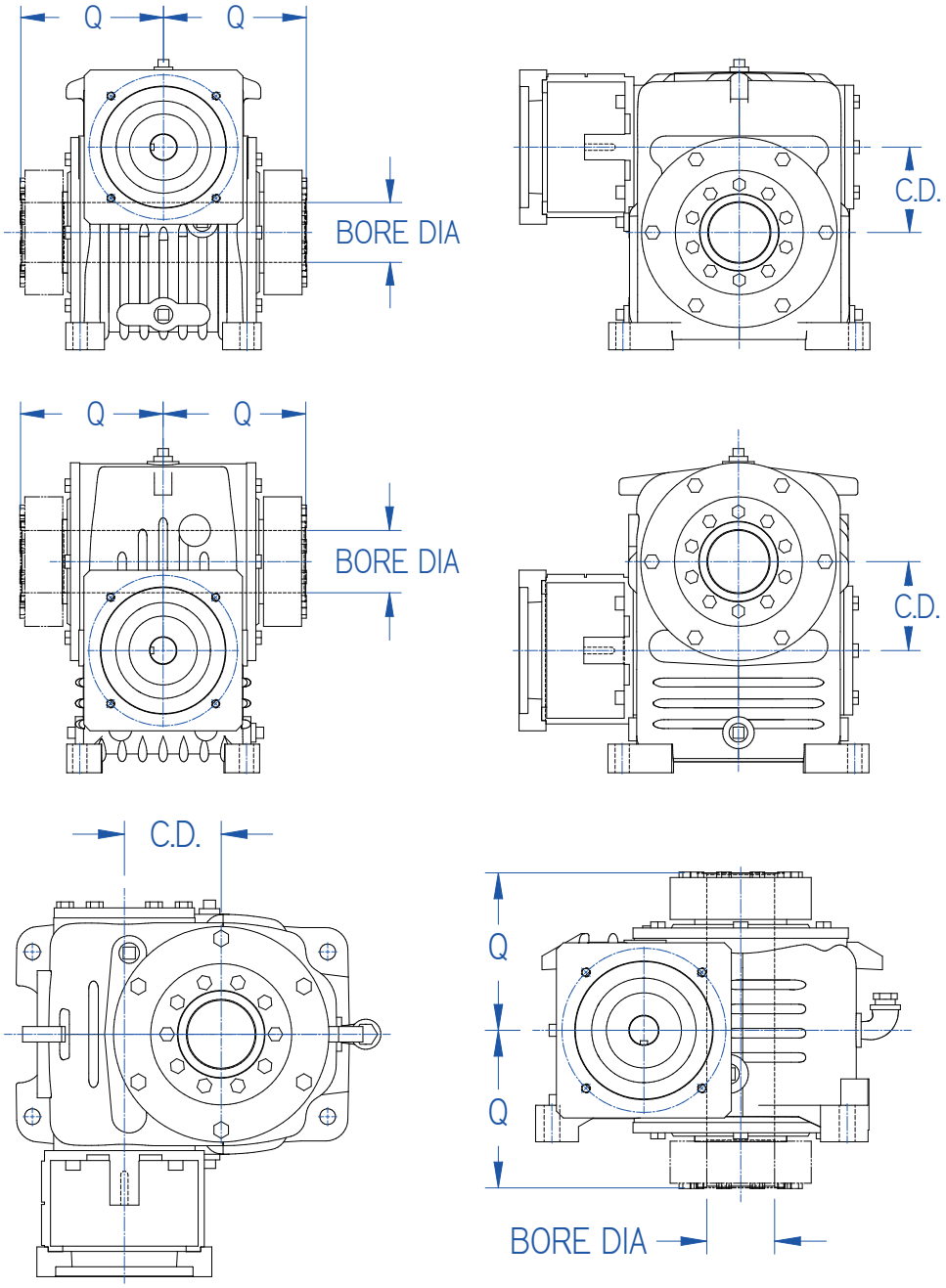
Shrink Disc Option

(Shrink Disk can be mounted on either side or both.)



Reducer Size	Center Distance	Dimension "Q"	Reducer Bore Size		Driven Shaft Diameter	
	Inch	inch	inch	Tolerance (+/-)	inch	Tolerance (+/-)
30	3.0	5.10	2.1875	+0.0008/-0.0000	2.1875	+0.0000/-0.0011
35	3.5	6.00	2.4375	+0.0008/-0.0000	2.4375	+0.0000/-0.0011
40	4.0	7.13	2.6875	+0.0008/-0.0000	2.6875	+0.0000/-0.0011
50	5.0	8.13	3.1875	+0.0012/-0.0000	3.1875	+0.0000/-0.0015
60	6.0	9.10	3.4375	+0.0012/-0.0000	3.4375	+0.0000/-0.0015
70	7.0	10.88	4.4375	+0.0012/-0.0000	4.4375	+0.0000/-0.0015
80	8.0	10.88	4.4375	+0.0012/-0.0000	4.4375	+0.0000/-0.0015

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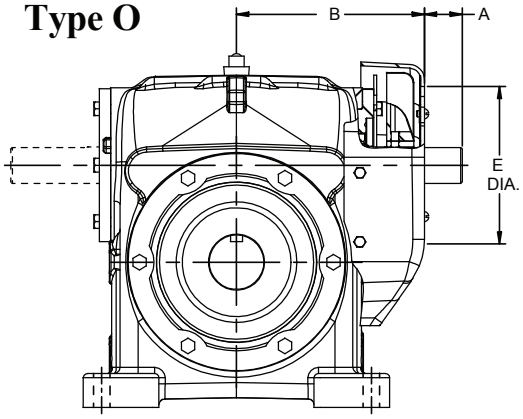
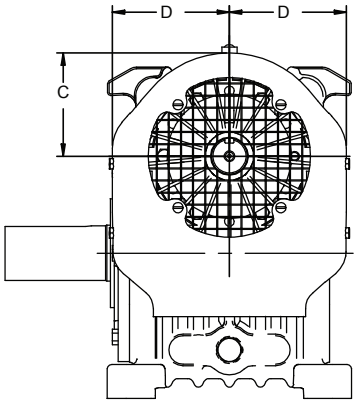
Fan Cooling Dimensions

Motor Adapters not shown for simplcity

Unit Type O



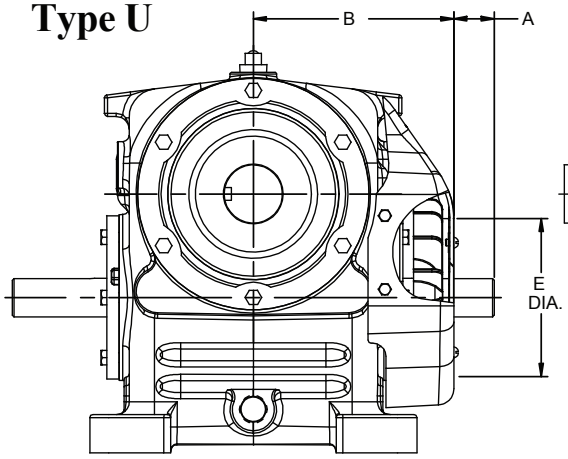


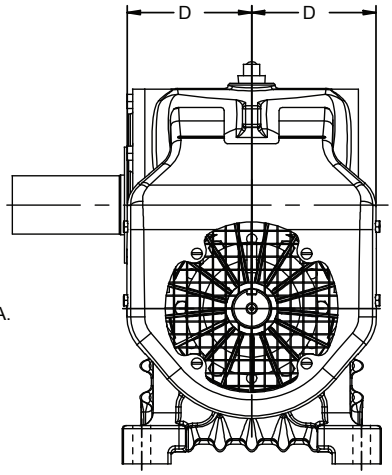
Size	A	B	C	D	E
30	0.89	5.80	3.65	3.18	4.94
35	1.00	6.75	4.25	4.25	4.25
40	1.69	7.62	4.68	4.87	4.75
50	1.88	8.62	4.87	5.75	4.75
60	2.30	9.46	6.00	6.50	6.50
70	3.00	11.50	7.00	7.31	6.50
80	2.62	12.87	7.43	7.87	10.5

For dimensions not shown see dimension pages for individual reducer sizes.

Important: Do not restrict air intake flow to fan when attaching coupling, clutch or sheaves to input shaft.

Unit Type U



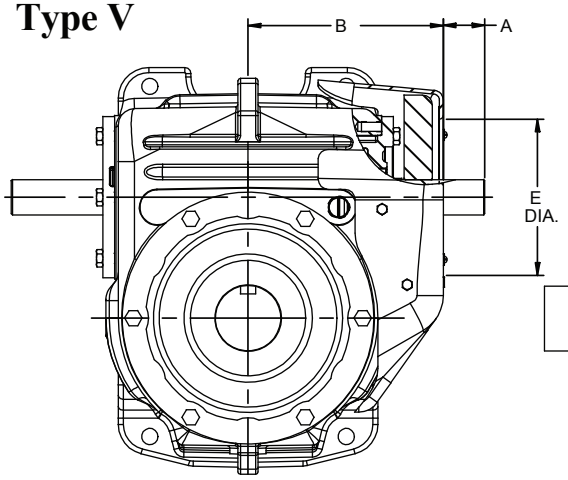


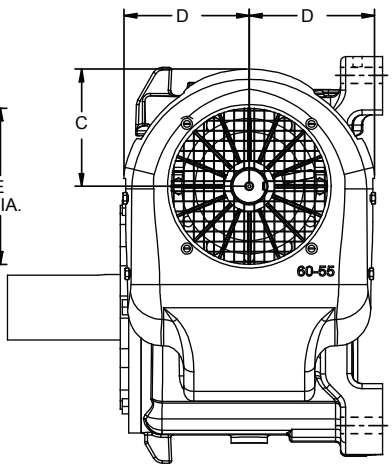
Size	A	B	D	E
30	0.89	6.75	4.25	4.25
35	1.00	6.75	4.25	4.25
40	1.69	7.62	5.25	4.75
50	1.88	8.62	6.00	4.75
60	2.30	9.46	6.75	6.50
70	3.00	11.50	7.75	6.50
80	2.37	13.12	8.50	10.5

For dimensions not shown see dimension pages for individual reducer sizes.

Important: Do not restrict air intake flow to fan when attaching coupling, clutch or sheaves to input shaft.

Unit Type V





Size	A	B	C	D	E
30	0.89	5.80	3.65	3.18	4.95
35	1.00	6.75	4.25	4.25	4.25
40	1.69	7.62	4.68	4.87	4.75
50	1.88	8.62	4.87	5.75	4.75
60	2.30	9.46	6.00	6.50	6.50
70	3.00	11.50	7.00	7.31	6.50
80	2.62	13.2	7.43	7.87	10.5

For dimensions not shown see dimension pages for individual reducer sizes.

Important: Do not restrict air intake flow to fan when attaching coupling, clutch or sheaves to input shaft.

Unit Designation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
**															
EXAMPLE	U	3	5	C	A	-	1	-	D	1	1	H	C	D	F

1 - Unit Type

O	-	Worm Over
U	-	Worm Under
V	-	Gear Vertical

2 - Size of Unit

3	0
3	5
4	0
5	0

6	0
7	0
8	0

4 - Exact Ratio & Backlash

A	-	5:1 Standard backlash
B	-	5:1 Low backlash
C	-	10:1 Standard backlash
D	-	10:1 Low backlash
E	-	15:1 Standard backlash
F	-	15:1 Low backlash
G	-	20:1 Standard backlash
H	-	20:1 Low backlash
J	-	25:1 Standard backlash
K	-	25:1 Low backlash
L	-	30:1 Standard backlash
M	-	30:1 Low backlash
N	-	40:1 Standard backlash
P	-	40:1 Low backlash
R	-	50:1 Standard backlash
S	-	50:1 Low backlash
T	-	60:1 Standard backlash
U	-	60:1 Low backlash
W	-	70:1 Standard backlash (sizes 50 - 80 only)
X	-	70:1 Low backlash (sizes 50 - 80 only)

5 - Output Shaft

	A	-	Solid single extended - (inch)
	B	-	Solid double extended - (inch)
*	G	-	Hollow (see chart on pg. 35 for additional sizes)
*	Y	-	Shrink disc shaft

* The value "G" is shown as an example. Refer to page 35 for the letter corresponding to the required bore size.
* The "Y"represents standard shrink disc bores sizes shown on page 32.

6, 7, 8 - Mounting Position

-	1	-

Unit mounting position (see page 36 & 37 for codes)

15 - Cooling Option & Special features

-	-	None
F	-	Fan cooled

14 - Motor Speed

A	-	0 - 100 RPM
B	-	101 - 500 RPM
C	-	501 - 1,000 RPM
D	-	1,001 - 2,000 RPM
E	-	2,001 - 3,000 RPM

13 - Coupling Type

L	-	Unit to fit motor less coupling
B	-	Bellows style coupling no keyway
C	-	Bellows style coupling with keyway
E	-	Jaw style coupling no keyway
F	-	Jaw style coupling with keyway

Coupling type is determined on pages 38 - 45

12 - Servo Motor Shaft Diameter (mm)

A	-	14
B	-	15.875
C	-	16
D	-	19
E	-	19.05
F	-	22
G	-	22.22
H	-	24
J	-	25.4

K	-	28
L	-	28.575
M	-	31.75
N	-	32
O	-	34.925
P	-	35
Q	-	38
R	-	42
S	-	48

T	-	55
U	-	60
V	-	70
W	-	75
Y	-	41.275

See page 41 for coupling allowable bore ranges

9, 10, 11 - Servo Motor Code

D	1	1

See page 38 - 45 for code based on servo motor used

We reserve the right to improve or change product design and specifications without notice.

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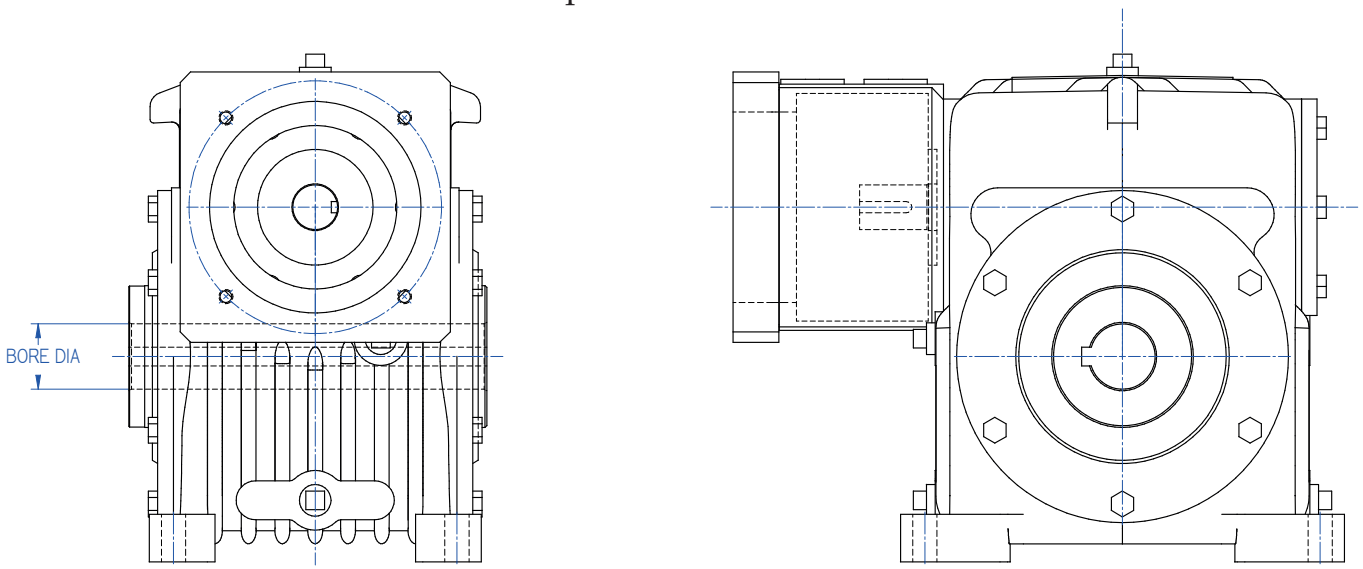
Position 5 Model Code for Hollow output shafts



The table below is a list of standard bore sizes for position 5 of the 15 digit code for each reducer size.

Available Hollow Shaft Bore Sizes										
Bore Diameter	Unit Size							Keyway	Bore Tolerance	Tapped Hole Size*
	30	35	40	50	60	70	80			
1.500	G							3/8 x 3/16	+0.002/-0.000	5/16 - 24
1.6875	H	H						3/8 x 3/16	+0.002/-0.000	5/16 - 24
1.9375	J	J						1/2 x 1/4	+0.002/-0.000	5/16 - 24
2.1875	L	L						1/2 x 1/4	+0.002/-0.000	5/16 - 24
2.1875			L					5/8 x 5/16	+0.003/-0.000	5/16 - 24
2.4375	M							3/8 x 3/16	+0.002/-0.000	5/16 - 24
2.4375		M	M					5/8 x 5/16	+0.003/-0.000	5/16 - 24
2.500	N	N						3/8 x 3/16	+0.002/-0.000	5/16 - 24
2.6875		P						3/8 x 3/16	+0.002/-0.000	5/16 - 24
2.6875			P					5/8 x 5/16	+0.003/-0.000	5/16 - 24
2.750		Q						3/8 x 3/16	+0.002/-0.000	5/16 - 24
2.750				Q				5/8 x 5/16	+0.003/-0.000	5/16 - 24
2.9375			R					5/8 x 5/16	+0.003/-0.000	5/16 - 24
2.9375					R			3/4 x 3/8	+0.003/-0.000	5/16 - 24
3.1875				S				5/8 x 5/16	+0.003/-0.000	5/16 - 24
3.4375				T				5/8 x 5/16	+0.003/-0.000	5/16 - 24
3.4375					T			3/4 x 3/8	+0.003/-0.000	5/16 - 24
3.9375					U			3/4 x 3/8	+0.003/-0.000	5/16 - 24
3.9375						U	U	1 x 1/2	+0.003/-0.000	1/2 - 20
4.4375						V	V	1 x 1/2	+0.003/-0.000	1/2 - 20

Special hollow gear shaft bore sizes are available at additional cost.

*Two set screws at long end of shaft 90 degrees apart.

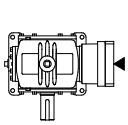
Mounting Positions

Worm Over Gear and Worm Under Gear

Unit Type O & Unit Type U

ALL DIAGRAMS SHOW SOLID OUTPUT SHAFT, SAME NUMBERS AND LETTERS APPLY TO HOLLOW OUTPUT SHAFTS.

FLOOR MOUNTED (View from Top)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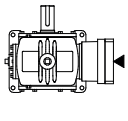
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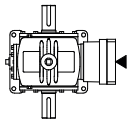
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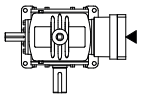
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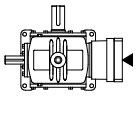
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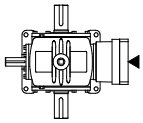
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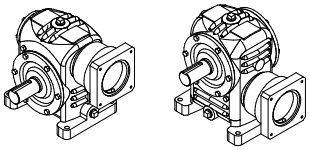
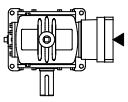
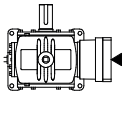
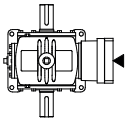

1 SHOWN

CEILING MOUNTED


C1


C2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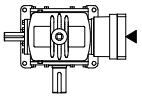
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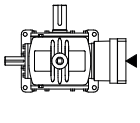
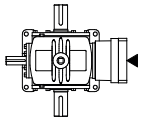
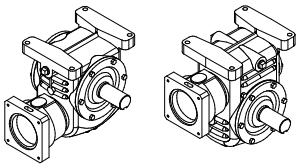
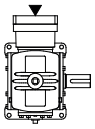
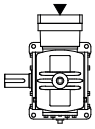

C5

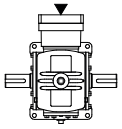

C6


C1 SHOWN

WALL MOUNTED (Worm Vertical Up)


W1


W2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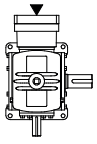
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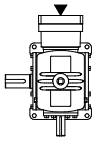
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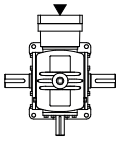
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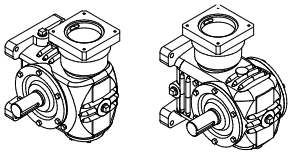
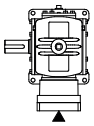
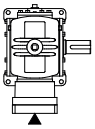
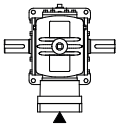

W2 SHOWN

WALL MOUNTED (Worm Vertical Down)


X1


X2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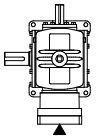
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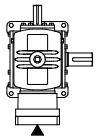
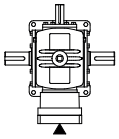

X5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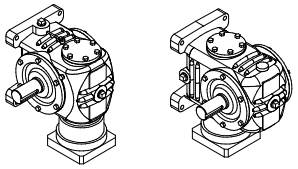
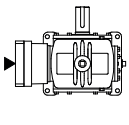

X1 SHOWN

WALL MOUNTED (Worm Horizontal to the left)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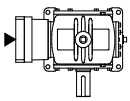
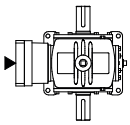
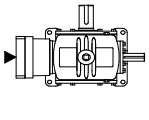
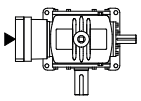
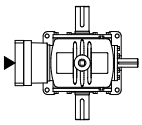
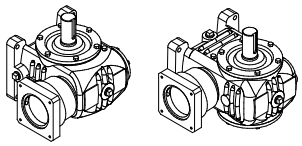

Y2


Y3

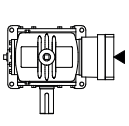

Y4

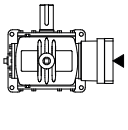

Y5

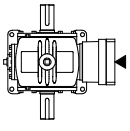

Y6

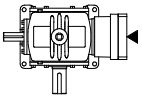

Y1 SHOWN

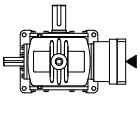
WALL MOUNTED (Worm Horizontal to the right)


Z1


Z2


Z3


Z4


Z5

Z6

Z2 SHOWN

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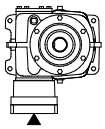
Gear Shaft Vertical

Unit Type V

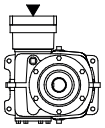
A Gearshaft Extended Opposite Feet
B Gearshaft Extended Through Feet
C Gearshaft Double Extended

ALL DIAGRAMS SHOW SOLID OUTPUT SHAFT, SAME LETTERS AND NUMBERS APPLY TO HOLLOW OUTPUT SHAFTS.

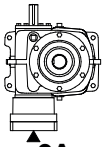
FLOOR MOUNTED (View from Top)



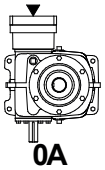
7A
7B
7C



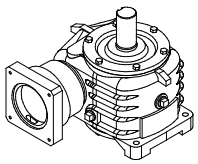
8A
8B
8C



9A
9B
9C

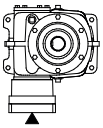


0A
0B
0C

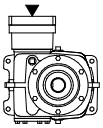


7A SHOWN

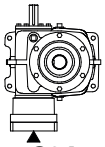
CEILING MOUNTED



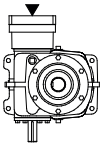
C7A
C7B
C7C



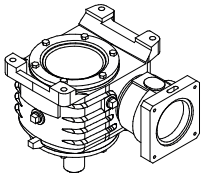
C8A
C8B
C8C



C9A
C9B
C9C

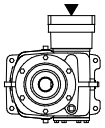


C0A
C0B
C0C

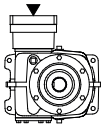


C7A SHOWN

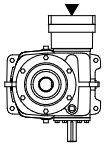
WALL MOUNTED (Worm Vertical Up)



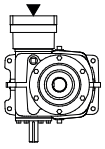
W7A
W7B
W7C



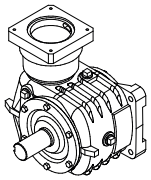
W8A
W8B
W8C



W9A
W9B
W9C

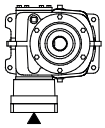


W0A
W0B
W0C

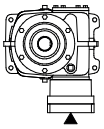


W8A SHOWN

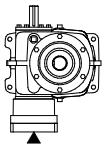
WALL MOUNTED (Worm Vertical Down)



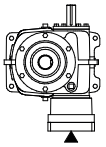
X7A
X7B
X7C



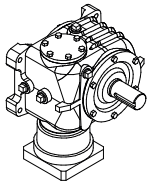
X8A
X8B
X8C



X9A
X9B
X9C

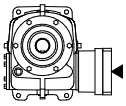


X0A
X0B
X0C

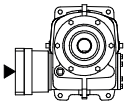


X7A SHOWN

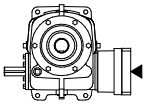
WALL MOUNTED (Worm Horizontal Under Gear)



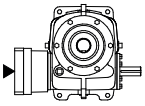
Y7A
Y7B
Y7C



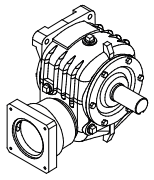
Y8A
Y8B
Y8C



Y9A
Y9B
Y9C

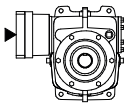


Y0A
Y0B
Y0C

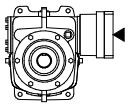


Y8A SHOWN

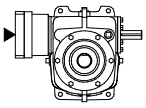
WALL MOUNTED (Worm Horizontal Over Gear)



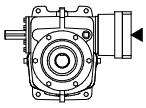
Z7A
Z7B
Z7C



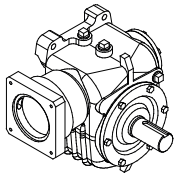
Z8A
Z8B
Z8C



Z9A
Z9B
Z9C



Z0A
Z0B
Z0C



Z7A SHOWN

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Motor Adapter & Coupling Selection

The following tables can be used to determine the positions 9 / 10 / 11 of the 15-digit model number and allowable motor shaft length from motors not listed on pages 41 - 44 for each unit size. The flange square is a nominal value and may not be the exact size of the motor flange square intended. Contact cone Drive for acceptable motor shaft length and model coupling for all spider type couplings.

Unit Size 30

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range	
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KLC-125	KLC-50
MP3B-11	160	80	100	5.3 - 6.3	B	1	1	30	25 - 51	37 - 51
MP3B-12	160	80	100	6.4 - 8.3	B	1	2	30	25 - 51	37 - 51
MP3B-13	160	95	115	8.4 - 10.3	B	1	3	30	25 - 51	37 - 51
MP3B-14	160	95	115	6.4 - 8.3	B	1	4	30	25 - 51	37 - 51
MP3B-15	160	95	130	6.4 - 8.3	B	1	5	30	25 - 51	37 - 51
MP3B-16	160	95	130	8.4 - 10.3	B	1	6	30	25 - 51	37 - 51
MP3C-01	160	110	130	8.4 - 10.3	C	0	1	30	25 - 51	37 - 51
MP3C-02	160	110	130	6.4 - 8.3	C	0	2	30	25 - 51	37 - 51
MP3C-03	160	110	145	8.4 - 10.3	C	0	3	30	25 - 51	37 - 51
MP3C-04	160	110	145	6.4 - 8.3	C	0	4	30	25 - 51	37 - 51
MP3C-05	160	110	165	10.4 - 12.4	C	0	5	30	25 - 51	37 - 51
MP3C-06	160	110	165	6.4 - 8.3	C	0	6	30	25 - 51	37 - 51
MP3C-07	160	120	185	8.4 - 10.3	C	0	7	30	25 - 51	37 - 51
MP3C-08	160	115	149	8.4 - 10.3	C	0	8	30	25 - 51	37 - 51
MP3C-09	160	130	165	8.4 - 10.3	C	0	9	30	25 - 51	37 - 51
MP3C-10	160	130	165	10.4 - 12.4	C	1	0	30	25 - 51	37 - 51
MP3H-17	160	110	145	6.4 - 8.3	H	1	7	69	64 - 90	76 - 90
MP3H-18	160	110	145	8.4 - 10.3	H	1	8	69	64 - 90	76 - 90
MP3H-19	160	110	165	6.4 - 8.3	H	1	9	69	64 - 90	76 - 90
MP3H-20	160	110	165	8.4 - 10.3	H	2	0	69	64 - 90	76 - 90
MP3H-23	160	130	165	8.4 - 10.3	H	2	3	69	64 - 90	76 - 90
MP3H-24	160	130	165	10.4 - 12.4	H	2	4	69	64 - 90	76 - 90
MP3K-27	190	130	215	10.4 - 12.4	K	2	7	49	44 - 70	56 - 70
MP3K-28	190	130	215	12.5 - 15	K	2	8	49	44 - 70	56 - 70
MP3K-29	190	180	215	10.4 - 12.4	K	2	9	49	44 - 70	56 - 70
MP3K-30	190	180	215	12.5 - 15	K	3	0	49	44 - 70	56 - 70
MP3M-31	240	230	265	12.5 - 15	M	3	1	63	58 - 84	70 - 84
MP3N-32	240	230	265	12.5 - 15	N	3	2	90	85 - 111	97 - 111
MP3P-33	260	180	215	12.5 - 15	P	3	3	85	80 - 106	92 - 106
MP3P-34	260	230	265	10.4 - 12.4	P	3	4	85	80 - 106	92 - 106
MP3P-35	260	230	265	12.5 - 15	P	3	5	85	80 - 106	92 - 106
MP3P-36	260	250	300	17 - 18.9	P	3	6	85	80 - 106	92 - 106
MP3P-37	260	250	300	19 - 20	P	3	7	85	80 - 106	92 - 106
MP3T-22	190	114.3	200	10.4 - 12.4	T	2	2	79	74 - 100	86 - 100
MP3T-25	190	130	200	12.5 - 15	T	2	5	79	74 - 100	86 - 100
MP3T-26	190	180	215	12.5 - 15	T	2	6	79	74 - 100	86 - 100
MP3T-40	190	114.3	200	12.5 - 15	T	4	0	79	74 - 100	86 - 100
MP3T-41	190	114.3	228.6	8.4 - 10.3	T	4	1	79	74 - 100	86 - 100
MP3T-42	190	180	215	10.4 - 12.4	T	4	2	79	74 - 100	86 - 100

Unit Size 35

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range		
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-270	KLC-125	KLC-50
MP3B-11	160	80	100	5.3 - 6.3	B	1	1	30	30 - 51	30 - 51	42 - 51
MP3B-12	160	80	100	6.4 - 8.3	B	1	2	30	30 - 51	30 - 51	42 - 51
MP3B-13	160	95	115	8.4 - 10.3	B	1	3	30	30 - 51	30 - 51	42 - 51
MP3B-14	160	95	115	6.4 - 8.3	B	1	4	30	30 - 51	30 - 51	42 - 51
MP3B-15	160	95	130	6.4 - 8.3	B	1	5	30	30 - 51	30 - 51	42 - 51
MP3B-16	160	95	130	8.4 - 10.3	B	1	6	30	30 - 51	30 - 51	42 - 51
MP3C-01	160	110	130	8.4 - 10.3	C	0	1	30	30 - 51	30 - 51	42 - 51
MP3C-02	160	110	130	6.4 - 8.3	C	0	2	30	30 - 51	30 - 51	42 - 51
MP3C-03	160	110	145	8.4 - 10.3	C	0	3	30	30 - 51	30 - 51	42 - 51
MP3C-04	160	110	145	6.4 - 8.3	C	0	4	30	30 - 51	30 - 51	42 - 51
MP3C-05	160	110	165	10.4 - 12.4	C	0	5	30	30 - 51	30 - 51	42 - 51
MP3C-06	160	110	165	6.4 - 8.3	C	0	6	30	30 - 51	30 - 51	42 - 51
MP3C-07	160	120	185	8.4 - 10.3	C	0	7	30	30 - 51	30 - 51	42 - 51
MP3C-08	160	115	149	8.4 - 10.3	C	0	8	30	30 - 51	30 - 51	42 - 51
MP3C-09	160	130	165	8.4 - 10.3	C	0	9	30	30 - 51	30 - 51	42 - 51
MP3C-10	160	130	165	10.4 - 12.4	C	1	0	30	30 - 51	30 - 51	42 - 51

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Unit Size 35 - Continued

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range		
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-270	KLC-125	KLC-50
MP3H-17	160	110	145	6.4 - 8.3	H	1	7	69	61 - 90	69 - 90	81 - 90
MP3H-18	160	110	145	8.4 - 10.3	H	1	8	69	61 - 90	69 - 90	81 - 90
MP3H-19	160	110	165	6.4 - 8.3	H	1	9	69	61 - 90	69 - 90	81 - 90
MP3H-20	160	110	165	8.4 - 10.3	H	2	0	69	61 - 90	69 - 90	81 - 90
MP3H-23	160	130	165	8.4 - 10.3	H	2	3	69	61 - 90	69 - 90	81 - 90
MP3H-24	160	130	165	10.4 - 12.4	H	2	4	69	61 - 90	69 - 90	81 - 90
MP3K-27	190	130	215	10.4 - 12.4	K	2	7	49	61 - 90	69 - 90	81 - 90
MP3K-28	190	130	215	12.5 - 15	K	2	8	49	61 - 90	69 - 90	81 - 90
MP3K-29	190	180	215	10.4 - 12.4	K	2	9	49	61 - 90	69 - 90	81 - 90
MP3K-30	190	180	215	12.5 - 15	K	3	0	49	61 - 90	69 - 90	81 - 90
MP3M-31	240	230	265	12.5 - 15	M	3	1	63	61 - 90	69 - 90	81 - 90
MP3N-32	240	230	265	12.5 - 15	N	3	2	90	61 - 90	69 - 90	81 - 90
MP3P-33	260	180	215	12.5 - 15	P	3	3	85	61 - 90	69 - 90	81 - 90
MP3P-34	260	230	265	10.4 - 12.4	P	3	4	85	61 - 90	69 - 90	81 - 90
MP3P-35	260	230	265	12.5 - 15	P	3	5	85	61 - 90	69 - 90	81 - 90
MP3P-36	260	250	300	17 - 18.9	P	3	6	85	61 - 90	69 - 90	81 - 90
MP3P-37	260	250	300	19 - 20	P	3	7	85	61 - 90	69 - 90	81 - 90
MP3T-22	190	114.3	200	10.4 - 12.4	T	2	2	79	61 - 90	69 - 90	81 - 90
MP3T-25	190	130	200	12.5 - 15	T	2	5	79	61 - 90	69 - 90	81 - 90
MP3T-26	190	180	215	12.5 - 15	T	2	6	79	61 - 90	69 - 90	81 - 90
MP3T-40	190	114.3	200	12.5 - 15	T	4	0	79	61 - 90	69 - 90	81 - 90
MP3T-41	190	114.3	228.6	8.4 - 10.3	T	4	1	79	61 - 90	69 - 90	81 - 90
MP3T-42	190	180	215	10.4 - 12.4	T	4	2	79	61 - 90	69 - 90	81 - 90

Unit Size 40

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range	
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KLC-125	KLC-50
MP3B-11	160	80	100	5.3 - 6.3	B	1	1	30	30 - 51	35 - 51
MP3B-12	160	80	100	6.4 - 8.3	B	1	2	30	30 - 51	35 - 51
MP3B-13	160	95	115	8.4 - 10.3	B	1	3	30	30 - 51	35 - 51
MP3B-14	160	95	115	6.4 - 8.3	B	1	4	30	30 - 51	35 - 51
MP3B-15	160	95	130	6.4 - 8.3	B	1	5	30	30 - 51	35 - 51
MP3B-16	160	95	130	8.4 - 10.3	B	1	6	30	30 - 51	35 - 51
MP3C-01	160	110	130	8.4 - 10.3	C	0	1	30	30 - 51	35 - 51
MP3C-02	160	110	130	6.4 - 8.3	C	0	2	30	30 - 51	35 - 51
MP3C-03	160	110	145	8.4 - 10.3	C	0	3	30	30 - 51	35 - 51
MP3C-04	160	110	145	6.4 - 8.3	C	0	4	30	30 - 51	35 - 51
MP3C-05	160	110	165	10.4 - 12.4	C	0	5	30	30 - 51	35 - 51
MP3C-06	160	110	165	6.4 - 8.3	C	0	6	30	30 - 51	35 - 51
MP3C-07	160	120	185	8.4 - 10.3	C	0	7	30	30 - 51	35 - 51
MP3C-08	160	115	149	8.4 - 10.3	C	0	8	30	30 - 51	35 - 51
MP3C-09	160	130	165	8.4 - 10.3	C	0	9	30	30 - 51	35 - 51
MP3C-10	160	130	165	10.4 - 12.4	C	1	0	30	30 - 51	35 - 51
MP3H-17	160	110	145	6.4 - 8.3	H	1	7	69	65 - 90	74 - 90
MP3H-18	160	110	145	8.4 - 10.3	H	1	8	69	65 - 90	74 - 90
MP3H-19	160	110	165	6.4 - 8.3	H	1	9	69	65 - 90	74 - 90
MP3H-20	160	110	165	8.4 - 10.3	H	2	0	69	65 - 90	74 - 90
MP3H-23	160	130	165	8.4 - 10.3	H	2	3	69	65 - 90	74 - 90
MP3H-24	160	130	165	10.4 - 12.4	H	2	4	69	65 - 90	74 - 90
MP3K-27	190	130	215	10.4 - 12.4	K	2	7	49	45 - 70	54 - 70
MP3K-28	190	130	215	12.5 - 15	K	2	8	49	45 - 70	54 - 70
MP3K-29	190	180	215	10.4 - 12.4	K	2	9	49	45 - 70	54 - 70
MP3K-30	190	180	215	12.5 - 15	K	3	0	49	45 - 70	54 - 70
MP3M-31	240	230	265	12.5 - 15	M	3	1	63	59 - 84	68 - 84
MP3N-32	240	230	265	12.5 - 15	N	3	2	90	81 - 111	95 - 111
MP3P-33	260	180	215	12.5 - 15	P	3	3	85	81 - 106	95 - 106
MP3P-34	260	230	265	10.4 - 12.4	P	3	4	85	81 - 106	95 - 106
MP3P-35	260	230	265	12.5 - 15	P	3	5	85	81 - 106	95 - 106
MP3P-36	260	250	300	17 - 18.9	P	3	6	85	81 - 106	95 - 106
MP3P-37	260	250	300	19 - 20	P	3	7	85	81 - 106	95 - 106
MP3T-22	190	114.3	200	10.4 - 12.4	T	2	2	79	76 - 100	84 - 100
MP3T-25	190	130	200	12.5 - 15	T	2	5	79	76 - 100	84 - 100

Motor Adapter & Coupling Selection

Unit Size 40 - Continued

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range	
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KLC-125	KLC-50
MP3T-26	190	180	215	12.5 - 15	T	2	6	79	76 - 100	84 - 100
MP3T-40	190	114.3	200	12.5 - 15	T	4	0	79	76 - 100	84 - 100
MP3T-41	190	114.3	228.6	8.4 - 10.3	T	4	1	79	76 - 100	84 - 100
MP3T-42	190	180	215	10.4 - 12.4	T	4	2	79	76 - 100	84 - 100

Unit Size 50

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range		
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-400	EK2-300	EK2-450
MP4Q-01	240	130	165	10.4 - 12.4	Q	0	1	39	63 - 103	Contact Cone Drive for Allowable Shaft Length	Contact Cone Drive for Allowable Shaft Length
MP4Q-02	240	130	215	12.5 - 15	Q	0	2	39	63 - 103		
MP4Q-03	240	114.3	200	12.5 - 15	Q	0	3	39	63 - 103		
MP4Q-04	240	180	215	12.5 - 15	Q	0	4	39	63 - 103		
MP4R-11	260	250	300	17 - 18.9	R	1	1	39	63 - 103		
MP4R-12	260	230	265	12.5 - 15	R	1	2	39	63 - 103		
MP4R-13	260	200	235	12.5 - 15	R	1	3	39	63 - 103		
MP4S-21	260	230	265	12.5 - 15	S	2	1	48	72 - 112		
MP4S-22	260	250	300	17 - 18.9	S	2	2	48	72 - 112		
MP4S-23	260	114.3	200	12.5 - 15	S	2	3	48	72 - 112		
MP4S-24	260	200	235	12.5 - 15	S	2	4	48	72 - 112		
MP4V-41	260	230	265	12.5 - 15	V	4	1	72	95 - 136		
MP4V-42	260	250	300	17 - 18.9	V	4	2	72	95 - 136		
MP4V-43	260	114.3	200	12.5 - 15	V	4	3	72	95 - 136		
MP4V-44	260	200	235	12.5 - 15	V	4	4	72	95 - 136		
MP4U-31	315	300	350	17 - 18.9	U	3	1	39	63 - 103		

Unit Size 60

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range	
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-600	EK2-450
MP4Q-01	240	130	165	10.4 - 12.4	Q	0	1	39	90 - 137	Contact Cone Drive for Allowable Shaft Length
MP4Q-02	240	130	215	12.5 - 15	Q	0	2	39	90 - 137	
MP4Q-03	240	114.3	200	12.5 - 15	Q	0	3	39	90 - 137	
MP4Q-04	240	180	215	12.5 - 15	Q	0	4	39	90 - 137	
MP4R-11	260	250	300	18 - 19	R	1	1	39	90 - 137	
MP4R-12	260	230	265	12.5 - 15	R	1	2	39	90 - 137	
MP4R-13	260	200	235	12.5 - 15	R	1	3	39	90 - 137	
MP4S-21	260	230	265	12.5 - 15	S	2	1	48	99 - 146	
MP4S-22	260	250	300	18 - 19	S	2	2	48	99 - 146	
MP4S-23	260	114.3	200	12.5 - 15	S	2	3	48	99 - 146	
MP4S-24	260	200	235	12.5 - 15	S	2	4	48	99 - 146	
MP4V-41	260	230	265	12.5 - 15	V	4	1	72	123 - 170	
MP4V-42	260	250	300	17 - 18.9	V	4	2	72	123 - 170	
MP4V-43	260	114.3	200	12.5 - 15	V	4	3	72	123 - 170	
MP4V-44	260	200	235	12.5 - 15	V	4	4	72	123 - 170	
MP4U-31	315	300	350	17 - 18.9	U	3	1	39	90 - 137	

Unit Size 70

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range		
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-600	EK2-800	EK2-450
MP5D-01	315	250	300	17 - 18.9	D	0	1	29	91 - 139	Contact Cone Drive for Allowable Shaft Length	Contact Cone Drive for Allowable Shaft Length
MP5D-03	315	215.9	184.15	M12	D	0	3	29	91 - 139		
MP5D-04	315	266.7	228.6	M12	D	0	4	29	91 - 139		
MP5E-11	315	250	300	17 - 18.9	E	1	1	59	121 - 169		
MP5E-12	315	300	350	17 - 18.9	E	1	2	59	121 - 169		
* MP5E-13	315	300	350	17 - 18.9	E	1	3	59	91 - 120		

* The worm shaft length changes from 11.625 inch to 12.250 inch when using the MP5E-13 plates.

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Unit Size 80

Adapter Plate P/N	Servo Motor Dimensions			Motor Hole Size Range	Code Positions 9 through 11			Adapter Thickness	Motor Shaft Length Range	
	Flange Sq.	Pilot	Bolt Circle Dia.		9	10	11		KM-900	EK2-800
MP5D-01	315	250	300	17 - 18.9	D	0	1	29	78 - 139	Contact Cone Drive for Allowable Shaft Length
MP5D-03	315	215.9	184.15	M12	D	0	3	29	78 - 139	
MP5D-04	315	266.7	228.6	M12	D	0	4	29	78 - 139	
MP5E-11	315	250	300	17 - 18.9	E	1	1	59	107 - 168	
MP5E-12	315	300	350	17 - 18.9	E	1	2	59	107 - 168	

APPROXIMATE LENGTH FROM CENTERLINE OF OUTPUT TO SERVO MOTOR INTERFACE

Unit Size	Length To Motor Adapter, mm	Adapter Pilot Length, mm	Adapter Plate Thickness
30	190.5	6	See Motor Adapter & Plate Selection Tables
35	212.9	6	
40	227.0	6	
50	284.5	6	
60	359.4	6	
70	409.4	0	
80	444.5	0	

EXAMPLE CALCULATION FOR DISTANCE TO MOTOR INTERFACE

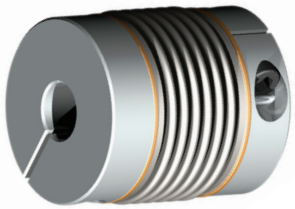
Approx Length (OAL) to Motor Shaft Interface assuming an MP3B-11 for a unit size 30:

$$OAL = \left(\text{Length to Motor Adapter}\right) + \left(\text{Adapter Plate thickness} - \text{Adapter Pilot}\right)$$

$$= 190.5 + (30 - 6)$$

$$= 214.5 \text{ mm}$$

Position 12 of the Unit Designation identifies the motor diameter



Bellows coupling Information

Coupling Size	Bore Size (mm)		Nominal Torque, Nm	Moment of Inertia, 10^{-3} kgm^2	Torsion Resistance, Nm/arcmin	Mass, kg	Screw Size	Torque to Tighten Screws, Nm	Length, mm
	Minimum	Maximum							
KLC - 50	15	34	50	0.22	6.5	0.43	M6	18	67
KLC - 125	16	43	125	0.75	12	0.90	M8	40	81
KM - 270	27	55	270	2.2	32	1.4	M12	115	100
KM - 400	32	55	400	2.4	47	1.5	M12	115	106
KM - 600	35	70	600	4.7	67	2.2	M14	200	116
KM - 900	40	75	900	9.0	105	3.3	M14	200	143

Jaw coupling Information

Coupling Size	Bore Size (mm)		Nominal Torque, Nm	Moment of Inertia, 10^{-3} kgm^2	Torsion Resistance, Nm/arcmin	Mass, kg	Screw Size	Torque to Tighten Screws, Nm	Length, mm
	Minimum	Maximum							
EK2 - 300	20	45	405	0.6	5.2	1.1	M10	70	11
EK2 - 450	28	60	660	1.5	7.9	1.7	M12	120	114
EK2 - 800	35	80	1100	9.5	19	10	M16	200	162

List of servo motors with code (Reducers 30 to 40)

Use the following table to select motor code positions 9 through 10 as well as position 12 for the motor shaft diameter for a known motor brand and motor model number.

MOTOR BRAND	MOTOR MODEL NUMBER	REDUCER SIZE	30			35			40			Motor Shaft Dia. Code	30 & 35	40
		COUPLING TYPE	BELLOWS			BELLOWS			BELLOWS					
		MODEL CODE POSITION	9	10	11	9	10	11	9	10	11	12	BELLOWS	BELLOWS
ALLEN BRADLEY	1326AB-410G-21	→	B	1	4	B	1	4	B	1	4	D	KLC50	KLC125
ALLEN BRADLEY	1326AB-B420	→	B	1	3	B	1	3	B	1	3	D	KLC50	KLC125
ALLEN BRADLEY	1326AB-B520E-21	→	C	0	9	C	0	9	C	0	9	H	KLC50	KLC125
ALLEN BRADLEY	1326AB-B530	→	C	1	0	C	1	0	C	1	0	H	KLC50	KLC125
ALLEN BRADLEY	1326AB-B740	→	K	3	0	K	3	0	K	3	0	N	KLC125	KLC125
ALLEN BRADLEY	1326AS-B860C	→				M	3	1	M	3	1	R	KM270	KM270
ALLEN BRADLEY	F4030	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
ALLEN BRADLEY	F-4050	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
ALLEN BRADLEY	F-4075	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
ALLEN BRADLEY	F-6100	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	F-6200	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	F-6300	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	H-4075	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
ALLEN BRADLEY	H-6100	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	H-6200	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	H-6300	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
ALLEN BRADLEY	H-8500	→				M	3	1	M	3	1	R	KM270	KM270
ALLEN BRADLEY	MPL-A4540	→	C	0	1	C	0	1	C	0	1	H	KLC50	KLC125
ALLEN BRADLEY	MPL-B330	→	B	1	2	B	1	2	B	1	2	C	KLC50	KLC125
ALLEN BRADLEY	MPL-B420	→	B	1	3	B	1	3	B	1	3	D	KLC50	KLC125
ALLEN BRADLEY	MPL-B430	→	B	1	3	B	1	3	B	1	3	D	KLC50	KLC125
ALLEN BRADLEY	MPL-B4520	→	C	0	1	C	0	1	C	0	1	H	KLC50	KLC125
ALLEN BRADLEY	MPL-B4530	→	C	0	1	C	0	1	C	0	1	H	KLC50	KLC125
ALLEN BRADLEY	MPL-B540	→	H	2	4	H	2	4	H	2	4	K	KLC125	KLC125
ALLEN BRADLEY	MPL-B640	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
ALLEN BRADLEY	MPL-B660	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
ALLEN BRADLEY	MPL-B680	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
ALLEN BRADLEY	MPL-B860	→				N	3	2	N	3	2	R	KM270	KM270
ALLEN BRADLEY	MPL-B880	→				N	3	2	N	3	2	R	KM270	KM270
ALLEN BRADLEY	MPL-B960	→				P	3	6	P	3	6	S	KM270	KM270
ALLEN BRADLEY	MPL-B980	→				P	3	6	P	3	6	S	KM270	KM270
BALDOR	BSM-100	→	H	2	4	H	2	4	H	2	4	K	KLC125	KLC125
EMERSON	142UM	→	C	1	0	C	1	0	C	1	0	H	KLC50	KLC125
EMERSON	142UMD	→	C	1	0	C	1	0	C	1	0	H	KLC50	KLC125
EMERSON	BLM-6300	→	C	0	9	C	0	9	C	0	9	N	KLC125	KLC125
EMERSON	BLM6310	→	H	2	3	H	2	3	H	2	3	N	KLC125	KLC125
EMERSON	BLM-81000	→				T	2	6	T	2	6	S	KM270	KM270
EMERSON	BLM-8500	→	K	3	0	K	3	0	K	3	0	N	KLC125	KLC125
EMERSON	DXM-6120	→	C	0	9	C	0	9	C	0	9	H	KLC50	KLC125
EMERSON	MGM-340	→	B	1	2	B	1	2	B	1	2	A	KLC50	KLC125
EMERSON	MGM-4120	→	C	0	3	C	0	3	C	0	3	H	KLC50	KLC125
EMERSON	MGM-490	→	C	0	3	C	0	3	C	0	3	H	KLC50	KLC125
EMERSON	MHE-4120	→	C	0	3	C	0	3	C	0	3	H	KLC50	KLC125
EMERSON	MHM-490	→	C	0	3	C	0	3	C	0	3	H	KLC50	KLC125
EMERSON	MHM6200	→	C	1	0	C	1	0	C	1	0	H	KLC50	KLC125
EMERSON	MHM-6300	→	C	1	0	C	1	0	C	1	0	N	KLC125	KLC125
EMERSON	UM95	→	B	1	2	B	1	2	B	1	2	D	KLC50	KLC125

Table Continued...

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List of servo motors with code (Reducers 30 to 40)

Use the following table to select motor code positions 9 through 10 as well as position 12 for the motor shaft diameter for a known motor brand and motor model number.

MOTOR BRAND	MOTOR MODEL NUMBER	REDUCER SIZE	30			35			40			Motor Shaft Dia. Code	30 & 35	40
		COUPLING TYPE	BELLOWS			BELLOWS			BELLOWS					
		MODEL CODE POSITION	9	10	11	9	10	11	9	10	11	12	BELLOWS	BELLOWS
FANUC	ALPHA 12 hvis	→	H	1	8	H	1	8	H	1	8	H	KLC50	KLC125
FANUC	ALPHA 13	→	T	2	2	T	2	2	T	2	2	P	KLC125	KLC125
FANUC	ALPHA 22	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
FANUC	ALPHA 22/3000	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
FANUC	ALPHA 30	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
FANUC	ALPHA 40	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
FANUC	ALPHA 6	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
FANUC	ALPHA 8	→	C	0	3	C	0	3	C	0	3	D	KLC50	KLC125
FANUC	ALPHA C 12	→	T	4	0	T	4	0	T	4	0	P	KLC125	KLC125
GIDDINGS & LEWIS	FSM630	→	T	2	5	T	2	5	T	2	5	P	KLC125	KLC125
BOSCH REXROTH	2AD-104	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	2AD-134C	→				P	3	6	P	3	6	R	KM270	KM270
BOSCH REXROTH	MAC-112	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MAC-90	→	C	0	5	C	0	5	C	0	5	H	KLC50	KLC125
BOSCH REXROTH	MAD100	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MAD130	→				P	3	6	P	3	6	R	KM270	KM270
BOSCH REXROTH	MDD-112	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MHD-090	→	C	0	5	C	0	5	C	0	5	H	KLC50	KLC125
BOSCH REXROTH	MHD-093	→	H	2	4	H	2	4	H	2	4	N	KLC125	KLC125
BOSCH REXROTH	MHD-112	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MHD-115	→	T	4	2	T	4	2	T	4	2	Q	KLC125	KLC125
BOSCH REXROTH	MKD-071	→	B	1	5	B	1	5	B	1	5	D	KLC50	KLC125
BOSCH REXROTH	MKD090	→	C	0	5	C	0	5	C	0	5	H	KLC50	KLC125
BOSCH REXROTH	MKD112	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MSK060	→	B	1	6	B	1	6	B	1	6	H	KLC50	KLC125
BOSCH REXROTH	MSK061	→	B	1	6	B	1	6	B	1	6	H	KLC50	KLC125
BOSCH REXROTH	MSK070	→	H	2	4	H	2	4	H	2	4	N	KLC125	KLC125
BOSCH REXROTH	MSK071	→	H	2	4	H	2	4	H	2	4	N	KLC125	KLC125
BOSCH REXROTH	MSK071E	→	H	2	4	H	2	4	H	2	4	N	KLC125	KLC125
BOSCH REXROTH	MSK076	→	C	0	5	C	0	5	C	0	5	H	KLC50	KLC125
BOSCH REXROTH	MSK100	→	K	2	8	K	2	8	K	2	8	N	KLC125	KLC125
BOSCH REXROTH	MSK101	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
KOLLMORGAN	AKM44AC	→	B	1	2	B	1	2	B	1	2	D	KLC50	KLC125
KOLLMORGAN	AKM73AC	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
KOLLMORGAN	B-602	→	C	1	0	C	1	0	C	1	0	H	KLC50	KLC125
PACIFIC SCIENTIFIC	PMA54Q	→	K	3	0	K	3	0	K	3	0	N	KLC125	KLC125
SEIMENS	1FK7101.5	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
SEIMENS	1FT5072	→	C	0	9	C	0	9	C	0	9	H	KLC50	KLC125
SEIMENS	1FT5102	→	K	3	0	K	3	0	K	3	0	N	KLC125	KLC125
SEIMENS	1FT6084	→	H	2	4	H	2	4	H	2	4	N	KLC125	KLC125
SEIMENS	1FT6086	→	H	2	3	H	2	3	H	2	3	N	KLC125	KLC125
SEIMENS	1FT6105	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
SEIMENS	1FT6108-8AC71	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
SEIMENS	1FT7103	→	T	2	6	T	2	6	T	2	6	Q	KLC125	KLC125
YASKAWA	SGMG-44	→	T	2	2	T	2	2	T	2	2	P	KLC125	KLC125
YASKAWA	SGMPH-15	→	C	0	4	C	0	4	C	0	4	D	KLC50	KLC125

List of servo motors with code (Reducer 50 to 60)

Use the following table to select motor code positions 9 through 10 as well as position 12 for the motor shaft diameter for a known motor brand and motor model number.

MOTOR BRAND	MOTOR MODEL NUMBER	REDUCER SIZE	50						60						MOTOR SHAFT DIA. CODE	50		60	
		COUPLING TYPE	BELLOWS			JAW			BELLOWS			JAW							
		MODEL CODE POSITION	9	10	11	9	10	11	9	10	11	9	10	11	12	JAW	BELLOWS	JAW	BELLOWS
ALLEN BRADLEY	HPK1307	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
ALLEN BRADLEY	HPK1308	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
ALLEN BRADLEY	HPK1310	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
ALLEN BRADLEY	MPL-B640	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
ALLEN BRADLEY	MPL-B660	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
ALLEN BRADLEY	MPL-B680	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
ALLEN BRADLEY	MPL-B860	→	S	2	1	V	4	1	R	1	2	R	1	2	R	EK2-300	KM400	EK2-450	KM600
ALLEN BRADLEY	MPL-B880	→	S	2	1	V	4	1	R	1	2	R	1	2	R	EK2-300	KM400	EK2-450	KM600
ALLEN BRADLEY	MPL-B960	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
ALLEN BRADLEY	MPL-B980	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
ALLEN BRADLEY	MPM2154	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
BOSCH REXROTH	MAD100	→	Q	0	2	Q	0	2	Not Available						N	EK2-300	KM400		
BOSCH REXROTH	MAD130	→	S	2	2	V	4	2	R	1	1	R	1	1	R	EK2-300	KM400	EK2-450	KM600
BOSCH REXROTH	MAD160	→	Not Available						U	3	1	U	3	1	T			EK2-450	KM600
BOSCH REXROTH	MSK100	→	Q	0	2	Q	0	2	Not Available						N	EK2-300	KM400		
BOSCH REXROTH	MSK101	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
BOSCH REXROTH	MSK103	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
BOSCH REXROTH	MSK131	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
KOLLMORGEN	AKM6xx-AC	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
KOLLMORGEN	AKM6xx-AN	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
KOLLMORGEN	AKM7xx-AC	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
KOLLMORGEN	AKM7xx-AN	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
KOLLMORGEN	AKM8xx-AC	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
KOLLMORGEN	AKM8xx-AN	→	S	2	2	V	4	2	R	1	1	R	1	1	S	EK2-450	KM400	EK2-450	KM600
SEIMENS	1FK7082	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FK7085	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FK7086	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FK7101	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FK7103	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FK7105	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FT7082	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FT7084	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FT7086	→	Q	0	1	Q	0	1	Not Available						N	EK2-300	KM400		
SEIMENS	1FT7102	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FT7103	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FT7105	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
SEIMENS	1FT7108	→	Q	0	4	Q	0	4	Not Available						Q	EK2-300	KM400		
YASKAWA	SGMBH-2BD	→	Not Available						R	1	2	V	4	1	U			EK2-450	KM600
YASKAWA	SGMBH-3GD	→	Not Available						R	1	1	V	4	2	V				KM600
YASKAWA	SGMBH-3ZD	→	Not Available						R	1	2	V	4	1	U			EK2-450	KM600
YASKAWA	SGMBH-4ED	→	Not Available						R	1	1	V	4	2	V				KM600
YASKAWA	SGMGV-1AD	→	S	2	4	V	4	4	R	1	3	R	1	3	R	EK2-300	KM400	EK2-450	KM600
YASKAWA	SGMGV-1ED	→	S	2	4	V	4	4	R	1	3	R	1	3	T	EK2-450	KM400	EK2-450	KM600
YASKAWA	SGMGV-30	→	Q	0	3	Q	0	3	Not Available						P	EK2-300	KM400		
YASKAWA	SGMGV-44	→	Q	0	3	Q	0	3	Not Available						P	EK2-300	KM400		
YASKAWA	SGMGV-55	→	S	2	3	V	4	3	Not Available						R	EK2-300	KM400		
YASKAWA	SGMGV-75	→	S	2	3	V	4	3	Not Available						R	EK2-300	KM400		

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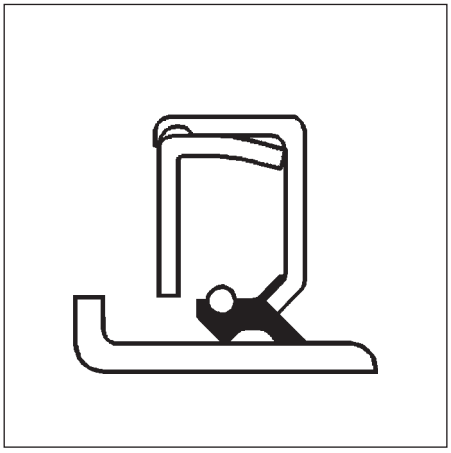
List of servo motors with code (Reducer 70 to 80)

Use the following table to select motor code positions 9 through 10 as well as position 12 for the motor shaft diameter for a known motor brand and motor model number.

MOTOR BRAND	MOTOR MODEL NUMBER	REDUCER SIZE	70						80						MOTOR SHAFT DIA. CODE	70		80	
		COUPLING TYPE	BELLOWS			JAW			BELLOWS			JAW							
		MODEL CODE POSITION	9	10	11	9	10	11	9	10	11	9	10	11	12	JAW	BELLOWS	JAW	BELLOWS
ALLEN BRADLEY	HPK1307	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	HPK1308	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	HPK1310	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	HPK1609	→	E	1	3	E	1	3	E	1	2	E	1	2	T	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	HPK1611	→	E	1	3	E	1	3	E	1	2	E	1	2	T	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	HPK1613	→	E	1	3	E	1	3	E	1	2	E	1	2	T	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	MPL-B960	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
ALLEN BRADLEY	MPL-B980	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
BOSCH REXROTH	MAD130	→	D	0	1	D	0	1	Not Available						R	EK2-450	KM600		
BOSCH REXROTH	MAD160	→	E	1	3	E	1	3	E	1	2	E	1	2	T	EK2-450	KM600	EK2-800	KM900
BOSCH REXROTH	MSK131	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
BOSCH REXROTH	MAD180	→	E	1	3	E	1	2	E	1	2	E	1	2	U	EK2-450	KM600	EK2-800	KM900
KOLLMORGEN	AKM8xx-AC	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
KOLLMORGEN	AKM8xx-AN	→	D	0	1	D	0	1	D	0	1	D	0	1	S	EK2-450	KM600	EK2-800	KM900
YASKAWA	SGMBH-3GD	→	D	0	1	E	1	1	D	0	1	E	1	1	V	EK2-800	KM600	EK2-800	KM900
YASKAWA	SGMBH-4ED	→	D	0	1	E	1	1	D	0	1	E	1	1	V	EK2-800	KM600	EK2-800	KM900

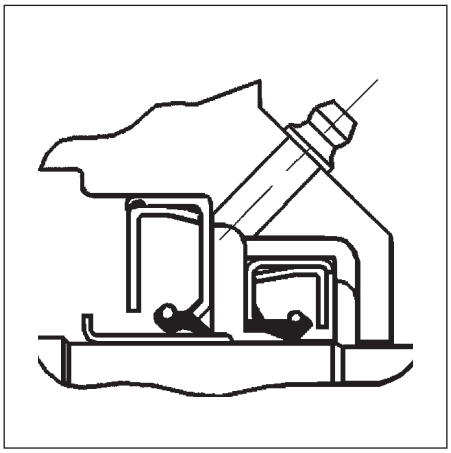
Oil Seals

Cone Drive standard speed reducers are furnished with the highest quality available oil seals. The following types are most generally used.



Wear Ring Double Lip Type

Wear Ring Double Lip Type: Consists of a conventional double lip seal with a steel wear sleeve that is pressed on the shaft to provide a specially prepared sealing surface for the oil seal lips. This seal provides an effective proven sealing method and also eliminates seal lip wear on the shaft itself.

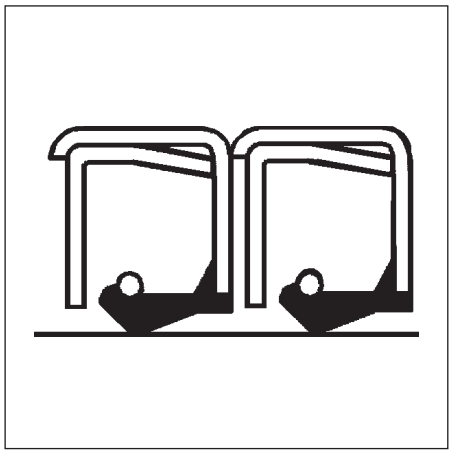


"Taconite" Seal Type

Taconite Seal Type: Consists of a double seal arrangement with special cap which embodies grease channels, a grease fitting and purge hole. This arrangement provides a cavity between seals, and around the outside seal for grease packing and purging. The taconite seal is optional at extra cost. This seal is used in areas requiring protection against outside contaminants such as coal dust, cement dust, taconite, water and steam.

Standard Single Lip Type

Standard Type A: A conventional single lip seal which seals directly on a specially prepared shaft surface.



This type seal will be used singularly or tandem to suit sealing requirement.

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Lubrication, Installation, Operation & Maintenance Instructions For Cone Drive Speed Reducers

Cone Drive double-enveloping worm gear speed reducers are used throughout Industry to provide smooth and quiet speed reduction. When properly selected, applied and maintained, they will provide optimum performance.

IMPORTANT: In any applications of Cone Drive Products where breakage, damage, disconnection, any other malfunction of any drive train component, or excessive wear could result in personal injury or property damage, a fail safe device capable of stopping and holding the load in the event of such an occurrence must be incorporated after the drive train.

THE FOLLOWING INFORMATION IS FOR YOUR PROTECTION. PLEASE READ CAREFULLY.

1. Do not attempt to install or operate this reducer until all of these instructions are read and thoroughly understood. If you have any questions, please contact Cone Drive.

2. The horsepower or output torque capacity of this reducer and the service factor (maximum allowable operating cycle) are stamped on the reducer nameplate. These values are not to be exceeded as overloading can result in reducer failure. Exceeding the rating and duty cycle will void the warranty. Please contact Cone Drive with any questions regarding rating and service factors.

3. Each reducer is specifically arranged to operate at the input speed specified on the nameplate. If the input speed is not specified by the customer, it is set up for 1750 RPM and service factor

3a. Do not operate the reducer at speeds or under service other than specified on the nameplate without contacting Cone Drive for specific instructions on oil level location and bearing settings.

4. Do not alter the reducer without approval from Cone Drive.

5. This reducer has moving mechanical components and connected electrical devices, operating under high voltage to achieve its intended purpose. Operation and repair should only be done by qualified personnel.

6. Before servicing a speed reducer, the main electrical disconnect must be moved to and locked in the off-position. The person performing the work should post on that disconnect a warning to others not to turn on the power.

7. It is normal for the reducer to operate at a housing temperature of up to 200ºF. To prevent burns, proper guards or shields must be provided by the purchaser or user to prevent personnel from touching the reducer.

8. Cone Drive products are furnished without guard covers. It is the responsibility of the purchase or user to provide guards for all exposed shafting, couplings, sprockets, sheaves, belts, chains, clutches, and any other moving parts in accordance with current local, state and federal requirements.

9. Failure to follow the instructions contained in this bulletin may result in unit failure, property damage or personal injury.

FINISH COAT PAINTING

Cone Drive speed reducers are furnished with a prime coat of paint on exterior housing surfaces. The reducer should be painted with a finish coat to protect the housing exterior, particularly if subjected to outdoor service, periodic washdown or harsh environments. Mask all shafts, oil seals, tags, name plates, oil level stickers, breathers, gauges etc. before painting. (Painting seal lips can result in oil leakage.)

INSTALLATION

IMPORTANT: Unless otherwise specified on the reducer or in accompanying documentation, all Cone Drive speed reducers are shipped without oil and must be filled to the oil level gage or plug with the proper oil before start-up. See the following section on lubrication.

1. The speed reducer must be securely mounted to a rigid flat foundation or base plate. If necessary, shim under the reducer feet to provide a flat mounting surface.

2. Bolt the reducer to the foundation or mounting base using the largest diameter bolt that will fit through the foot holes of the reducer. Be sure to use a bolt in all available mounting feet holes. If the reducer will be subjected to heavy chain pull or thrust loading, heat treated mounting bolts must be used to prevent stretching and loosening of the bolts.

3. The input and output shafts of the reducer should be coupled to the motor and driven shafts with flexible couplings and the reducer aligned with these shafts within +.001". Solid or rigid couplings should be avoided. Failure to properly align shafts and the use of solid couplings can result in excessive coupling and bearing wear, shaft deflection and eventual failure of one (1) or more of the components.

4. Couplings, sheaves and sprockets should be mounted on the reducer shafts carefully. Do not pound or hammer them onto the shafts as this will damage bearings and oil seals.

Coupling Installation Procedure

4a. Clean worm shaft, motor shaft, and mating surfaces of the motor and gearhead to ensure they are dust free.

4b. Slide the coupling onto the worm shaft.

4c. Slide the motor shaft into the coupling clamp ring until the

Lubrication, Installation, Operation & Maintenance Instructions For Cone Drive Speed Reducers

gearhead and motor flanges are seated together.

4d. Use the bolts and nuts provided to clamp the gearhead and motor flanges together.

4e. Ensure minimum coupling engagement (see table below) is met on both the worm and motor shafts.

4f. Tighten the clamp ring screws through the access slot in the motor adapter (and plate on some configurations) according to the following torque settings:

Coupling	Min. Engagement (mm)	Tightening Torque of Coupling Bolt	
		in-lb.	Nm
GAM KLC50	16	160	18
GAM KLC125	19	355	40
GAM KM270	29	1020	115
GAM KM400	30	1020	115
GAM KM600	33	1770	200
GAM KM900	46	1770	200
R&W EK2-300	30	620	70
R&W EK2-450	35	1060	120
R&W EK2-800	46	2570	290

CONTACT CONE DRIVE IF YOUR COUPLING IS NOT LISTED

5. Sprockets and sheaves should be mounted as close to the reducer as possible and “V” belts and chains adjusted to the proper tension to keep bearing loading and shaft deflection to a minimum. Too much tension in belts and improper location of sheaves and sprockets will lead to excessive chain pull, bearing wear and shaft deflection. For specific information on chain pull capacity, shaft stress and bearing life please contact Cone Drive.

NOTE: Exposed metal parts are coated with a commercial rust inhibitor. This rust inhibitor must be removed prior to installation. Failure to do so may result in difficulty in assembling close tolerance mating components.

6. Before starting motor review motor rotation, reducer rotation and required direction of driven machine to insure that the motor is wired for proper direction of rotation. In many instances a machine must run in one direction and failure to wire the motor properly can result in damage to the driven machine

7. **IMPORTANT:** Fill unit to proper level with recommended oil. Grease all fittings with recommended grease (see section on lubrication). In the case of double or triple reduction reducers, be sure to fill each reduction stage to the proper oil level. Note: Some reducers may have been factory filled. Read all tags.

NOTE: All reducers are built for one mounting position, i.e.; floor mounted or wall mounted with worm vertical up or ceiling mounted, etc. If the reducer is to be mounted in any position other than the position for which it was furnished, contact Cone Drive for information on relocating oil level, grease packing bearings, etc., before start-up. If a reducer is operated in a mounting position other than the position for which it was assembled, reducer failure may occur from improper oil level or grease fitting location resulting in lack of lubrication to the gearset and bearings.

START-UP

1. After the reducer has been properly mounted, aligned and lubricated, it is ready for start-up.

2. Make sure driven machine is clear of all obstructions and all safety guards and covers are in place, according to appropriate local, state and federal requirements. If possible, turn motor shaft by hand to confirm drive system is operating freely and in correct direction of rotation.

3. Jog motor to confirm proper rotation.

4. Operate reducer with minimum load for approximately 15 minutes (in both directions if applicable) to seat gears, bearings, and oil seals.

OPERATION

1. All reducers require a few hours of “run-in” under load to achieve optimum efficiency. During this initial run-in the reducer will probably run warmer than normal and draw more current than after the run-in period. Reducers operating at a very low load or speed will take much longer to run-in and even if operated continuously at low load or speed may never achieve the efficiency that they would if operated at or near their catalog rating.

2. **IMPORTANT:** Normal reducer operating temperature measured on the oil sump area of the housing should not exceed 100ºF above ambient temperature or 200ºF. If the reducer operating temperature exceeds 200ºF, shut down the unit and contact Cone Drive. Excessive oil sump temperature is indicative of overloading, misalignment, or improper or marginal lubrication. Continuous operation of the reducer with the oil sump temperature above 200ºF will result in breakdown of the oil and failure of the reducer.

MAINTENANCE

1. The reducer oil levels should be checked periodically and the recommended oil added as required to maintain the proper oil level.

2. Oil should be changed as outlined in the lubrication section.

3. All grease fittings should be lubricated with the recommended grease once per month.

4. The reducer, particularly finned areas and fan covers, should be kept clean to allow maximum heat dissipation.

5. All reducers and foundation bolts should be checked for tightness after three (3) months of service and annually thereafter.

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6. If a reducer is to be repaired, contact Cone Drive for detailed instructions, blueprints, parts lists, etc. If it is necessary field service is available.

7. If a reducer is to be returned, contact Cone Drive for instructions and a returned material authorization (RMA) number.

STORAGE RECOMMENDATIONS FOR CONE DRIVE SPEED REDUCERS

If a reducer is to be stored or shut down for more than 30 days, it should be protected from water condensation and corrosion as follows:
Any enclosed system of gearing is subject to water condensation on the inside of the reducer caused by fluctuating ambient temperatures. This condensation can cause severe rusting of the worm and bearings which could lead to premature failure of the reducer. However, this condition can be easily prevented by following the recommendations outlined for various storage conditions. If the reducer is furnished with a motor, follow the motor manufacturers recommendations for motor preservation.

1. Standard Shipping Procedure - Protection for Maximum Storage Duration of 30 Days. Cone Drive speed reducers are treated inside using a rust inhibitor, the exterior is painted with one coat of primer, and all exposed shafting coated with a rust preventative prior to shipment. This procedure is intended to protect the reducers during shipment and short term inside storage for a maximum period of thirty (30) days after shipment.

2. Long Term Storage (Indoors) for Periods up to One Year. (a) Fill the reducer completely full with one of the lubricants shown on our approved list of lubricants. A copy of this lubricant list is shipped with each unit. (b) Rotate the wormshaft and gearshaft at least once per month to keep the seals from sticking to the wear rings and/or shafts. (c) If it is not practical to rotate the wormshaft periodically we recommend purchasing a spare set of oil seals to have on hand in the event of seal leakage at start-up. (d) Before putting the reducer into service, lower the oil in the reducer to the proper operating oil level.

3. Long Term Storage (Outdoors) for Periods Up to One Year. Proceed as in (2) with the following additions. (a) After filling the unit with oil, plug the breather hole with a pipe plug and wire the breather to the unit. (b) Paint the outside of the unit with a finish coat of paint. (Reducer from the factory is prime coated only.) (c) Coat all exposed shafting with a long term rust preventative.

4. Extended Storage Periods Exceeding One Year.
(a) Immediately after receipt of the reducer treat the inside of the reducer with “Olin Chemicals Corp. - Dichan® 100 Vapor-Phase Corrosion Inhibitor for Ferrous Metals” by adding an amount specified by Olin Chemical, through the breather. Observe all Olin Chemicals Corp. cautions and warnings when handling this material. Plug the reducer and wire the breather to the unit. (b) Paint the exterior of the unit with a finish coat of paint. (c) Coat all exposed shafting with a long term rust preventative. (d) Place the unit in a heavy plastic bag treated with Dichan® 100 powder. Seal the bag air tight. (e) Crate the unit and cover the crate to keep out water. (f) Purchase a spare set of oil seals to have on hand at start-up.

LUBRICATION DATA

Lubrication is very important for successful operation of Cone Drive gearsets and speed reducers. Inadequate lubrication can result in increased power consumption, added maintenance and gearset failure. Please review the following recommendations and the “Approved List of Lubricants” shipped with all Cone Drive gearsets and speed reducers. Cone Drive recommends only those lubricants listed or any lubricant which meets all the requirements of AGMA (American Gear Manufacturers Association) 9004-D94 “Lubrication of Industrial Enclosed Gear Drives” as it applies to double enveloping worm gearing. Use of other lubricants can result in gearset failure which will not be covered under warranty. See reducers nameplate for the recommended lubricant.

TYPE OF OIL

Performance is based on synthetic lubricants. Using a mineral oil will reduce the mechanical power and output torque ratings by 25%.

AMBIENT TEMPERATURE

The oils shown in the table on the following page are for use in an ambient temperature range of approximately 15° to 125°F with the low end of the range depending on the pour point of the specific oil used. If the ambient temperature will be below or above this range please contact Cone Drive for specific recommendations on proper lubricant as well as proper oil seal and shim materials.

OIL SUMP TEMPERATURES

The maximum recommended oil sump temperature is 200°F where reducers will be used at maximum ambient and full catalog rating, contact Cone Drive for lubrication recommendations.

SLUDGE

It is necessary that the oil be clean and free from sludge at all times to obtain long life from a gear unit. Sludge in gear units may be caused by excessive heat, from dust and dirt and other contaminates and by the presence of moisture or chemical fumes. Therefore, every precaution should be taken to prevent water and foreign particles from entering the gear case.

CONE DRIVE REDUCERS ARE SHIPPED WITHOUT OIL

At assembly all reducers are treated with a rust inhibitor. This treatment coats all internal parts and will protect the reducer for a period of 30 days. If the unit is to be stored longer than 30 days, see long term storage instructions.

Lubrication Data

OIL CHANGE

If an approved synthetic lubricant is used, it should be changed after 5000 hours of operation or once per year, whichever occurs first. These change intervals are recommended for units operating under favorable conditions. Where operating conditions are severe, such a rapid rise and fall in temperature of the gear case with accompanied sweating of the inside walls and resulting formation of sludge, or where operation is in moist or dusty atmospheres, or in the presence of chemical fumes or extended running at sump temperatures in excess of 180°F, it may be necessary to change the oil at intervals of one to three months. It is recommended a sampling program be established with your lubricant manufacturer where reducers are exposed to the severe operating conditions, mentioned above.

OIL LEVEL

Cone Drive reducers are furnished with a bronze colored hex head pipe plug to indicate oil level. An oil level tag is affixed to the unit near the oil level indicator. Oil level should always be checked with the unit stopped. Estimated oil capacities for standard reducers, are listed in this section.

GREASE PACKED BEARINGS

Bearings that are at least partially submerged in oil do not require special maintenance. However, bearings that are not submerged in oil require grease lubrication. Grease fittings and internal retainers are furnished when required. They should be greased with a high quality lithium base NLGI #2 or NLGI #3 bearing grease at normal maintenance intervals depending on the duty cycle of the reducer.

EXTREME PRESSURE (E.P.) LUBRICANTS

Extreme Pressure (E.P.) lubricants or cylinder oils with sulphurphosphorus additives are not acceptable and should not be used in Cone Drive Speed reducers or worm gearing.

Viscosity

Oils recommended for AGMA 7 comp., 8 comp., and 8A comp. must have a minimum viscosity index of 90.

AGMA Lubricant Number Guidelines

CENTER DISTANCE	WORM SPEED (RPM)	† AMBIENT TEMPERATURE		WORM SPEED ABOVE (RPM)	† AMBIENT TEMPERATURE
		-10°C to + 10°C (14°F to 50°F)	-10°C to + 50°C (50°F to 125°F)		-10°C to + 50°C (14°F to 125°F)
Upto to 6" inclusive	0 - 700	AGMA 7S or AGMA 8 comp	AGMA 7S or AGMA 8 comp	700 - up	AGMA 7S or AGMA 8 comp
Over 6" to 12"	0 - 450			450 - up	
Over 12" to 18"	0 - 300			300 - up	
Over 18" & above	0 - 200			200 - up	

Viscocity Ranges

AGMA NO.	ASTM SYSTEM		ISO VISC.
	SUS @210°F	SUS @100°F	CST @40°C
7S Synthetic		1919-2346	414-506
7 Compound	125-150	1919-2346	414-506
8 Compound	150-190	2837-3467	612-748
8A Comp.	190-250	4171-5098	900-1100

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Limiting Speeds for Splash Type Lubrication

The maximum sliding velocity for splash lubrication is 2000 ft. per minute. If the gear set sliding velocity exceeds this value special lubrication provisions are required. Please contact Cone Drive Engineering for specific recommendations.

The ratings charts in the following section are blocked to indicate acceptable operating speeds with splash lubrication for standard reducers and gear sets.

The sliding velocity for standard reducers or gear sets is determined by multiplying the factor from the table by the speed of the worm in RPM.

Sliding Velocity - "V" in ft. per min.
Example: 4.000 C.D. 20:1 Ratio at 3000 RPM:
"V" = Sliding Velocity (Ft/Min.) "V" = .489 x 3000 "V" = 1467 Ft/Min.

SLIDING VELOCITY FACTOR											
RATIO											
Size	C.D.	5:1	10:1	15:1	20:1	25:1	30:1	40:1	50:1	60:1	70:1
30	3.000	.457	.382	.369	.363	.362	.361	.360	.359	.359	.359
35	3.500	.533	.453	.439	.433	.431	.430	.429	.428	.428	.428
40	4.000	.613	.512	.495	.489	.486	.485	.484	.483	.483	.482
50	5.000	.722	.632	.612	.605	.600	.598	.597	.596	.595	.595
60	6.000	.888	.763	.740	.731	.726	.724	.723	.722	.722	.722
70	7.000	1.050	.860	.827	.818	.812	.809	.807	.806	.805	.805
80	8.000	1.180	.920	.882	.870	.863	.860	.857	.856	.855	.855

Oil Capacities

Approximate Quantities in Quarts & Gallons

Single Reduction Reducers - Floor Mounted Position

UNIT SIZE		30	35	40	50	60	70	80
WORM OVER GEAR	STANDARD OIL LEVEL	$2_{1/2}$ Qt.	1 Gal.	$1_{1/2}$ Gal.	$2_{1/2}$ Gal.	$3_{3/4}$ Gal.	$6_{1/2}$ Gal.	$10_{1/2}$ Gal.
	ALT OIL LEVEL	$1_{1/2}$ Qt.	$2_{1/2}$ Qt.	1 Gal.	$1_{3/4}$ Gal.	$2_{1/2}$ Gal.	4 Gal.	$6_{1/2}$ Gal.
WORM UNDER GEAR		$1_{1/2}$ Qt.	$3_{1/2}$ Qt.	$1_{1/2}$ Gal.	$2_{1/4}$ Gal.	$3_{1/4}$ Gal.	$5_{1/4}$ Gal.	$7_{3/4}$ Gal.
VERTICAL OUTPUT SHAFT		$1_{1/2}$ Qt.	$2_{1/2}$ Qt.	1 Gal.	$1_{3/4}$ Gal.	$2_{3/4}$ Gal.	5 Gal.	$6_{1/2}$ Gal.

Lubrication Data

	AGMA #7S SYNTHETIC (ISO Viscosity Grade 460)[5]			
MANUFACTURER	**BRAND NAME**	**POUR POINT** °F (°C)	**KIN. VISCOSITY** CST @ 100°C	**Food Grade** (Note 3)
Chevron	Chevron Clarity Synthetic Machine Oil	-33 (-36)	46.1	
Exxon Mobil Oil Corp.	Mobil SHC 634 Synthetic Lubricant	-40 (-40)	46.5	
Exxon Mobil Oil Corp.	Mobil Glygoyle 460 (Note 6)	-27 (-33)	77.2	X
Exxon Mobil Oil Corp.	Mobil SHC Cibus 460	-44 (-42)	43.6	X
Total Lubricants	Carter SE 460	-40 (-40)	49.6	
Kluber Lubrication	Kluberoil 4 UH1 460 N	-22 (-30)	47.0	X
Royal Purple, Ltd.	Thermyl-glyde Worm Gear680 (Note 4)	-27 (-33)	43.0	
Shell	Shell Morlina S4 B	-44 (-42)	45.5	
LUBRIPLATE Lubricants Co.	Lubriplate PGO-FGL 460 Synthetic Gear Oil	-33 (-36)	83.0	X
LUBRIPLATE Lubricants Co.	Lubriplate SFGO Ultra 460 Synthetic Gear Oil	-40 (-40)	46.0	X

	AGMA #8 Compound (NON-E.P.) (ISO Viscosity Grade 680)			AGMA #8A Compound (NON-E.P.) (ISO Viscosity Grade 1000)			
MANUFACTURER	**BRAND NAME**	**POUR POINT** °F (°C)	**KIN. VISCOSITY** CST @ 100°C	**BRAND NAME**	**POUR POINT** °F (°C)	**KIN. VISCOSITY** CST @ 100°C	**Food Grade** (Note 3)
BP Oil not available in U.S.				Energol DC-C 1000	21 (-6)	45.3	
Bel-Ray Company	HP Worm Gear Oil		37.2				
Bel-Ray Company	No-Tox HD Oil 680	9 (-13)	50.2	No-Tox HD Oil 1000	9 (-13)	66.8	X
Chevron	Cylinder Oil W-ISO #680	10 (-12)	39.3				
Citgo	Cylinder Oil #680-7	5 (-15)	40				
Castrol	Worm Gear Oil #680	-7 (20)	37	Worm Gear Oil #1000	-7 (20)	45.5	
Imperial	Cylesstic TK 680	-7 (20)	37.8	Cylesstic TK 1000	-1 (30)	46.7	
Total Lubricantss	Cylan WG 680	-7 (20)	36				
Fiske Brothers Refining				Lubriplate CP-8A	35 (2)	47	
Fiske Brothers Refining	Lubriplate SPO-288	10 (-12)	38				
Imperial/Esso Oil	Cylesso TK 680	-7 (20)	37.8				
Lubrication Engineers	680 Almasol	-6 (21)	48.3				
Mobil Oil	Extra Hecla Super Cylinder Oil	32 (0)	35.8	Extra Hecla Super Cylinder Oil Mineral	37 (3)	43.0	
Schaeffer Manufacturing	#147 Steam Cylinder Oil	-10 (-12)	27-30				
Shell Oil	Valvata J-680	27 (-3)	38.44				

NOTES:

1... The listed synthetic lubricants are acceptable for use as an AGMA #7, #8 or AGMA #7 lubricants are primarily used in force feed lubrication systems or other special applications.
2... Manufacturers listed in bold print have product available worldwide. Contact a listed manufacturer for availability in your area.
3... For specific food grade approval type, refer to manufacturer for details.
4... Thermyl-Glyde Worm Gear 680 is an ISO grade 680 and AGMA 8S lubricant.
5... Synthetic lubricants with viscosity grades other than those shown may be recommended by Cone Drive Engineering in some cases.
6... This is a polyalkylene glycol (PAG) based product. See supplier for compatibility guidelines and other specifications unique to this PAG lubricant.

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