

Frame Size	Units	Note	37	55	75	90	115	130	140	160	190
Ratio	i		3/4/5/6/8/10								
Nominal Output Torque	T2N [Nm]	*1	22	35	70	140	260	430	720	1100	1440
Maximum Acceleration Torque	T2B [Nm]	*2	33	53	105	210	390	645	1080	1650	2160
Emergency Stop Torque	T2Not [Nm]	*3	44	70	140	280	520	860	1440	2200	2880
Nominal Input Speed (Ratios 3/4/5)	n1N [rpm]	*4	2300	2100	1800	1500	1150	1000	700	600	550
Nominal Input Speed (Ratios 6/8/10)	n1N [rpm]	*4	3700	3200	2700	2200	1800	1500	1200	1100	1000
Maximum Input Speed	n1max [rpm]	*5	8000	8000	8000	7000	6000	5000	5000	4500	4500
Maximum Radial Load	F2Rmax [N]	*6	2200	3300	4900	7200	10000	12600	15000	18000	22500
Maximum Axial Load	F2Amax [N]	*7	1100	1650	2450	3600	5000	6300	7500	9000	11250
Efficiency	h [%]	*8	> 96	> 96	> 96	> 96	> 96	> 96	> 96	> 96	> 96
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	1.3	2.1	4.2	10.5	23.4	39.6	61.8	90	126
Maximum Torsional Backlash (Standard)	jt [arcmin]	*10	≤ 6	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
Maximum Torsional Backlash (Reduced)	jt [arcmin]	*10	≤ 4	≤ 3	≤ 3	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
Noise Level	LpA [dB(A)]	*11	< 65	< 66	< 66	< 68	< 68	< 70	< 70	< 72	< 72
Ambient Temperature	[°C]	-	-10 to 90								
Permitted Housing Temperature	[°C]	-	90								
Protection Class	-	-	IP64								
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150]								
Service Life	SL [h]	*12	30,000								
Weight	m [kg]	-	1.9	3.5	5.5	9.5	15.5	23.5	32.5	46.5	60

Frame Size	Units	Note	37	55	75	90	115	130	140	160	190
Ratio	i		12/15								
Nominal Output Torque	T2N [Nm]	*1	15	25	50	95	180	300	510	815	1020
Maximum Acceleration Torque	T2B [Nm]	*2	22	38	75	143	270	450	765	1223	1530
Emergency Stop Torque	T2Not [Nm]	*3	30	50	100	190	360	600	1020	1630	2040
Nominal Input Speed	n1N [rpm]	*4	4500	3900	3300	2800	2300	2000	1600	1350	1300
Maximum Input Speed	n1max [rpm]	*5	8000	8000	8000	7000	6000	5000	5000	4500	4500
Maximum Radial Load	F2Rmax [N]	*6	2200	3300	4900	7200	10000	12600	15000	18000	22500
Maximum Axial Load	F2Amax [N]	*7	1100	1650	2450	3600	5000	6300	7500	9000	11250
Efficiency	h [%]	*8	> 93	> 93	> 93	> 93	> 93	> 93	> 93	> 93	> 93
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	1.3	2.1	4.2	10.5	23.4	39.6	61.8	90	126
Maximum Torsional Backlash (Standard)	jt [arcmin]	*10	≤ 6	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
Maximum Torsional Backlash (Reduced)	jt [arcmin]	*10	≤ 4	≤ 3	≤ 3	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
Noise Level	LpA [dB(A)]	*11	< 65	< 66	< 66	< 68	< 68	< 70	< 70	< 72	< 72
Ambient Temperature	[°C]	-	-10 to 90								
Permitted Housing Temperature	[°C]	-	90								
Protection Class	-	-	IP64								
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150]								
Service Life	SL [h]	*12	30,000								
Weight	m [kg]	-	1.9	3.5	5.5	9.5	15.5	23.5	32.5	46.5	60

Frame Size	Units	Note	-	55	75	90	115	130	140	160	190
Ratio	i		16/18/24/30/32/40/50/60/80/100								
Nominal Output Torque	T2N [Nm]	*1	-	35	70	140	260	430	720	1100	1440
Maximum Acceleration Torque	T2B [Nm]	*2	-	53	105	210	390	645	1080	1650	2160
Emergency Stop Torque	T2Not [Nm]	*3	-	70	140	280	520	860	1440	2200	2880
Nominal Input Speed	n1N [rpm]	*4	-	3500	3000	3000	2500	2500	2500	2500	2500
Maximum Input Speed	n1max [rpm]	*5	-	6000	6000	6000	6000	5000	5000	4500	4500
Maximum Radial Load	F2Rmax [N]	*6	-	3300	4900	7200	10000	12600	15000	18000	22500
Maximum Axial Load	F2Amax [N]	*7	-	1650	2450	3600	5000	6300	7500	9000	11250
Efficiency	h [%]	*8	-	> 92	> 92	> 92	> 92	> 92	> 92	> 92	> 92
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	-	2.1	4.1	10.2	22.8	37.8	60.1	86.5	119.2
Maximum Torsional Backlash (Standard)	jt [arcmin]	*10	-	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
Maximum Torsional Backlash (Reduced)	jt [arcmin]	*10	-	≤ 3	≤ 3	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
Noise Level	LpA [dB(A)]	*11	-	< 66	< 66	< 68	< 68	< 70	< 70	< 72	< 72
Ambient Temperature	[°C]	-	-10 to 90								
Permitted Housing Temperature	[°C]	-	90								
Protection Class	-	-	IP64								
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150], DIN 51818 Synthetic Grease								
Service Life	SL [h]	*12	30,000								
Weight	m [kg]	-	-	4	6.5	12.5	19.5	27	36	49	61.5

- *1) At nominal input speed, service life is 30,000 hours
- *2) The maximum torque when starting or stopping operation. Permitted 1,000 cycles/hour.
- *3) The maximum torque allowed under a stress situation. Permitted 1,000 times during service life
- *4) The average input speed at nominal input torque. Maintain housing temperature below permitted value
- *5) The maximum intermittent input speed
- *6) The maximum radial load the gearbox can accept. Measured at center of output shaft at 400rpm output
- *7) The maximum axial load the gearbox can accept. Measured at center of output shaft at 400rpm output
- *8) The efficiency at full load
- *9) At nominal output torque. Does not include lost motion
- *10) Measured at output, 2% load and max 10Nm
- *11) Measured at 3,000 rpm input
- *12) Based on S5 duty cycle <60% and <20 minute run time

Moment of inertia I_1 [kgcm²]

Ratio	Frame Size								
	37	55	75	90	115	130	140	160	190
3:1	0.178	0.39	0.98	2.42	7.12	14.03	26.96	52.32	91.47
4:1	0.14	0.30	0.73	1.77	5.09	9.17	17.44	32.78	62.43
5:1	0.123	0.23	0.58	1.41	4.00	7.12	13.53	24.76	44.29
6:1	0.113	0.22	0.52	1.41	3.65	6.76	12.25	22.49	39.55
8:1	0.104	0.17	0.43	1.12	2.85	5.09	8.95	15.67	27.07
10:1	0.099	0.15	0.38	1.00	2.46	4.27	7.38	12.47	21.43
12:1	0.097	0.14	0.36	0.88	2.25	3.81	6.47	10.67	18.14
15:1	0.095	0.13	0.34	0.81	2.07	3.45	5.76	9.23	15.53
16:1	-	0.40	1.19	1.25	5.12	5.37	8.74	9.70	11.55
18:1	-	0.46	1.38	1.41	6.64	6.73	12.57	12.85	13.33
24:1	-	0.39	1.15	1.18	4.9	4.99	7.99	8.27	8.75
30:1	-	0.37	1.06	1.09	4.15	4.24	6.58	6.86	7.34
32:1	-	0.38	1.15	1.16	4.84	4.88	7.79	7.89	8.07
40:1	-	0.36	1.06	1.07	4.09	4.13	6.38	6.48	6.66
50:1	-	0.36	1.05	1.06	4.07	4.09	6.31	6.36	6.45
60:1	-	0.35	0.94	0.97	3.20	3.29	4.14	4.42	4.90
80:1	-	0.34	0.94	0.95	3.14	3.18	3.94	4.04	4.22
100:1	-	0.34	0.93	0.94	3.12	3.14	3.87	3.92	4.01

Units and Symbols

Maximum Motor Acceleration Torque	T1BMot	Nm
Nominal Output Torque	T2N	Nm
Maximum Acceleration Torque	T2B	Nm
Emergency Stop Torque	T2Not	Nm
Nominal Input Speed	n1N	rpm
Maximum Input Speed	n1max	rpm
Maximum Input Radial Load	F1Rmax	N
Maximum Output Radial Load	F2Rmax	N
Maximum Input Axial Load	F1Amax	N
Maximum Output Axial Load	F2Amax	N
Mass Moment of Inertia	I1	kgcm ²
Efficiency at Full Load	η	%
Torsional Rigidity	Ct21	Nm/arc-min
Maximum Torsional Backlash	jt	arc-min
Noise Level	LpA	dB(A)
Service Life	Lh	h
Run time	RT	min
Duty cycle	DC	%
Ambient Temperature	ta	°C
Thermal Performance Limit	Ptherm	kW
Performance	P	kW
Weight	m	kg