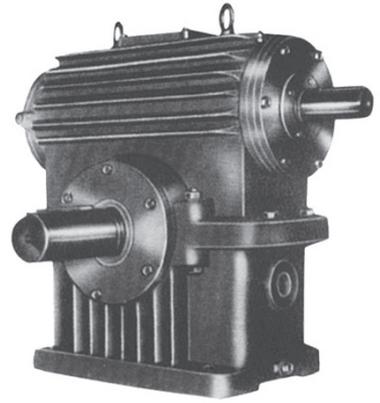


十九、CW系列圆弧圆柱蜗杆减速机

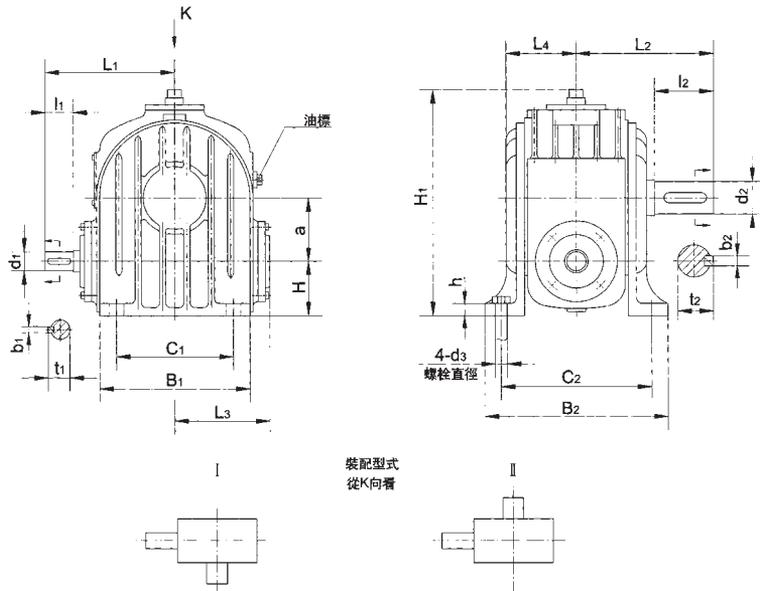
一、概述

CW 系列圆弧圆柱蜗杆减速器是按照中华人民共和国国家标准 (GB9147 - 88) 生产, 主要包括 CWU、CWS、CWO 三个系列, 适用于冶金、矿山、运输、水泥、建筑、化工、纺织轻工、能源等行业的机械传动。

蜗杆转速不超过 1500r/min, 蜗杆轴可正、反向运转, 工作环境温度为 $-40^{\circ}\text{C} \sim +40^{\circ}\text{C}$, 当工作环境温度低于 0°C , 启动前润滑油必须加到 0°C 以上, 当工作环境温度高于 40°C 必须采取冷却措施。



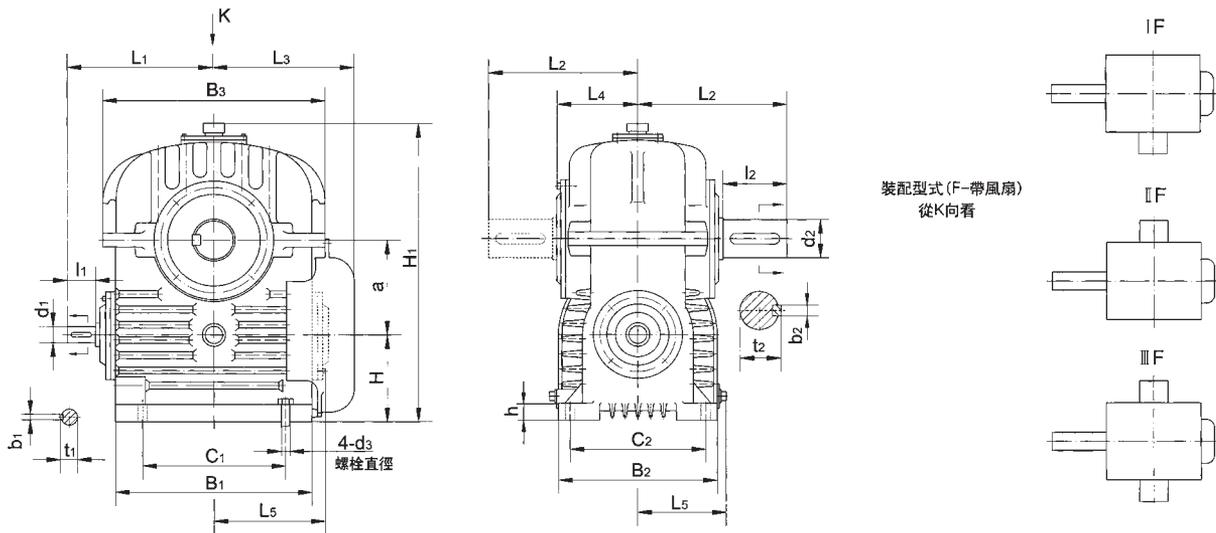
二、规格及基本参数



CWU63-CWU100 型减速器外形和安装尺寸

尺寸 型号	a	B1	B2	C1	C2	h	H	H1	d3	$i \leq 12.5$				
										d1	l1	b1	t1	L1
63	63	148	180	115	150	12	54	220	M12	19js6	28	6	21.5	128
80	80	175	200	140	170	15	65	267	M12	24js6	36	8	27	151
100	100	218	230	175	190	15	80	322	M12	28js6	42	8	31	182

尺寸 型号	$i \geq 16$					d2	l2	b2	t2	L2	L3	L4	重量 (不包括油重)
	d1	l1	b1	t1	L1								
63	19js6	28	6	21.5	128	32k6	58	10	35	135	97	70	19.5
80	24js6	36	8	27	151	38k6	58	10	41	143	110	81	28.5
100	24js6	36	8	27	176	42k6	82	12	45	182	130	95	43

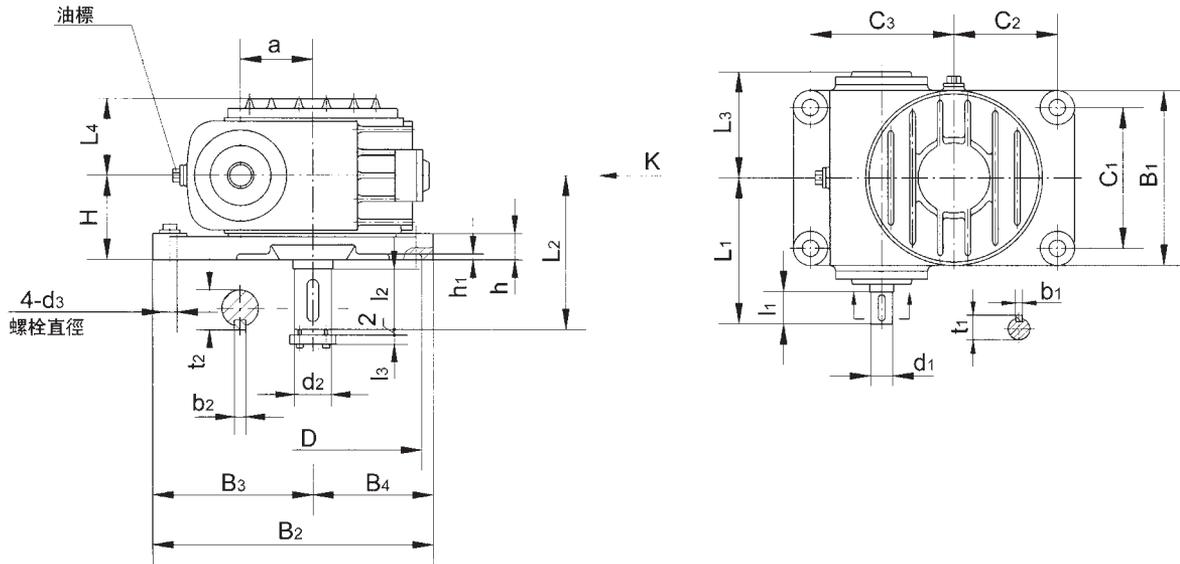


CWU125-CWU500型減速器外形和安裝尺寸

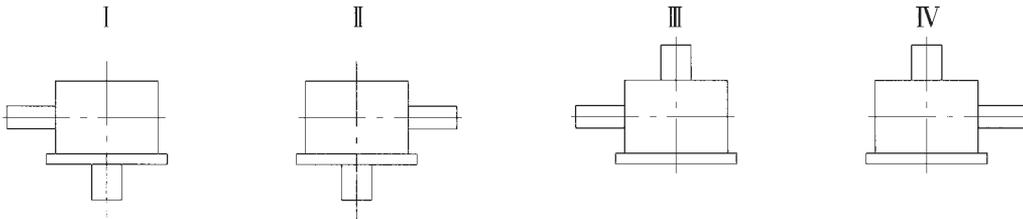
裝配形式 (F-帶風扇)

尺寸 型号	a	B1	B2	B3	C1	C2	i < 125					i > 16				
							d1	I1	b1	t1	L1	d1	I1	b1	t1	L1
125	125	260	250	310	220	205	32k6	58	10	35	218	28js6	42	8	31	202
140	140	285	275	345	230	225	38k6	58	10	41	228	28js6	42	8	31	212
160	160	325	300	385	230	250	42k6	82	12	45	277	32k6	58	10	35	253
180	180	350	320	420	260	270	42k6	82	12	45	292	32k6	58	10	35	268
200	200	400	350	465	280	300	48k6	82	14	51.5	324	38k6	58	10	41	300
225	225	440	380	505	325	325	48k6	82	14	51.5	342	38k6	58	10	41	318
250	250	510	410	575	370	350	55k6	82	16	59	380	42k6	82	12	45	380
280	280	570	460	645	420	400	60m6	105	18	64	430	48k6	82	14	51.5	407
315	315	640	530	715	470	445	65m6	105	18	69	470	48k6	82	14	51.5	447
355	355	730	580	805	540	490	70m6	105	20	74.5	515	55k6	82	16	59	492
400	400	790	620	880	620	530	75m6	105	20	79.5	545	60m6	105	18	64	545
450	450	885	680	985	700	580	80m6	130	22	85	625	65m6	105	18	69	600
500	500	1015	750	1110	760	640	90m6	130	25	95	680	70m6	105	20	74.5	655

尺寸 型号	d2	I2	b2	t2	L2	L3	L4	L5	L6	h	H	H1	d3	重量 (不包括油重)
125	55k6	82	16	59	222	202	133	153	147	30	125	408	M16	92
140	60m6	105	18	64	260	220	144	166	160	30	140	445	M16	120
160	65m6	105	18	69	270	245	156	186	172	35	160	510	M16	145
180	75m6	105	20	79.5	290	260	173	200	182	35	180	560	M20	200
200	80m6	130	22	85	325	295	180	235	197	40	200	650	M20	260
225	90m6	130	25	95	340	320	193	247	212	40	225	730	M20	320
250	100m6	165	28	106	385	360	208	285	228	45	225	785	M24	395
280	110m6	165	28	116	405	390	225	312	235	50	250	885	M24	530
315	120m6	165	32	127	420	430	242	352	289	50	280	980	M30	700
355	130m6	200	32	137	470	480	255	397	315	55	300	1085	M30	910
400	150m6	200	36	158	490	520	277	429	335	60	315	1175	M30	1200
450	170m6	240	40	179	560	565	299	484	367	65	355	1310	M36	1660
500	190m6	280	45	200	640	655	343	549	403	80	400	1450	M36	2330



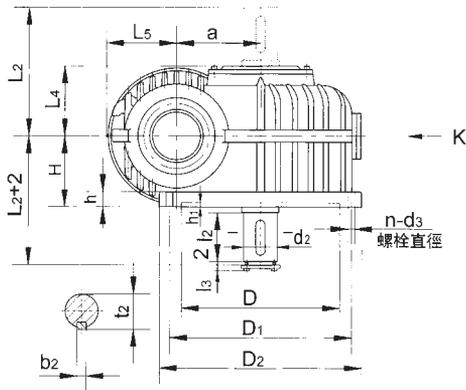
装配型式
从K向看



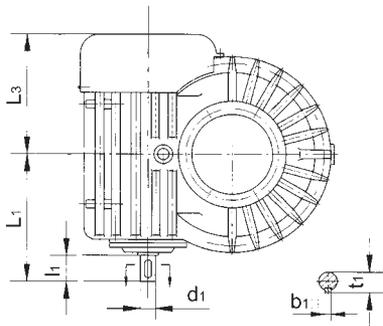
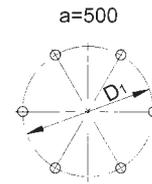
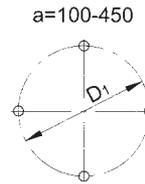
CWS63-CWS100 型减速器外形和安装尺寸

尺寸 型号	a	B1	B2	B3	B4	C1	C2	C3	D	h	h1	i ≤ 12.5				
												d1	I1	b1	t1	L1
63	63	155	245	140	105	125	90	125	190	23	5	19js6	28	6	21.5	128
80	80	180	270	160	110	150	95	145	210	23	5	24js6	36	8	27	151
100	100	220	325	200	125	190	110	185	240	23	5	28js6	42	8	31	182

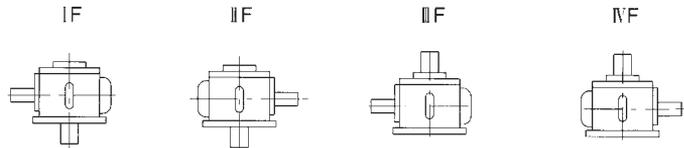
尺寸 型号	i ≥ 16					d2	I2	b2	t2	L2	L3	L4	H	d3	重量(不包括油重)
	d1	I1	b1	t1	L1										
63	19js6	28	6	21.5	128	32k6	58	10	35	135	97	70	75	M12	19
80	24js6	36	8	27	151	38k6	58	10	41	143	110	81	80	M12	28
100	24js6	36	8	27	176	42k6	82	12	45	182	130	95	95	M12	42.5



地脚螺孔位置如图



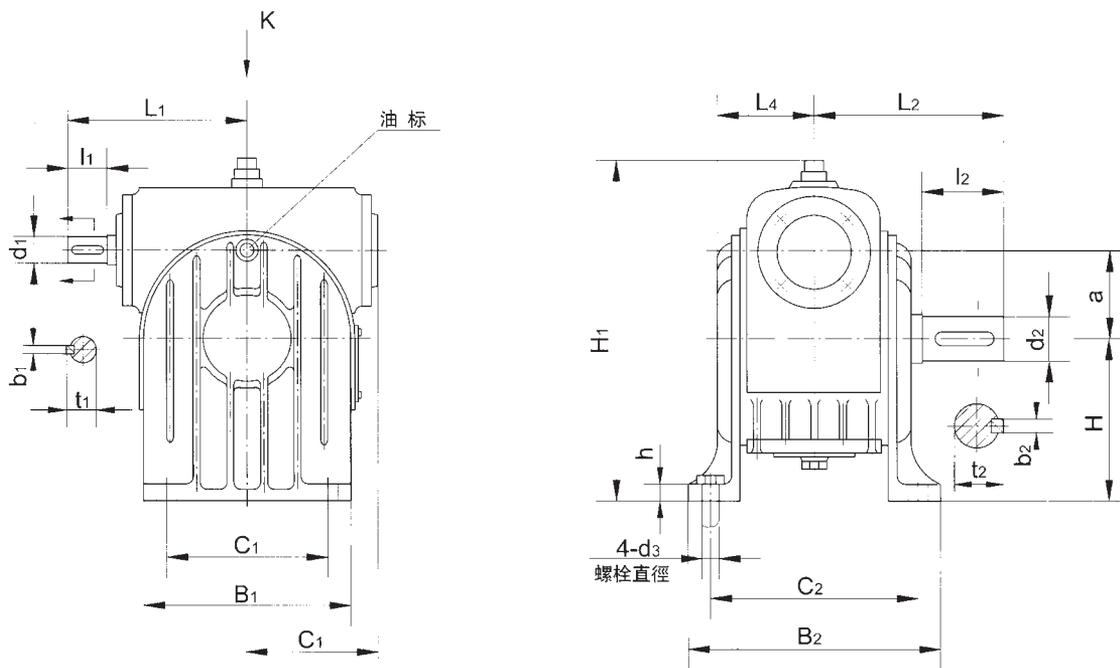
装配型式(F-带风扇)
从K向看



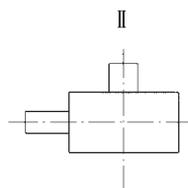
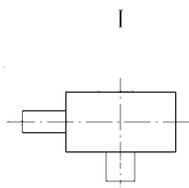
CWS125-CWS500 型减速器外形和安装尺寸

型号 \ 尺寸	a	D	D1	D2	L3	L4	L5	h	h1	H	i < 12.5				
											d1	I1	b1	t1	L1
125	125	230	280	320	202	134	125	32	8	132	32k6	58	10	35	218
140	140	260	320	360	220	145	135	32	8	150	38k6	58	10	41	228
160	160	300	360	400	245	156	142	32	8	160	42k6	82	12	45	277
200	200	370	435	480	295	182	180	38	8	190	48k6	82	14	51.5	324
250	250	470	540	600	360	208	210	40	8	212	55k6	82	16	59	380
280	280	550	640	700	390	225	215	45	8	225	60m6	105	18	64	430
315	315	605	700	760	430	242	235	50	10	250	65m6	105	18	69	470
355	355	700	805	880	480	270	235	55	10	265	70m6	105	20	74.5	515
400	400	765	875	950	515	277	247	60	10	265	75m6	105	20	79.5	545
450	450	875	990	1070	565	320	275	65	10	315	80m6	130	22	85	625
500	500	1000	1100	1180	655	290	275	75	10	375	90m6	130	25	95	680

型号 \ 尺寸	i ≥ 16					d2	I2	b2	t2	L2	I3	地脚螺栓		重量 (不包括油重)
	d1	I1	b1	t1	L1							d3	n	
125	28js6	42	8	31	202	55k6	82	16	59	222	14	M12	4	95
140	28js6	42	8	31	212	60m6	105	18	64	260	15	M16	4	110
160	32k6	58	10	35	253	65m6	105	18	69	270	15	M16	4	150
200	38k6	58	10	41	300	80m6	130	22	85	325	17	M16	4	270
250	42k6	82	12	45	380	100m6	165	28	106	385	17	M20	4	410
280	48k6	82	14	51.5	407	110m6	165	28	116	405	17	M24	4	550
315	48k6	82	14	51.5	447	120m6	165	32	127	420	17	M24	4	750
355	55k6	82	16	59	492	130m6	200	32	137	470	17	M30	4	930
400	60k6	105	18	64	545	150m6	200	36	158	490	24	M30	4	1200
450	65m6	105	18	69	600	170m6	240	40	179	560	24	M36	4	1650
500	70m6	105	20	74.5	655	190m6	280	45	200	640	24	M30	4	2190



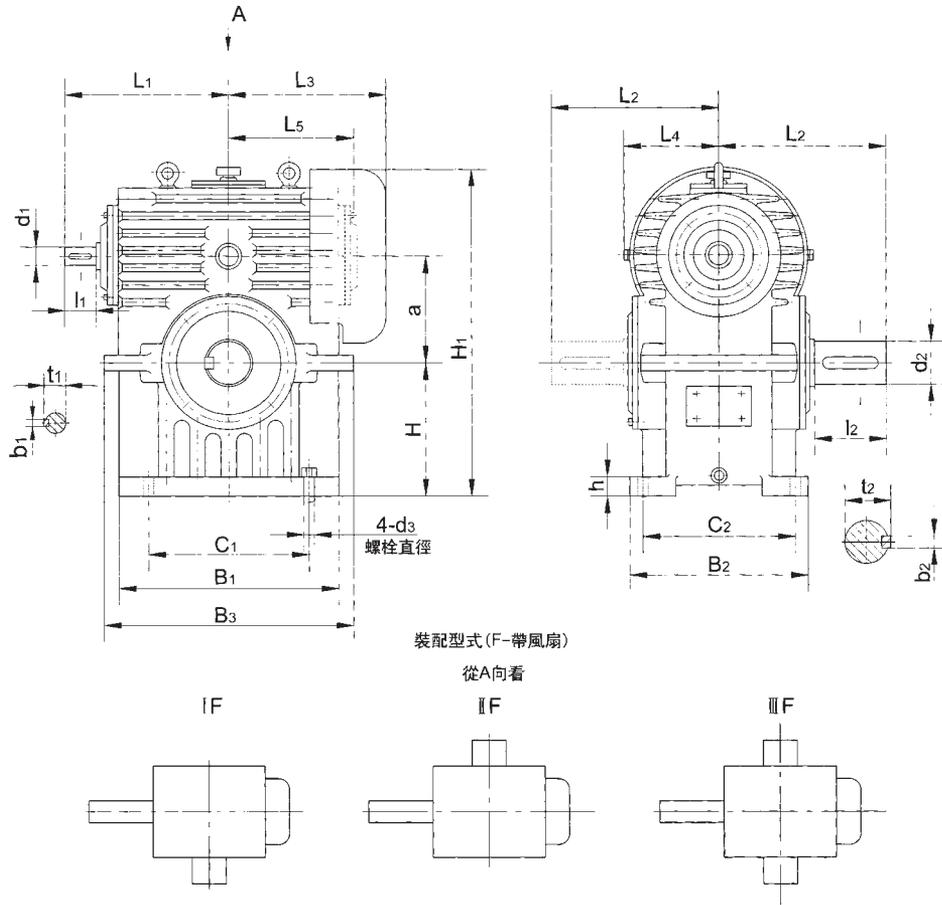
裝配型式
從K向看



CW063-CW0100 型減速器外形和安裝尺寸

尺寸 型号	a	B1	B2	C1	C2	h	H	H1	d3	i < 12.5				
										d1	I1	b1	t1	L1
63	63	148	180	115	150	12	117	245	M12	19js6	28	6	21.5	128
80	80	175	200	140	170	15	145	296	M12	24js6	36	8	27	151
100	100	218	230	175	190	15	180	365	M12	28js6	42	8	31	182

尺寸 型号	i > 16					d2	I2	b2	t2	L2	L3	L4	重量 (不包括油重)
	d1	I1	b1	t1	L1								
63	19js6	28	6	21.5	128	32k6	58	10	35	135	97	70	19.5
80	24js6	36	8	27	151	38k6	58	10	41	143	110	81	28.5
100	24js6	36	8	27	176	42k6	82	12	45	182	130	95	43



CWO125-CWO250 型減速器外形和安裝尺寸

尺寸 型号	a	B1	B2	B3	C1	C2	h	H	H1	d3	i ≤ 12.5				
											d1	I1	b1	t1	L1
125	125	260	250	310	220	205	30	155	410	M16	32K6	58	10	35	218
140	140	285	275	345	230	225	30	195	485	M16	38K6	58	10	41	228
160	160	325	300	385	230	250	35	195	505	M16	42K6	82	12	45	277
180	180	350	320	420	260	270	35	220	600	M20	42K6	82	12	45	292
200	200	400	350	465	280	300	40	250	655	M20	48K6	82	14	51.5	342
225	225	440	380	505	325	325	40	275	700	M20	48K6	82	14	51.5	342
250	250	510	410	575	370	350	45	310	820	M24	55K6	82	16	59	380

尺寸 型号	i ≥ 16					d2	I2	b2	t2	L2	L3	L4	L5	重量 (不包括油重)
	d1	I1	b1	t1	L1									
125	28js6	42	8	31	202	55k6	82	16	59	222	202	133	158	98
140	28js6	42	8	31	212	60m6	105	18	64	260	220	144	166	110
160	32k6	58	10	35	253	65m6	105	18	69	270	245	156	186	150
180	32k6	58	10	35	268	75m6	105	20	79.5	290	260	173	200	210
200	38k6	58	10	41	300	80m6	130	22	85	32.5	295	182	235	270
225	38k6	58	10	41	318	90m6	130	25	95	340	320	193	247	335
250	42k6	82	12	45	380	100m6	165	28	106	385	360	210	285	410

三、减速机的公称传动比及额定输入功率P1和额定输出扭矩T2

传动比代号	公称传动比	转速 W1	中心距号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
			中心距	63	80	100	125	140	160	180	200	225	250	280	315	355	400	450	500			
			型号	CWU			CWS			CWO												
			额定输入功率 PIKW					额定输出扭矩 T2N														
1	5	1500	P1	3.500	6.388	10.39	25.22	---	44.58	---	64.90	---	98.44	---	141.9	---	202.4	---	---			
			T2	107	180	295	730	---	1300	---	1900	---	2900	---	4200	---	6000	---	---			
		1000	P1	2.978	4.871	8.092	21.28	---	35.59	---	53.68	---	91.75	---	135.7	---	193.6	---	---			
			T2	123	205	345	920	---	1550	---	2350	---	4050	---	6000	---	8600	---	---			
	750	P1	2.577	4.211	7.010	15.40	---	27.73	---	43.06	---	78.56	---	126.4	---	185.9	---	---				
		T2	141	235	395	940	---	1600	---	2500	---	4600	---	7400	---	1100	---	---				
	500	P1	2.120	3.367	5.436	11.64	---	19.81	---	31.23	---	56.14	---	104.2	---	169.4	---	---				
		T2	173	280	455	990	---	1700	---	2700	---	4900	---	9150	---	15000	---	---				
	2	6.3	1500	P1	3.198	5.505	9.258	21.37	27.51	38.40	48.46	55.38	69.18	83.77	102.5	121.7	150.5	137.8	---	---		
				T2	114	200	340	800	960	1450	1700	2100	2450	3200	3650	4670	5370	7500	---	---		
			1000	P1	2.422	4.331	7.141	17.96	24.97	31.03	43.85	49.95	64.08	78.53	95.58	114.4	145.3	172.5	---	---	189.9	
				T2	127	235	390	1000	1300	1750	2300	2750	3400	4500	5100	6580	7770	10500	---	---	12000	
750		P1	2.090	3.549	6.138	14.22	19.57	24.73	34.50	27.27	56.05	60.81	88.76	107.2	134.8	166.5	---	---	183.9			
		T2	146	260	445	1050	1350	1850	2400	2800	4000	5300	6300	8200	9590	13500	---	---	15500			
500		P1	1.706	2.955	4.829	10.47	13.65	17.08	24.52	26.64	41.03	50.37	67.32	83.58	112.5	143.1	---	---	162.7			
		T2	176	315	520	1150	1400	1900	2550	3000	4300	5700	7100	9540	11990	18000	---	---	20500			
3		8	1500	P1	2.932	4.866	7.628	17.01	24.25	28.44	43.51	48.25	61.38	73.84	91.68	113.6	136.0	166.1	---	---		
				T2	127	230	365	830	1050	1450	1900	2400	2700	3700	4050	5720	5040	8400	---	---		
			1000	P1	2.255	3.908	6.144	13.55	21.70	24.95	39.10	43.65	56.13	67.78	84.52	104.8	126.7	158.2	174.1	---	---	
				T2	146	275	440	990	1400	1990	2550	3250	3700	5100	5600	7910	8440	1200	12500	---	---	
	750	P1	1.962	3.334	5.289	12.93	16.96	21.37	30.61	35.01	50.44	62.32	77.46	95.18	114.0	148.9	162.4	---	---			
		T2	168	310	500	1250	1450	2150	2650	3450	4400	6200	6800	9540	10070	15000	15500	---	---			
	500	P1	1.647	2.714	4.183	9.322	12.25	15.42	21.93	25.38	35.91	44.70	61.33	79.99	101.7	129.6	147.3	---	---			
		T2	209	375	590	1350	1550	2300	2800	3700	4650	6600	8800	1192	1342	19500	2100	---	---			
	4	10	1500	P1	2.340	4.056	6.626	14.16	17.30	24.50	32.10	42.10	50.79	59.13	73.68	94.55	140.2	146.2	---	---		
				T2	132	235	390	850	1050	1500	1850	2600	3250	3800	4750	5910	7480	9200	---	---		
			1000	P1	1.800	3.250	5.132	12.78	16.05	21.96	29.62	37.06	43.94	51.10	64.89	87.71	11.24	138.1	162.2	176.0	---	
				T2	150	275	450	1150	1450	2000	2450	3400	4200	4900	6200	8200	1055	13000	14500	16500	---	
750		P1	1.594	2.729	4.401	10.54	12.95	17.41	23.73	28.83	35.14	46.40	57.94	80.74	100.2	132.0	156.0	164.1	---			
		T2	170	310	510	1250	1550	2100	2700	3500	4450	4900	6200	8200	12470	16500	18500	20500	---			
500		P1	1.272	2.203	3.542	7.714	9.355	12.88	16.98	20.87	26.40	35.62	45.57	64.70	82.81	118.1	137.8	147.4	---			
		T2	209	370	610	1350	1650	2300	2850	3750	4960	6700	8600	11920	15340	22000	24500	27500	---			
5		12.5	1500	P1	2.036	3.534	5.579	11.27	14.74	19.32	25.36	32.62	42.61	52.23	71.95	79.91	105.1	130.4	---	---		
				T2	137	240	385	800	1000	1400	1800	2450	3050	3850	5200	6100	8050	10000	---	---		
			1000	P1	1.594	2.840	4.465	9.919	13.37	17.63	23.21	29.04	38.43	47.23	66.84	73.88	96.65	127.1	152.5	183.3	---	
				T2	159	285	460	1050	1350	1900	2450	3250	4100	5200	7200	8300	11030	14500	17000	20500	---	
	750	P1	1.370	2.482	3.977	8.946	11.91	15.38	21.05	24.93	35.26	44.42	62.16	69.26	91.39	118.3	141.2	174.3	---			
		T2	182	325	540	1250	1600	2200	2950	3700	5000	6500	8900	10500	13900	1800	21000	26000	---			
	500	P1	1.126	1.967	3.121	6.791	9.104	11.16	16.00	17.60	27.75	32.91	45.05	55.40	76.37	101.3	102.2	157.3	---			
		T2	223	390	630	1400	1800	2350	3300	3850	5800	7100	9500	12400	17200	23000	28000	35000	---			
	6	16	1500	P1	1.728	3.019	4.930	11.06	13.63	19.62	23.11	33.22	39.52	46.71	57.25	77.70	94.45	124.2	---	---		
				T2	137	250	415	960	1200	1750	2200	3000	3700	4250	5400	7150	8920	11500	---	---		
			1000	P1	1.695	2.375	3.820	9.651	12.26	16.27	19.81	25.78	30.39	41.99	51.15	72.91	86.88	115.4	127.4	151.4	---	
				T2	159	290	480	1250	1600	2150	2800	3450	4300	5700	7200	10020	11990	16000	18000	21500	---	
750		P1	1.170	2.023	3.326	7.871	9.877	12.97	15.60	20.64	26.61	37.26	45.01	65.59	83.05	106.4	122.6	142.9	---			
		T2	182	325	550	1350	1700	2250	2900	3650	4900	6700	8400	11920	15340	19500	23000	27000	---			
500		P1	0.963	1.664	2.611	5.677	6.930	9.124	11.397	14.868	18.69	27.11	33.09	47.75	61.95	86.09	109.3	128.2	---			
		T2	228	400	650	1400	1750	2350	3150	3900	5100	7200	9100	12880	16780	23500	30500	36000	---			

减速机的额定输出扭矩表 T2

传动比代号	公称传动比	转速	中心距代号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
			中心距	63	80	100	125	140	160	180	200	225	250	280	315	355	400	450	500		
			型号	CWU CWS CWO																	
			额定输入功率 P _{ikw} \ 额定输出扭矩 T _{2N} · m																		
7	20	1500	P ₁ T ₂	1.667 164	2.680 285	4.210 455	8.592 970	11.05 1200	15.12 1750	19.39 2150	24.97 2950	31.94 3600	41.91 5000	51.71 5900	62.42 7540	80.82 9300	98.76 12000	-	-		
		1000	P ₁ T ₂	1.329 191	2.094 330	2.121 540	17.77 1250	9.301 1500	13.05 2250	16.70 2750	21.97 3850	27.088 4550	37.65 6700	45.95 8000	58.25 10490	75.23 12950	90.92 16500	120.8 22000	112.0 26000		
		750	P ₁ T ₂	1.147 219	1.825 380	2.957 630	6.915 1500	8.694 1850	11.45 2600	14.75 3200	18.14 4200	24.38 5400	34.87 8200	43.07 9700	52.03 12400	69.41 15820	83.01 20000	113.6 27500	131.5 32000		
		500	P ₁ T ₂	0.873 246	1.466 450	2.278 710	5.241 1650	6.478 2000	8.613 2850	10.81 3450	13.18 4500	18.06 5900	25.45 8800	31.64 10500	40.69 14310	54.29 18220	72.97 26000	99.07 35500	118.1 42500		
8	25	1500	P ₁ T ₂	1.205 141	2.152 275	3.531 445	6.526 890	8.323 1150	11.82 1600	14.19 2050	18.38 2650	22.32 3300	30.80 4500	38.03 5600	51.46 7340	65.70 10070	83.69 12500	-	-		
		1000	P ₁ T ₂	1.102 178	1.778 340	2.890 540	5.332 1100	6.796 1400	10.42 2100	12.09 2600	16.44 3500	19.86 4350	27.53 6000	35.05 7700	44.90 9540	60.58 13420	74.13 16500	90.13 20500	91.30 20500		
		750	P ₁ T ₂	0.824 191	1.516 380	23.40 590	4.877 1300	6.108 1650	9.484 2500	11.129 3150	14.76 4150	17.95 5200	25.08 7200	31.69 9200	42.47 11920	57.17 16780	69.46 20500	84.46 25500	85.55 25500		
		500	P ₁ T ₂	0.600 205	1.164 435	1.836 670	3.575 1400	4.403 1750	6.831 2650	8.050 3350	11.65 4800	14.05 6000	20.11 8500	25.81 11000	35.78 14780	46.72 20140	60.79 26500	74.00 33000	78.62 34500		
9	31.5	1500	P ₁ T ₂	1.054 146	1.809 260	2.901 430	7.208 1100	8.413 1350	12.14 2000	14.47 2550	21.53 3600	24.69 4300	28.73 4900	35.02 6200	50.41 8780	65.58 11500	-	-	-		
		1000	P ₁ T ₂	0.829 168	1.445 305	2.285 510	5.730 1300	6.738 1600	9.325 2250	11.13 2900	16.47 3700	18.48 4800	25.65 6500	30.75 8100	46.21 11920	58.96 15340	74.43 19500	95.59 26000	117.0 33000		
		750	P ₁ T ₂	0.689 187	1.223 340	1.973 570	4.548 1350	4.573 1700	7.469 2350	8.868 3000	11.95 3850	14.91 5000	21.21 7000	25.35 8800	36.44 12400	48.81 16780	67.04 23500	82.46 29500	109.0 40500		
		500	P ₁ T ₂	0.581 228	1.021 410	1.588 670	3.284 2400	3.879 1750	5.332 2450	6.568 3250	8.700 4100	10.91 5400	15.30 7400	18.47 9300	26.79 13350	34.13 17260	48.87 25000	60.39 32000	79.15 43500		
10	40	1500	P ₁ T ₂	1.015 178	1.634 300	2.559 485	5.451 1100	6.917 1350	9.506 2000	11.77 2450	15.87 3450	20.10 4300	26.95 6000	33.33 7100	40.55 9160	55.49 11990	67.48 15500	-	-		
		1000	P ₁ T ₂	0.780 196	1.2770 345	2.087 590	4.670 1400	5.889 1700	8.384 2600	10.35 3150	13.24 4200	17.18 5400	22.99 7800	29.94 9400	37.26 12400	49.51 15820	63.11 21500	81.63 28000	99.56 34500		
		750	P ₁ T ₂	0.704 228	1.095 390	1.812 670	4.159 1600	5.222 1950	6.691 2200	8.296 3300	10.709 4450	14.08 5800	19.78 8500	24.15 10000	32.39 14310	40.70 17260	57.84 26000	74.94 34000	93.04 42500		
		500	P ₁ T ₂	0.544 259	0.844 455	1.387 730	3.053 1700	3.770 2050	4.984 2900	6.147 3550	7.662 4650	10.48 6300	14.46 9000	18.34 11000	23.85 15260	30.06 18700	44.58 29500	56.40 37500	70.53 47500		
11	50	1500	P ₁ T ₂	0.787 159	1.430 310	2.182 480	4.226 990	5.339 1300	7.295 1800	8.872 2300	12.07 3100	14.44 3900	20.33 5300	25.42 6900	32.07 8580	43.13 11990	53.65 15000	-	-		
		1000	P ₁ T ₂	0.641 191	1.144 360	1.787 570	3.606 1250	4.439 1600	6.441 2350	7.795 3000	10.48 4000	13.36 5300	18.10 7000	22.34 9000	29.83 11920	39.61 16300	49.63 20500	61.38 26000	65.33 28000		
		750	P ₁ T ₂	0.525 205	0.966 405	1.511 640	3.221 1450	3.889 1800	5.829 2750	6.992 3500	9.088 4450	11.38 5900	16.18 8200	20.76 11000	27.24 14300	36.30 19600	45.94 25000	57.13 32000	60.92 34500		
		500	P ₁ T ₂	0.395 223	0.730 455	1.117 700	2.300 1500	2.803 1900	4.326 2950	5.131 3700	6.790 4850	8.235 6200	12.61 9200	15.77 12000	21.44 16220	28.74 22530	38.14 30500	47.08 39000	54.19 45500		
12	63	1500	P ₁ T ₂	-	1.175 280	1.782 450	3.332 890	4.452 1200	5.560 1650	7.709 2250	9.966 3000	13.17 3900	15.31 4600	20.20 6100	25.06 7820	33.84 10550	45.41 14500	-	-		
		1000	P ₁ T ₂	-	0.865 300	1.402 510	2.488 970	3.394 1350	4.22 1800	6.399 2750	7.787 3400	11.57 5000	13.39 5900	20.37 8100	22.77 10490	30.32 14380	42.56 2000	50.59 24000	64.58 31000		
		750	P ₁ T ₂	-	0.709 325	1.152 550	2.147 1100	2.889 1500	3.691 2050	5.14 2900	6.825 3900	9.659 5500	11.60 6700	15.45 9100	20.40 12400	29.52 17740	37.78 23500	47.20 29500	59.58 38000		
		500	P ₁ T ₂	-	0.574 390	0.900 630	1.701 1250	2.281 1700	2.878 2300	4.251 3400	5.302 4400	7.260 6000	8.654 7200	11.85 10000	15.84 13830	21.75 19180	28.77 26000	35.93 33000	46.28 43500		