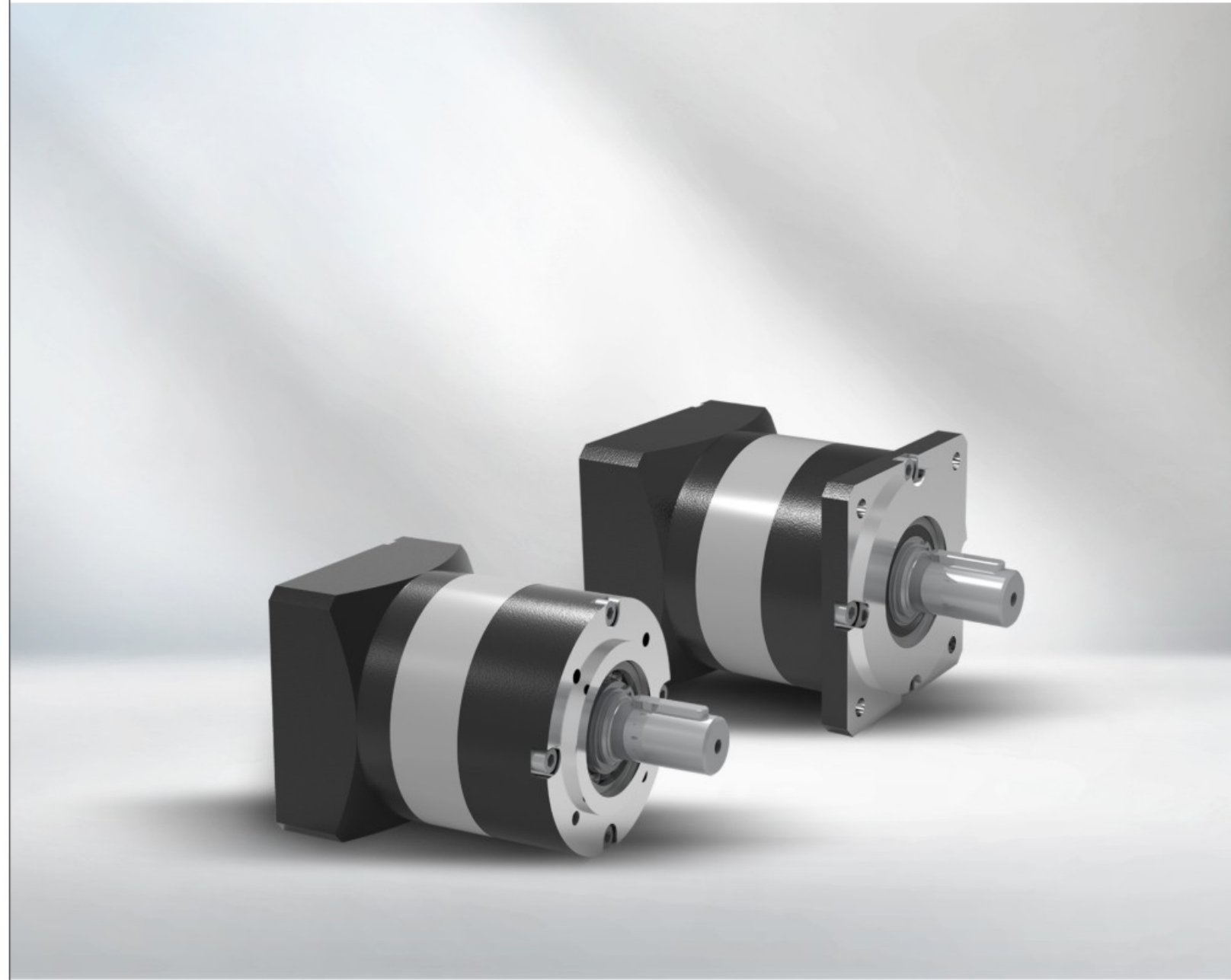


## Servo Planetary Gearbox Valued Line



## The Company

The **KOFON**® possesses expertise for the mastery of high precision motion control technologies. The company group established in 1998.

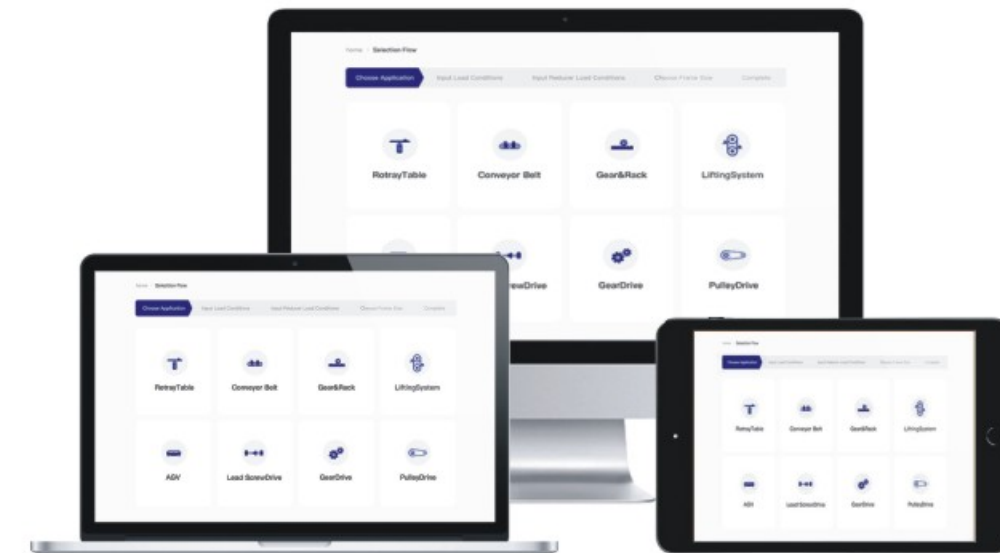
Now it employs over 650 staffs worldwide. We focus on the development, manufacturing and sales of the high precision planetary gearbox, spiral bevel gearbox and industrial automation integration solutions. Our reliable competence industry including high precision machine tools, intelligent logistic systems, robotics and new energy.

Kofon Motion aim to be dedicated to serve global customers with the reliable precision motion solutions.



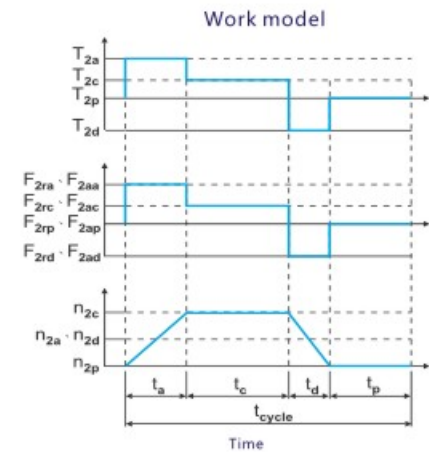
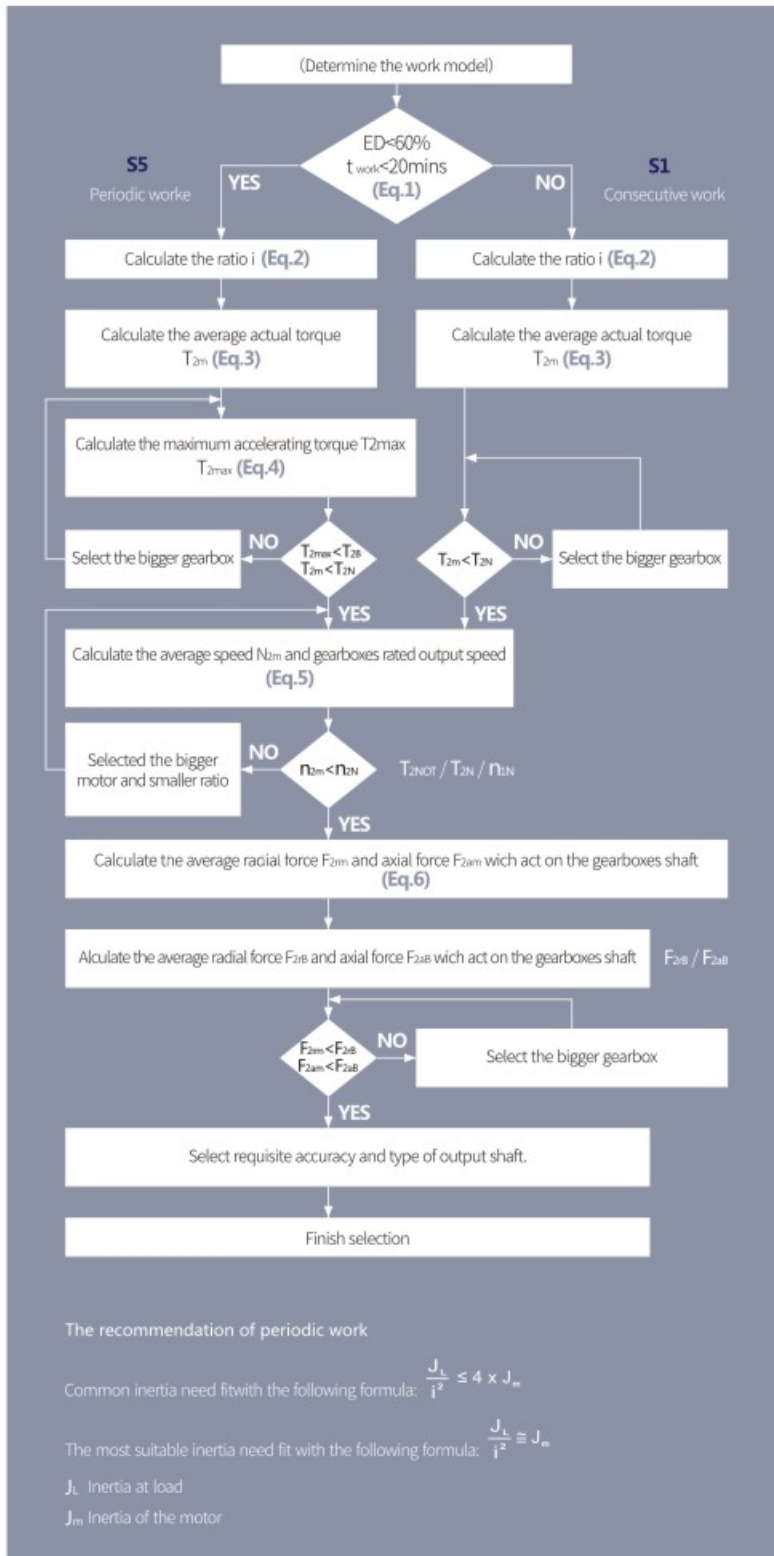
## Benefit with Powerful Gearbox Design Programme (KDP)

- The Kofon Design Programme (KDP) support you to realize the optimal portfolio of servo motor and gearbox by few steps.
- The KDP makes it available to get access to almost servo motors in the global market, and huge numbers of applications like pinions, spindles, belts, conveyors, rotary tables.
- You can also find the solutions by different industrial application sections from KDP online.
- The drawings could be download free from KDP online and the available drawing in format pdf, dwg and step.



Gearbox Selection

Order Instructions



1.  $ED = \frac{t_a + t_c + t_d}{t_{cycle}} \times 100\%$ ,  $t_{work} = t_a + t_c + t_d$  (Eq.1)

explanation :  
a:accelerated c:constant  
d:deacceleration p:stop

2.  $i \cong \frac{n_m}{n_{work}}$  (Eq.2)

$n_m$  Output speed of motor  
 $n_{work}$  Actual speed on work

3.  $T_{2m} = \sqrt[3]{\frac{n_{2a} \times t_a \times T_{2a}^3 + n_{2c} \times t_c \times T_{2c}^3 + n_{2d} \times t_d \times T_{2d}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$  (Eq.3)

4.  $T_{2max} = T_{mB} \times i \times k_A \times \eta$  (Eq.4)

$K_A$  Coefficient at load

$K_A$	Periodic times/hour
1.0	0-1,000
1.1	1,000-1,500
1.3	1,500-2,000
1.6	2,000-3,000
1.8	3,000-5,000

$T_{mB}$  The maximum output torque of motor  
 $\eta$  gearbox efficiency on work

5.  $n_{2a} = n_{2d} = -\frac{1}{2} \times n_{2c}$   
 $n_{2m} = \frac{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}{t_a + t_c + t_d}$   
 $n_{2N} = \frac{n_{1N}}{i}$  (Eq.5)

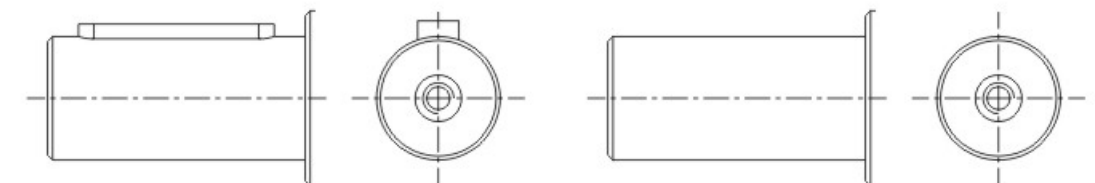
6.  $F_{2m} = \sqrt[3]{\frac{n_{2a} \times t_a \times F_{2a}^3 + n_{2c} \times t_c \times F_{2c}^3 + n_{2d} \times t_d \times F_{2d}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$  (Eq.6)

$F_{2am} = \sqrt[3]{\frac{n_{2a} \times t_a \times F_{2aa}^3 + n_{2c} \times t_c \times F_{2ac}^3 + n_{2d} \times t_d \times F_{2ad}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$  (Eq.6)

Order Code: SPL — 120 — 2 — 15 — S1 — P2 — Servo Motor

- SPL**  
Gearbox Series: SPL
- 120**  
Gearbox Size
- 2**  
Gearbox Stage
- 15**  
Gearbox Ratio
- S1**  
S1: Output shaft with key  
S2: Output shaft without key
- P2**  
Gearbox Precision
- Servo Motor**  
Motor Manufacturer and model

Output Shaft Key Option



S1: Output shaft with key

S2: Output shaft without key

Ordering Example: SPL120-2-15-S1-P2-ABB-8M1230

If there is any question, please ask our engineering sales for solutions.

Product Catalog

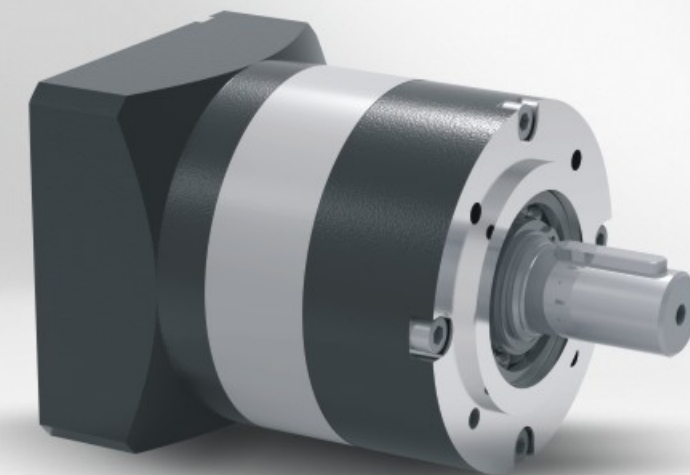
SPL .....	01
SPLF .....	33
SPLN .....	65
SPLS .....	85
SVX .....	105
SPH .....	129
Installation Instruction .....	150
Maintenance Instruction .....	152

# SPL

Powerful. Precision. Reliable

▶ Servo Planetary Gearbox

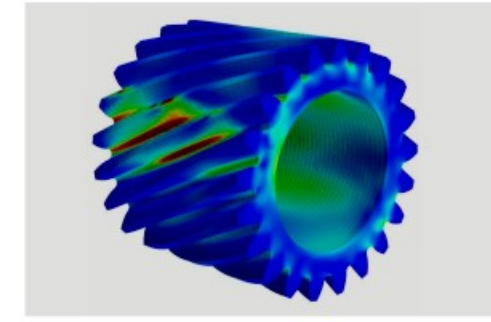
Valued Gearbox Solution





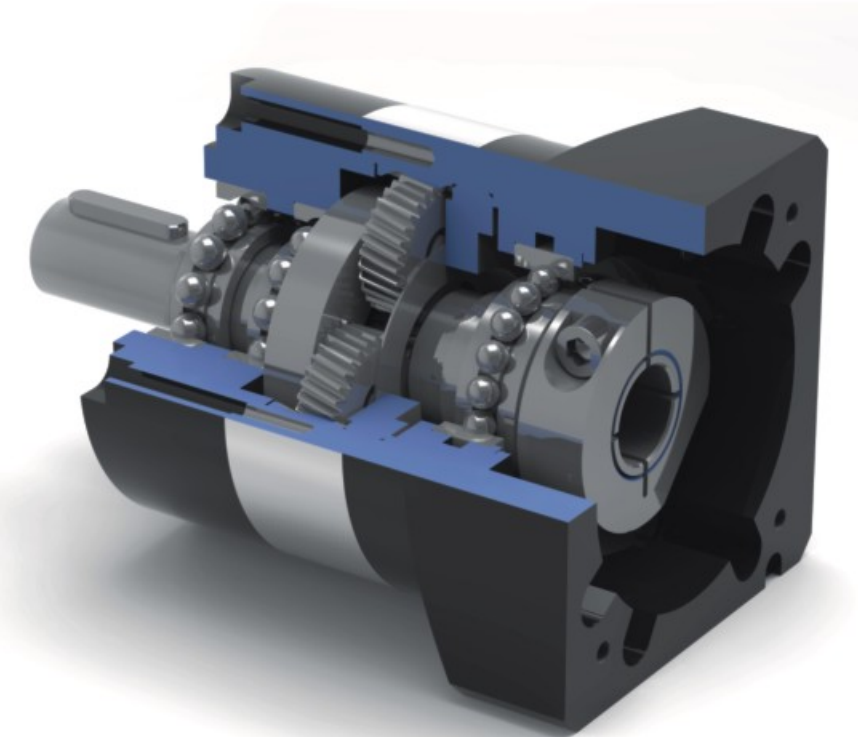
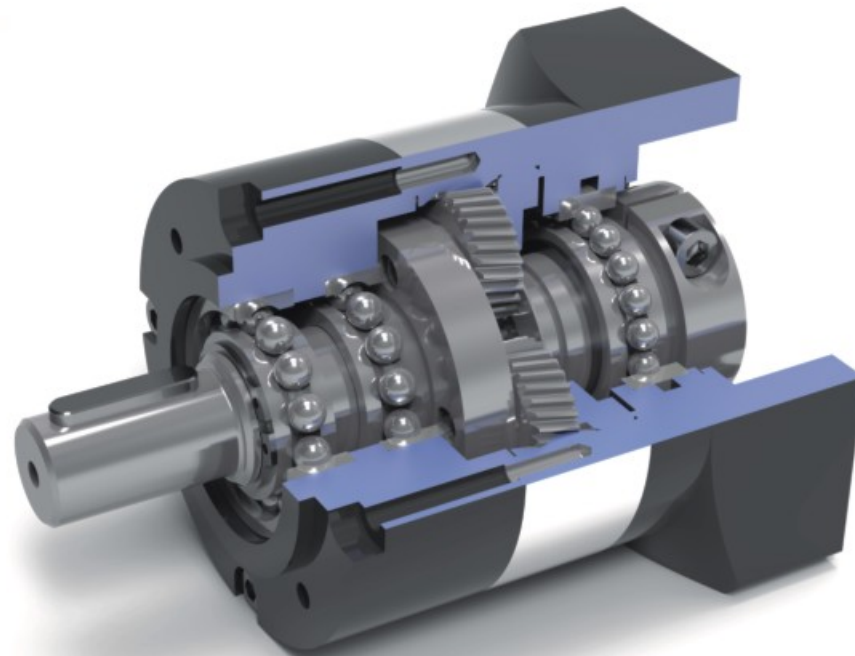
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%. The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SPL040 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	13	17	17	--	--	12	--	--	
		in.lb	115	150	150	--	--	106	--	--	
Emergency Stop Torque	$T_{2Max}$	Nm	26	34	34	--	--	24	--	--	
		in.lb	230	301	301	--	--	212	--	--	
Maximum Acceleration Torque	$T_{2a}$	Nm	23.4	30.6	30.6	--	--	21.6	--	--	
		in.lb	207	271	271	--	--	191	--	--	
Maximum Torque	$T_{2a}$	Nm	26	34	34	--	--	24	--	--	
		in.lb	230	301	301	--	--	212	--	--	
Permitted Average Input Speed	$n_{1a}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.022	0.019	0.017	--	--	0.017	--	--	
		in.lb	0.19	0.17	0.15	--	--	0.15	--	--	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>r</sub>	86.5								
Maximum Axial Load	$F_{2GMax}$	N	250								
		lb <sub>a</sub>	56.2								
Max. Tilting Moment	$M_{2Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.031	0.022	0.019	--	--	0.017	--	--	
Operating Noise Level	$L_{Pa}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.4								
		lb <sub>m</sub>	0.88								

SPL040 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	16	16	16	17	17	17	17	13	
		in.lb	142	142	142	150	150	150	150	115	
Emergency Stop Torque	$T_{2Max}$	Nm	32	32	32	34	34	34	34	26	
		in.lb	283	283	283	301	301	301	301	230	
Maximum Acceleration Torque	$T_{2a}$	Nm	28.8	28.8	28.8	30.6	30.6	30.6	30.6	23.4	
		in.lb	255	255	255	271	271	271	271	207	
Maximum Torque	$T_{2a}$	Nm	32	32	32	34	34	34	34	26	
		in.lb	283	283	283	301	301	301	301	230	
Permitted Average Input Speed	$n_{1a}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.019	0.017	0.019	0.017	0.017	0.017	0.017	0.017	
		in.lb	0.17	0.15	0.17	0.15	0.15	0.15	0.15	0.15	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>r</sub>	86.5								
Maximum Axial Load	$F_{2GMax}$	N	250								
		lb <sub>a</sub>	56.2								
Max. Tilting Moment	$M_{2Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.031	0.029	0.023	0.022	0.019	0.019	0.017	0.016	
Operating Noise Level	$L_{Pa}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.5								
		lb <sub>m</sub>	1.1								

SPL040 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	17	17	17	17	17	17	17	13	
		in.lb	150	150	150	150	150	150	150	115	
Emergency Stop Torque	$T_{2Max}$	Nm	34	34	34	34	34	34	34	26	
		in.lb	301	301	301	301	301	301	301	230	
Maximum Acceleration Torque	$T_{2a}$	Nm	30.6	30.6	30.6	30.6	30.6	30.6	30.6	23.4	
		in.lb	271	271	271	271	271	271	271	207	
Maximum Torque	$T_{2a}$	Nm	34	34	34	34	34	34	34	26	
		in.lb	301	301	301	301	301	301	301	230	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	
		in.lb	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 17								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>f</sub>	86.5								
Maximum Axial Load	$F_{20Max}$	N	250								
		lb <sub>f</sub>	56.2								
Max. Tilting Moment	$M_{20Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.029	0.019	0.019	0.029	0.016	0.016	0.016	0.016	
Operating Noise Level	$L_{PA}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.6								
		lb <sub>m</sub>	1.32								

SPL060 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	28	36	37	37	37	32	30	25	
		in.lb	248	319	327	327	327	283	266	221	
Emergency Stop Torque	$T_{2Max}$	Nm	56	72	74	74	74	64	60	50	
		in.lb	496	637	655	655	655	566	531	443	
Maximum Acceleration Torque	$T_{2a}$	Nm	50.4	64.8	66.6	66.6	66.6	57.6	54	45	
		in.lb	446	574	589	589	589	510	478	398	
Maximum Torque	$T_{2a}$	Nm	56	72	74	74	74	64	60	50	
		in.lb	496	637	655	655	655	566	531	443	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{20Max}$	N	430								
		lb <sub>f</sub>	96.7								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	72								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.065	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1								
		lb <sub>m</sub>	2.2								

SPL060 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	30	31	42	42	42	42	42	33	
		in.lb	266	274	372	372	372	372	372	292	
Emergency Stop Torque	$T_{2Max}$	Nm	60	62	84	84	84	84	84	66	
		in.lb	531	549	743	743	743	743	743	584	
Maximum Acceleration Torque	$T_{2a}$	Nm	54	55.8	75.6	75.6	75.6	75.6	75.6	59.4	
		in.lb	478	494	669	669	669	669	669	526	
Maximum Torque	$T_{2a}$	Nm	60	62	84	84	84	84	84	66	
		in.lb	531	549	743	743	743	743	743	584	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{2Max}$	N	430								
		lb <sub>f</sub>	96.7								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	72								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.2								
		lb <sub>m</sub>	2.65								

SPL060 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	42	42	42	42	42	42	42	33	
		in.lb	372	372	372	372	372	372	372	292	
Emergency Stop Torque	$T_{2Max}$	Nm	84	84	84	84	84	84	84	66	
		in.lb	743	743	743	743	743	743	743	584	
Maximum Acceleration Torque	$T_{2a}$	Nm	75.6	75.6	75.6	75.6	75.6	75.6	75.6	59.4	
		in.lb	669	669	669	669	669	669	669	526	
Maximum Torque	$T_{2a}$	Nm	84	84	84	84	84	84	84	66	
		in.lb	743	743	743	743	743	743	743	584	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{20Max}$	N	430								
		lb <sub>f</sub>	96.7								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	72								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.4								
		lb <sub>m</sub>	3.09								



SPL070 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1a}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.6								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.065	0.065	0.065	
Operating Noise Level	$L_{Pa}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.4								
		lb <sub>m</sub>	3.09								

SPL070 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1a}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{20Max}$	N	550								
		lb <sub>f</sub>	123.6								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{Pa}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2								
		lb <sub>m</sub>	4.4								

SPL070 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	38	
		in.lb	398	398	398	398	398	398	398	336	
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	68.4	
		in.lb	717	717	717	717	717	717	717	605	
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.6								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	m	kg	2.4								
		lb <sub>m</sub>	5.29								

SPL080 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	75	90	95	85	82	80	78	65	
		in.lb	664	797	841	752	726	708	690	575	
Emergency Stop Torque	$T_{2Max}$	Nm	150	180	190	170	164	160	156	130	
		in.lb	1328	1593	1682	1505	1452	1416	1381	1151	
Maximum Acceleration Torque	$T_{2a}$	Nm	135	162	171	153	147.6	144	140.4	117	
		in.lb	1195	1434	1513	1354	1306	1275	1243	1036	
Maximum Torque	$T_{2a}$	Nm	150	180	190	170	164	160	156	130	
		in.lb	1328	1593	1682	1505	1452	1416	1381	1151	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.9								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.4								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	m	kg	2								
		lb <sub>m</sub>	4.41								

SPL080 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	80	90	90	90	90	90	90	80	
		in.lb	708	797	797	797	797	797	797	708	
Emergency Stop Torque	$T_{2Max}$	Nm	160	180	180	180	180	180	180	160	
		in.lb	1416	1593	1593	1593	1593	1593	1593	1416	
Maximum Acceleration Torque	$T_{2a}$	Nm	144	162	162	162	162	162	162	144	
		in.lb	1275	1434	1434	1434	1434	1434	1434	1275	
Maximum Torque	$T_{2a}$	Nm	160	180	180	180	180	180	180	160	
		in.lb	1416	1593	1593	1593	1593	1593	1593	1416	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.9								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.4								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.39	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.8								
		lb <sub>m</sub>	6.17								

SPL080 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	95	95	95	95	95	95	95	82	
		in.lb	841	841	841	841	841	841	841	726	
Emergency Stop Torque	$T_{2Max}$	Nm	190	190	190	190	190	190	190	164	
		in.lb	1682	1682	1682	1682	1682	1682	1682	1452	
Maximum Acceleration Torque	$T_{2a}$	Nm	171	171	171	171	171	171	171	147.6	
		in.lb	1513	1513	1513	1513	1513	1513	1513	1306	
Maximum Torque	$T_{2a}$	Nm	190	190	190	190	190	190	190	164	
		in.lb	1682	1682	1682	1682	1682	1682	1682	1452	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.9								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.4								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.5								
		lb <sub>m</sub>	7.72								

SPL090 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.3								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.1								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.7								
		lb <sub>m</sub>	5.95								

SPL090 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	105	110	110	110	110	110	95
		in.lb	885	885	929	974	974	974	974	974	841
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	210	220	220	220	220	220	190
		in.lb	1770	1770	1859	1947	1947	1947	1947	1947	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	189	198	198	198	198	198	171
		in.lb	1593	1593	1673	1752	1752	1752	1752	1752	1513
Maximum Torque	$T_{2a}$	Nm	200	200	210	220	220	220	220	220	190
		in.lb	1770	1770	1859	1947	1947	1947	1947	1947	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.3								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.1								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.8								
		lb <sub>m</sub>	8.38								

SPL090 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	95	
		in.lb	1062	1062	1062	1062	1062	1062	1062	841	
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	171	
		in.lb	1912	1912	1912	1912	1912	1912	1912	1513	
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2Max}$	N	1020								
		lb <sub>f</sub>	229.3								
Maximum Axial Load	$F_{20Max}$	N	570								
		lb <sub>f</sub>	128.1								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	5								
		lb <sub>m</sub>	11.02								

SPL120 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1	0.95	0.85	0.81	0.78	0.78	0.78	0.78	
		in.lb	8.85	8.41	7.52	7.17	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2Max}$	N	2070								
		lb <sub>f</sub>	465.3								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.1								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	6.5								
		lb <sub>m</sub>	14.33								

SPL120 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	220	230	255	255	250	210	
		in.lb	1859	1859	1947	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	440	460	510	510	500	420	
		in.lb	3717	3717	3894	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	396	414	459	459	450	378	
		in.lb	3346	3346	3505	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	440	460	510	510	500	420	
		in.lb	3717	3717	3894	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.85	0.95	0.85	0.85	0.78	0.78	0.78	
		in.lb	8.41	7.52	8.41	7.52	7.52	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2Max}$	N	2070								
		lb <sub>f</sub>	465.3								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.1								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	9.5								
		lb <sub>m</sub>	20.94								

SPL120 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.85	0.85	0.85	0.78	0.78	0.78	0.78	0.78	
		in.lb	7.52	7.52	7.52	6.90	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{20Max}$	N	2070								
		lb <sub>f</sub>	465.3								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.1								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	11								
		lb <sub>m</sub>	24.25								

SPL160 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.55	2.45	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	22.57	21.68	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2Max}$	N	7300								
		lb <sub>f</sub>	1641.0								
Maximum Axial Load	$F_{20Max}$	N	6400								
		lb <sub>f</sub>	1438.7								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	15.5								
		lb <sub>m</sub>	34.17								

SPL160 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2Max}$	N	7300								
		lb <sub>f</sub>	1641.0								
Maximum Axial Load	$F_{20Max}$	N	6400								
		lb <sub>f</sub>	1438.7								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	28								
		lb <sub>m</sub>	61.73								

SPL160 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094.4	1094.4	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2Max}$	N	7300								
		lb <sub>r</sub>	1641.0								
Maximum Axial Load	$F_{20Max}$	N	6400								
		lb <sub>a</sub>	1438.7								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	30.5								
		lb <sub>m</sub>	67.24								

SPL205 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.3	3.15	3	3	3	3	3	
		in.lb	30.98	29.21	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>r</sub>	2697.6								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>a</sub>	1528.6								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	31								
		lb <sub>m</sub>	68.34								



SPL205 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	650	650	800	1000	1000	1050	1000	800	
		in.lb	5753	5753	7081	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	1300	1300	1600	2000	2000	2100	2000	1600	
		in.lb	11506	11506	14161	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1170	1170	1440	1800	1800	1890	1800	1440	
		in.lb	10355	10355	12745	15931	15931	16728	15931	12745	
Maximum Torque	$T_{2a}$	Nm	1300	1300	1600	2000	2000	2100	2000	1600	
		in.lb	11506	11506	14161	17701	17701	18586	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>f</sub>	2697.6								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.6								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	39								
		lb <sub>m</sub>	85.98								

SPL205 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1000	1000	1000	1000	1000	1000	1000	800	
		in.lb	8851	8851	8851	8851	8851	8851	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1800	1440	
		in.lb	15931	15931	15931	15931	15931	15931	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{20Max}$	N	12000								
		lb <sub>f</sub>	2697.6								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.6								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140	7.140	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	48								
		lb <sub>m</sub>	105.82								

SPL235 1-stage

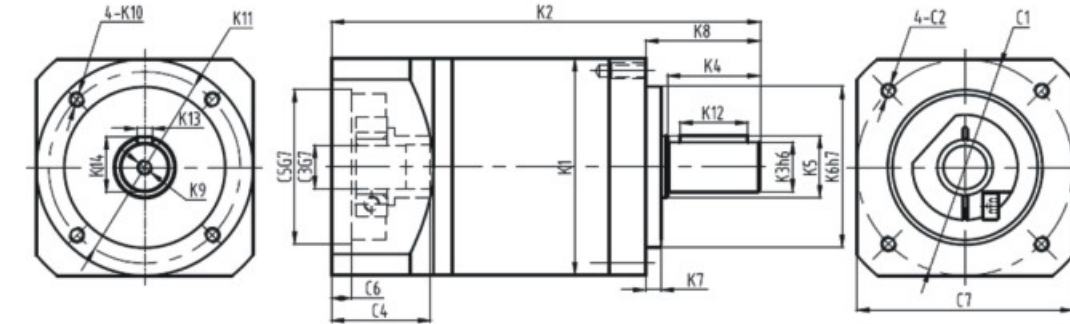
		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	1000	1600	1850	1650	1550	1350	1300	1300	
		in.lb	8851	14161	16374	14604	13719	11948	11506	11506	
Emergency Stop Torque	$T_{2Nst}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	2880	3330	2970	2790	2430	2340	2340	
		in.lb	15931	25490	29473	26287	24693	21507	20711	20711	
Maximum Torque	$T_{2a}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	5.2	5	4.85	4.67	4.67	4.67	4.67	4.67	
		in.lb	46.02	44.25	42.93	41.33	41.33	41.33	41.33	41.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2AMax}$	N	14000								
		lb <sub>f</sub>	3147.2								
Maximum Axial Load	$F_{2OMax}$	N	7800								
		lb <sub>f</sub>	1753.4								
Max. Tilting Moment	$M_{2OMax}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	69.610	54.370	53.270	50.840	50.840	50.840	50.840	50.560	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	53								
		lb <sub>m</sub>	116.84								

SPL235 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	1000	1000	1100	1850	1850	1800	1850	1350	
		in.lb	8851	8851	9736	16374	16374	15931	16374	11948	
Emergency Stop Torque	$T_{2Nst}$	Nm	2000	2000	2200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	19472	32748	32748	31863	32748	23897	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1980	3330	3330	3240	3330	2430	
		in.lb	15931	15931	17524	29473	29473	28676	29473	21507	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	19472	32748	32748	31863	32748	23897	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	3.3	3.15	3.3	3.15	3.15	3	3	3	
		in.lb	29.21	27.88	29.21	27.88	27.88	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2AMax}$	N	14000								
		lb <sub>f</sub>	3147.2								
Maximum Axial Load	$F_{2OMax}$	N	7800								
		lb <sub>f</sub>	1753.4								
Max. Tilting Moment	$M_{2OMax}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	59.610	48.610	23.670	22.750	22.750	22.590	22.590	22.590	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	66								
		lb <sub>m</sub>	145.50								

SPL235 3-stages

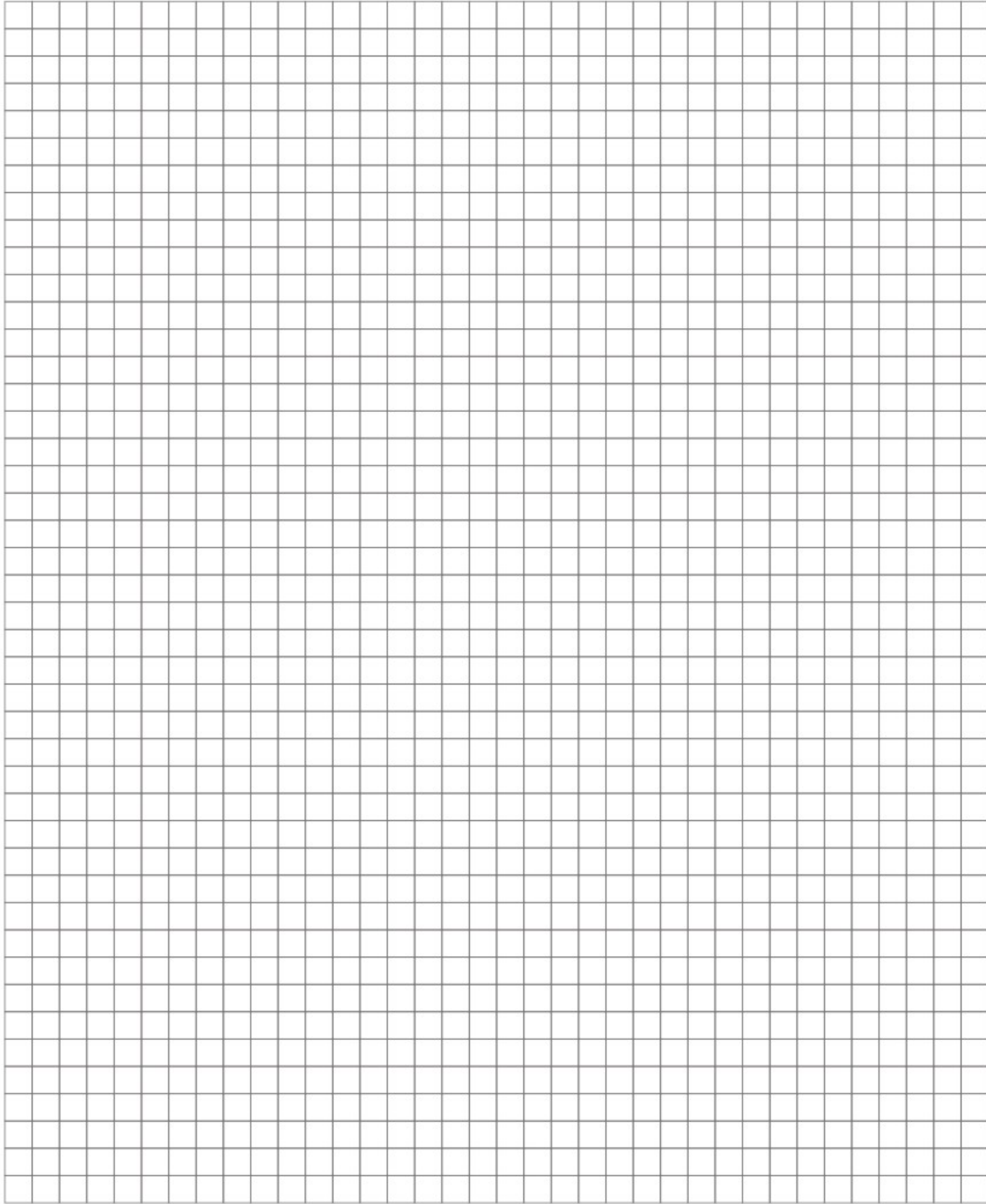
		3-stages									
Ratio	i	80	100	125	160	200	256	320	512		
Nominal Output Torque	Nm	1850	1850	1850	1850	1850	1850	1850	1850	1350	
	in.lb	16374	16374	16374	16374	16374	16374	16374	16374	11948	
Emergency Stop Torque	$T_{250\%}$	Nm	3700	3700	3700	3700	3700	3700	3700	2700	
	in.lb	32748	32748	32748	32748	32748	32748	32748	32748	23897	
Maximum Acceleration Torque	$T_{25}$	Nm	3330	3330	3330	3330	3330	3330	3330	2430	
	in.lb	29473	29473	29473	29473	29473	29473	29473	29473	21507	
Maximum Torque	$T_{20}$	Nm	3700	3700	3700	3700	3700	3700	3700	2700	
	in.lb	32748	32748	32748	32748	32748	32748	32748	32748	23897	
Permitted Average Input Speed	$n_{1M}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
	in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
	in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2MMax}$	N	14000								
	lb <sub>f</sub>		3147.2								
Maximum Axial Load	$F_{2CMMax}$	N	7800								
	lb <sub>f</sub>		1753.4								
Max. Tilting Moment	$M_{2CMMax}$	Nm	2350								
	in.lb		20799.15								
Mass Moment of Inertia	$J_1$	kgcm <sup>2</sup>	22.750	22.590	22.750	22.750	22.750	22.750	22.750	22.590	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	75								
		lb <sub>m</sub>	165.35								



Model	SPL040			SPL060			SPL070			SPL080			SPL090			SPL120			SPL160			SPL205			SPL235		
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
K1	φ40	φ60	φ70	φ80	φ89	φ115.5	φ160	φ205	φ235	φ1.575	φ2.36	φ2.76	φ3.15	φ3.5	φ4.55	φ6.3	φ8.07	φ9.25									
K2	88.8	101.8	113.8	116.4	132	147.5	122	145.7	169.4	147	169	191	149	180.3	211.6	198.5	233.5	268.5	275.5	336.5	356	288	348	409	357.5	402	462
	3.5	4	4.48	4.58	5.2	5.81	4.8	5.74	6.67	5.79	6.65	7.52	5.87	7.1	8.33	7.81	9.19	10.57	10.85	13.25	14.02	11.34	13.7	16.1	14.07	15.83	18.19
K3	φ10	φ14	φ14	φ20	φ20	φ25	φ40	φ55	φ75	φ0.39	φ0.55	φ0.55	φ0.79	φ0.79	φ0.98	φ1.57	φ2.17	φ2.95									
K4	23	30	30	36	36	50	80	82	105	0.91	1.18	1.18	1.42	1.42	1.97	3.15	3.23	4.14									
K5	φ12	φ17	φ17	φ25	φ25	φ35	φ50	φ60	φ85	φ0.47	φ0.67	φ0.67	φ0.98	φ0.98	φ1.38	φ1.97	φ2.36	φ3.35									
K6	φ26	φ40	φ40	φ60	φ60	φ80	φ130	φ160	φ180	φ1.02	φ1.57	φ1.57	φ2.36	φ2.36	φ3.15	φ5.12	φ6.3	φ7.09									
K7	2	3	3	3	3	4	5	15	30	0.08	0.12	0.12	0.12	0.12	0.16	0.2	0.59	1.18									
K8	26	35	35	40	40	55	87	105	138	1.02	1.38	1.38	1.57	1.57	2.17	3.43	4.13	5.43									
K9	M3X9	M5X12	M5X12	M6X16	M6X16	M10X26	M12X25	M20X40	M20X40	K10	M4X6	M5X8	M5X12	M6X15	M6X15	M10X20	M12X25	M12X20	M16X28								
K11	φ34	φ52	φ52	φ70	φ70	φ100	φ145	φ184	φ210	K12	φ1.34	φ2.05	φ2.05	φ2.76	φ2.76	φ3.94	φ5.71	φ7.24	φ8.27								
K12	16	22	22	28	28	40	70	70	90	K13	0.63	0.87	0.87	1.1	1.1	1.57	2.76	2.76	3.54								
K13	3	5	5	6	6	8	12	16	20	K14	0.12	0.2	0.2	0.24	0.24	0.31	0.47	0.63	0.79								
K14	11.2	16	16	22.5	22.5	28	43	59	79.5		0.44	0.63	0.63	0.89	0.89	1.1	1.69	2.32	3.13								
C1	φ46	φ70	φ70	φ90	φ90	φ145	φ200	φ215	φ200		φ1.81	φ2.76	φ2.76	φ3.54	φ3.54	φ5.71	φ7.87	φ8.46	φ9.25	φ9.25	φ8.46	φ7.87					
C2	M4X10	M5X12	M5X12	M6X15	M6X15	M8X20	M12X25	M8X20	M12X25		C3	φ8	φ14	φ14	φ19	φ19	φ24	φ35	φ24	φ42	φ35	φ55	φ42	φ35			
C3	φ0.31	φ0.55	φ0.55	φ0.75	φ0.75	φ0.94	φ1.38	φ0.94	φ1.65		C4	26.1	31.5	32.1	41.6	41.6	56.5	82	61.3	82.5	82	115.5	82.5	82			
C4	1.03	1.24	1.26	1.64	1.64	2.22	3.23	2.41	3.25		C5	φ30	φ50	φ50	φ70	φ70	φ110	φ114.3	φ110	φ180	φ114.3	φ200	φ180	φ114.3			
C5	φ1.18	φ1.97	φ1.97	φ2.76	φ2.76	φ4.33	φ4.5	φ4.33	φ7.09		C6	6	6.5	6.5	6.5	6.5	8	8	6.5	8	8	8	8	8	8	8	8
C6	0.24	0.26	0.26	0.26	0.26	0.31	0.31	0.26	0.31		C7	45	60	70	80	89	120	175	120	190	175	220	190	175			
C7	1.77	2.36	2.76	3.15	3.5	4.72	6.89	4.72	7.48																		

The dimensions modified as per the applied motor flanges.  
You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: [www.kofon-motion.com](http://www.kofon-motion.com)

Technical Memo

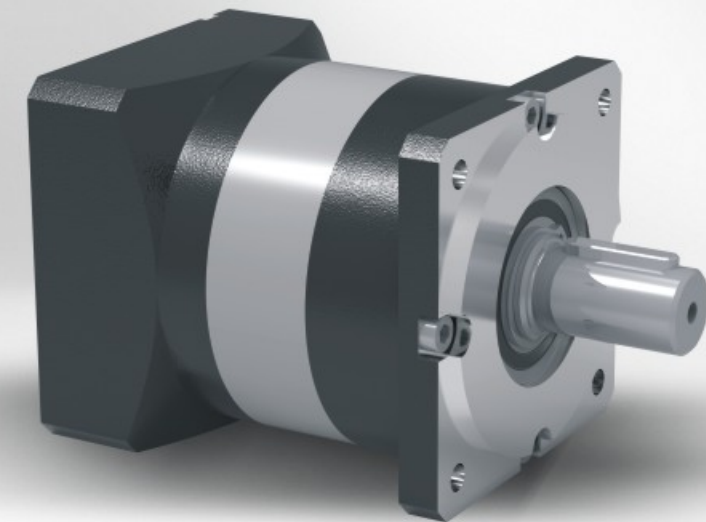


# SPLF

Powerful. Precision. Reliable

▶ Servo Planetary Gearbox

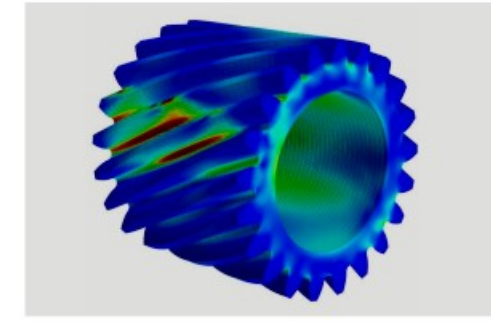
Valued Gearbox Solution





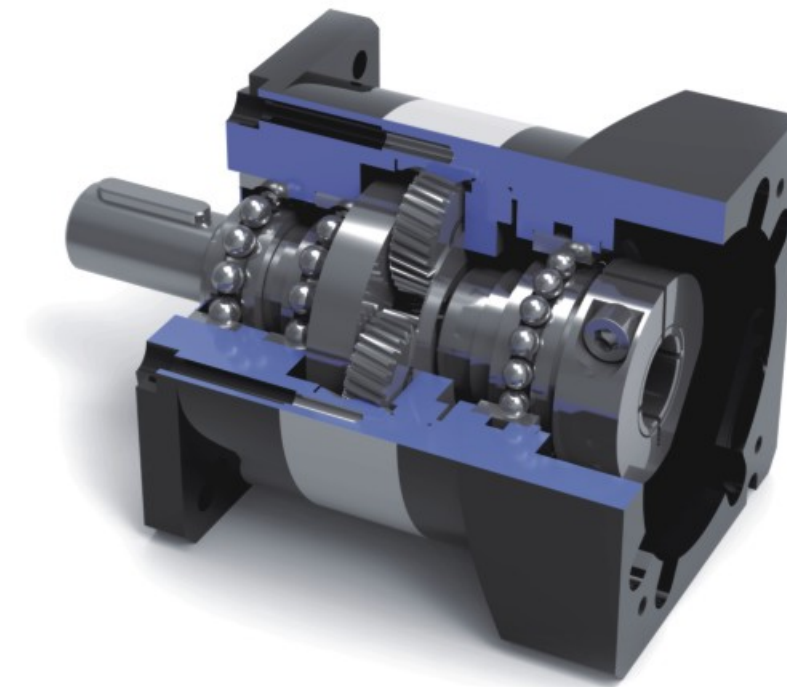
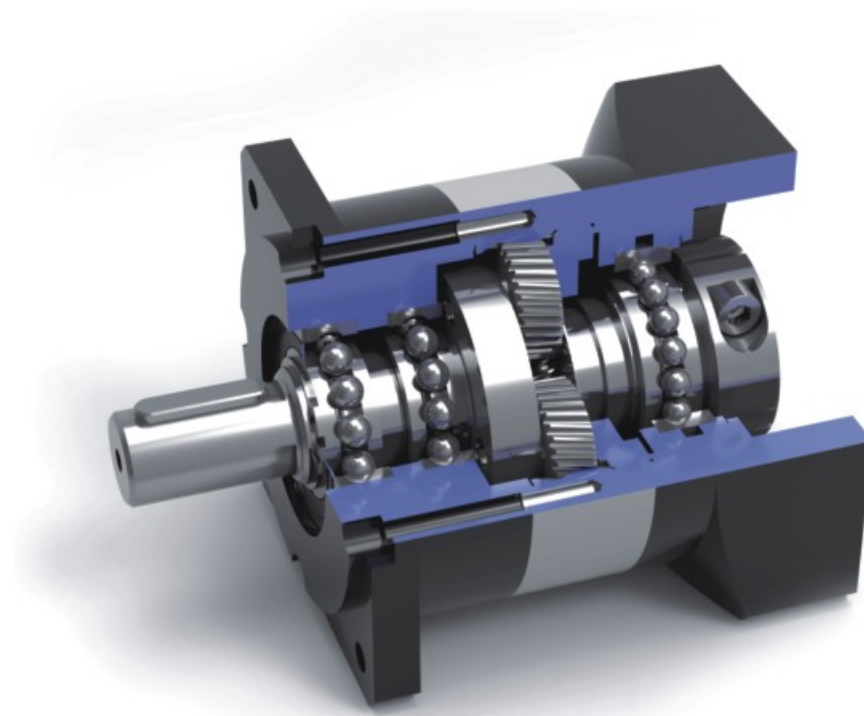
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%.The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



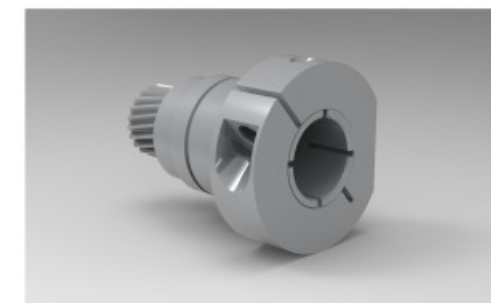
**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SPLF040 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	13	17	17	--	--	12	--	--	
		in.lb	115	150	150	--	--	106	--	--	
Emergency Stop Torque	$T_{2Max}$	Nm	26	34	34	--	--	24	--	--	
		in.lb	230	301	301	--	--	212	--	--	
Maximum Acceleration Torque	$T_{2a}$	Nm	23.4	30.6	30.6	--	--	21.6	--	--	
		in.lb	207	271	271	--	--	191	--	--	
Maximum Torque	$T_{2a}$	Nm	26	34	34	--	--	24	--	--	
		in.lb	230	301	301	--	--	212	--	--	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.022	0.019	0.017	--	--	0.017	--	--	
		in.lb	0.19	0.17	0.15	--	--	0.15	--	--	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>r</sub>	86.5								
Maximum Axial Load	$F_{20Max}$	N	250								
		lb <sub>a</sub>	56.2								
Max. Tilting Moment	$M_{20Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.031	0.022	0.019	--	--	0.017	--	--	
Operating Noise Level	$L_{PA}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.45								
		lb <sub>m</sub>	0.99								

SPLF040 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	16	16	16	17	17	17	17	13	
		in.lb	142	142	142	150	150	150	150	115	
Emergency Stop Torque	$T_{2Max}$	Nm	32	32	32	34	34	34	34	26	
		in.lb	283	283	283	301	301	301	301	230	
Maximum Acceleration Torque	$T_{2a}$	Nm	28.8	28.8	28.8	30.6	30.6	30.6	30.6	23.4	
		in.lb	255	255	255	271	271	271	271	207	
Maximum Torque	$T_{2a}$	Nm	32	32	32	34	34	34	34	26	
		in.lb	283	283	283	301	301	301	301	230	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.019	0.017	0.019	0.017	0.017	0.017	0.017	0.017	
		in.lb	0.17	0.15	0.17	0.15	0.15	0.15	0.15	0.15	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>r</sub>	86.5								
Maximum Axial Load	$F_{20Max}$	N	250								
		lb <sub>a</sub>	56.2								
Max. Tilting Moment	$M_{20Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.031	0.029	0.023	0.022	0.019	0.019	0.017	0.016	
Operating Noise Level	$L_{PA}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.55								
		lb <sub>m</sub>	1.21								

SPLF040 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	17	17	17	17	17	17	17	13	
		in.lb	150	150	150	150	150	150	150	115	
Emergency Stop Torque	$T_{2Max}$	Nm	34	34	34	34	34	34	34	26	
		in.lb	301	301	301	301	301	301	301	230	
Maximum Acceleration Torque	$T_{2a}$	Nm	30.6	30.6	30.6	30.6	30.6	30.6	30.6	23.4	
		in.lb	271	271	271	271	271	271	271	207	
Maximum Torque	$T_{2a}$	Nm	34	34	34	34	34	34	34	26	
		in.lb	301	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	8000								
Mean No Load Running Torque	$T_{012}$	Nm	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	
		in.lb	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 17								
Torsional Rigidity	$C_{21}$	Nm/arcmin	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		in.lb/arcmin	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	
Maximum Radial Load	$F_{2Max}$	N	385								
		lb <sub>f</sub>	86.5								
Maximum Axial Load	$F_{20Max}$	N	250								
		lb <sub>f</sub>	56.2								
Max. Tilting Moment	$M_{20Max}$	Nm	30								
		in.lb	265.52								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.029	0.019	0.019	0.029	0.016	0.016	0.016	0.016	
Operating Noise Level	$L_{PA}$	dB(A)	< 55								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	0.65								
		lb <sub>m</sub>	1.43								

SPLF060 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	28	36	37	37	37	32	30	25	
		in.lb	248	319	327	327	327	283	266	221	
Emergency Stop Torque	$T_{2Max}$	Nm	56	72	74	74	74	64	60	50	
		in.lb	496	637	655	655	655	566	531	443	
Maximum Acceleration Torque	$T_{2a}$	Nm	50.4	64.8	66.6	66.6	66.6	57.6	54	45	
		in.lb	446	574	589	589	589	510	478	398	
Maximum Torque	$T_{2a}$	Nm	56	72	74	74	74	64	60	50	
		in.lb	496	637	655	655	655	566	531	443	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{20Max}$	N	430								
		lb <sub>f</sub>	96.66								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	71.94								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.065	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.1								
		lb <sub>m</sub>	2.43								

SPLF060 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	30	31	42	42	42	42	42	33	
		in.lb	266	274	372	372	372	372	372	292	
Emergency Stop Torque	$T_{2Max}$	Nm	60	62	84	84	84	84	84	66	
		in.lb	531	549	743	743	743	743	743	584	
Maximum Acceleration Torque	$T_{2a}$	Nm	54	55.8	75.6	75.6	75.6	75.6	75.6	59.4	
		in.lb	478	494	669	669	669	669	669	526	
Maximum Torque	$T_{2a}$	Nm	60	62	84	84	84	84	84	66	
		in.lb	531	549	743	743	743	743	743	584	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{2Max}$	N	430								
		lb <sub>f</sub>	96.66								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	71.94								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.056								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.25								
		lb <sub>m</sub>	2.76								

SPLF060 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	42	42	42	42	42	42	42	33	
		in.lb	372	372	372	372	372	372	372	292	
Emergency Stop Torque	$T_{2Max}$	Nm	84	84	84	84	84	84	84	66	
		in.lb	743	743	743	743	743	743	743	584	
Maximum Acceleration Torque	$T_{2a}$	Nm	75.6	75.6	75.6	75.6	75.6	75.6	75.6	59.4	
		in.lb	669	669	669	669	669	669	669	526	
Maximum Torque	$T_{2a}$	Nm	84	84	84	84	84	84	84	66	
		in.lb	743	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		in.lb/arcmin	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	
Maximum Radial Load	$F_{20Max}$	N	430								
		lb <sub>f</sub>	96.66								
Maximum Axial Load	$F_{20Max}$	N	320								
		lb <sub>f</sub>	71.94								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.5								
		lb <sub>m</sub>	3.31								



SPLF070 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.650	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.5								
		lb <sub>m</sub>	3.31								

SPLF070 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.1								
		lb <sub>m</sub>	4.63								

SPLF070 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	38	
		in.lb	398	398	398	398	398	398	398	336	
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	68.4	
		in.lb	717	717	717	717	717	717	717	605	
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.3								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	2.5								
		lb <sub>m</sub>	5.51								

SPLF080 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	75	90	95	85	82	80	78	65	
		in.lb	664	797	841	752	726	708	690	575	
Emergency Stop Torque	$T_{2Max}$	Nm	150	180	190	170	164	160	156	130	
		in.lb	1328	1593	1682	1505	1452	1416	1381	1151	
Maximum Acceleration Torque	$T_{2a}$	Nm	135	162	171	153	147.6	144	140.4	117	
		in.lb	1195	1434	1513	1354	1306	1275	1243	1036	
Maximum Torque	$T_{2a}$	Nm	150	180	190	170	164	160	156	130	
		in.lb	1328	1593	1682	1505	1452	1416	1381	1151	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.87								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.42								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	2.2								
		lb <sub>m</sub>	4.85								

SPLF080 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	80	90	90	90	90	90	90	80	
		in.lb	708	797	797	797	797	797	797	708	
Emergency Stop Torque	$T_{2Max}$	Nm	160	180	180	180	180	180	180	160	
		in.lb	1416	1593	1593	1593	1593	1593	1593	1416	
Maximum Acceleration Torque	$T_{2a}$	Nm	144	162	162	162	162	162	162	144	
		in.lb	1275	1434	1434	1434	1434	1434	1434	1275	
Maximum Torque	$T_{2a}$	Nm	160	180	180	180	180	180	180	160	
		in.lb	1416	1593	1593	1593	1593	1593	1593	1416	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.87								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.42								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3								
		lb <sub>m</sub>	6.61								

SPLF080 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	95	95	95	95	95	95	95	82	
		in.lb	841	841	841	841	841	841	841	726	
Emergency Stop Torque	$T_{2Max}$	Nm	190	190	190	190	190	190	190	164	
		in.lb	1682	1682	1682	1682	1682	1682	1682	1452	
Maximum Acceleration Torque	$T_{2a}$	Nm	171	171	171	171	171	171	171	147.6	
		in.lb	1513	1513	1513	1513	1513	1513	1513	1306	
Maximum Torque	$T_{2a}$	Nm	190	190	190	190	190	190	190	164	
		in.lb	1682	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4	4	4	4	4	4	4	4	
		in.lb/arcmin	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	
Maximum Radial Load	$F_{2Max}$	N	640								
		lb <sub>f</sub>	143.87								
Maximum Axial Load	$F_{20Max}$	N	420								
		lb <sub>f</sub>	94.42								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.7								
		lb <sub>m</sub>	8.16								

SPLF090 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.9								
		lb <sub>m</sub>	6.39								

SPLF090 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	110	110	110	110	110	110	95
		in.lb	885	885	974	974	974	974	974	974	841
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	198	198	198	198	198	198	171
		in.lb	1593	1593	1752	1752	1752	1752	1752	1752	1513
Maximum Torque	$T_{2a}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.31	0.25	0.25	0.25
		in.lb	3.19	2.74	3.19	2.74	2.74	2.74	2.21	2.21	2.21
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.39	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	4								
		lb <sub>m</sub>	8.82								

SPLF090 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	95	
		in.lb	1062	1062	1062	1062	1062	1062	1062	841	
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	171	
		in.lb	1912	1912	1912	1912	1912	1912	1912	1513	
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	797	797	797	797	797	797	797	673	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{021}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>r</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>a</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	5.2								
		lb <sub>m</sub>	11.46								

SPLF120 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1	0.95	0.85	0.81	0.78	0.78	0.78	0.78	
		in.lb	8.85	8.41	7.52	7.17	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{021}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>r</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>a</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	7								
		lb <sub>m</sub>	15.43								

SPLF120 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	230	230	255	255	250	210	
		in.lb	1859	1859	2036	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	414	414	459	459	450	378	
		in.lb	3346	3346	3664	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.85	0.95	0.85	0.85	0.78	0.78	0.78	
		in.lb	8.41	7.52	8.41	7.52	7.52	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	10								
		lb <sub>m</sub>	22.05								

SPLF120 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.85	0.85	0.85	0.78	0.78	0.78	0.78	0.78	
		in.lb	7.52	7.52	7.52	6.90	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	11.5								
		lb <sub>m</sub>	25.35								

SPLF160 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.55	2.45	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	22.57	21.68	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	17.5								
		lb <sub>m</sub>	38.58								

SPLF160 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015	1094	1094	1094	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	30								
		lb <sub>m</sub>	66.14								

SPLF160 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094	1094	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{021}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	32.5								
		lb <sub>m</sub>	71.65								

SPLF205 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.3	3.15	3	3	3	3	3	
		in.lb	30.98	29.21	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{021}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	32								
		lb <sub>m</sub>	70.55								



SPLF205 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	650	650	1050	1000	1000	1050	1000	800	
		in.lb	5753	5753	9293	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1170	1170	1890	1800	1800	1890	1800	1440	
		in.lb	10355	10355	16728	15931	15931	16728	15931	12745	
Maximum Torque	$T_{2a}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Permitted Average Input Speed	$n_{in}$	rpm	2000								
Maximum Input Speed	$n_{inMax}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	40								
		lb <sub>m</sub>	88.18								

SPLF205 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1000	1000	1000	1000	1000	1000	1000	800	
		in.lb	8851	8851	8851	8851	8851	8851	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1800	1440	
		in.lb	15931	15931	15931	15931	15931	15931	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Permitted Average Input Speed	$n_{in}$	rpm	2000								
Maximum Input Speed	$n_{inMax}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{20Max}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140	7.140	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	49								
		lb <sub>m</sub>	108.03								

SPLF235 1-stage

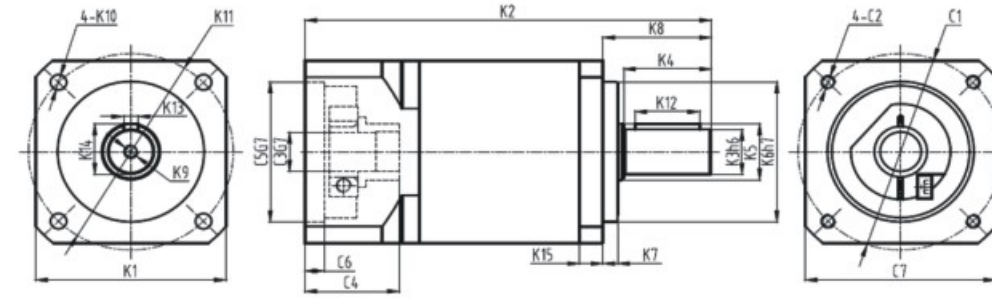
		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	1000	1600	1850	1650	1550	1350	1300	1300	
		in.lb	8851	14161	16374	14604	13719	11948	11506	11506	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	2880	3330	2970	2790	2430	2340	2340	
		in.lb	15931	25490	29473	26287	24693	21507	20711	20711	
Maximum Torque	$T_{2a}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	5.2	5	4.85	4.67	4.67	4.67	4.67	4.67	
		in.lb	46.02	44.25	42.93	41.33	41.33	41.33	41.33	41.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2Max}$	N	14000								
		lb <sub>f</sub>	3147.20								
Maximum Axial Load	$F_{20Max}$	N	7800								
		lb <sub>f</sub>	1753.44								
Max. Tilting Moment	$M_{20Max}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	69.610	54.370	53.270	50.840	50.840	50.840	50.840	50.560	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	54								
		lb <sub>m</sub>	119.05								

SPLF235 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	1000	1000	1600	1850	1850	1800	1850	1350	
		in.lb	8851	8851	14161	16374	16374	15931	16374	11948	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	3200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	28322	32748	32748	31863	32748	23897	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	2880	3330	3330	3240	3330	2430	
		in.lb	15931	15931	25490	29473	29473	28676	29473	21507	
Maximum Torque	$T_{2a}$	Nm	2000	2000	3200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	28322	32748	32748	31863	32748	23897	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	3.3	3.15	3.3	3.15	3.15	3	3	3	
		in.lb	29.21	27.88	29.21	27.88	27.88	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{20Max}$	N	14000								
		lb <sub>f</sub>	3147.20								
Maximum Axial Load	$F_{20Max}$	N	7800								
		lb <sub>f</sub>	1753.44								
Max. Tilting Moment	$M_{20Max}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	59.610	48.610	23.670	22.750	22.750	22.590	22.590	22.590	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	67								
		lb <sub>m</sub>	147.71								

SPLF235 3-stages

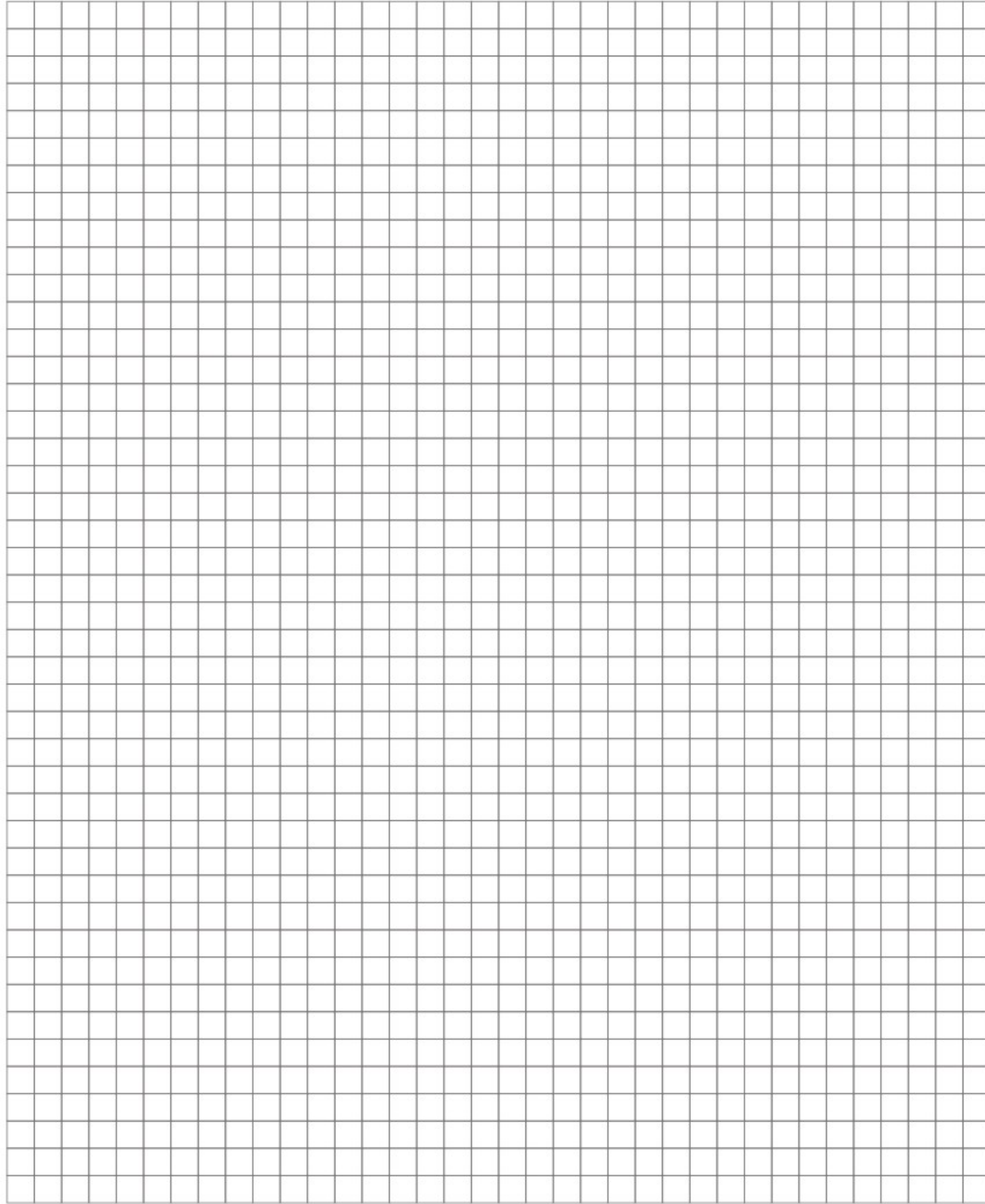
		3-stages									
Ratio	i	80	100	125	160	200	256	320	512		
Nominal Output Torque	Nm	1850	1850	1850	1850	1850	1850	1850	1350		
	in.lb	16374	16374	16374	16374	16374	16374	16374	11948		
Emergency Stop Torque	$T_{2Max}$	Nm	3700	3700	3700	3700	3700	3700	2700		
	in.lb		32748	32748	32748	32748	32748	32748	23897		
Maximum Acceleration Torque	$T_{2a}$	Nm	3330	3330	3330	3330	3330	3330	2430		
	in.lb		29473	29473	29473	29473	29473	29473	21507		
Maximum Torque	$T_{2a}$	Nm	3700	3700	3700	3700	3700	3700	2700		
	in.lb		32748	32748	32748	32748	32748	32748	23897		
Permitted Average Input Speed	$n_{1M}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2		
	in.lb		20.36	20.36	20.36	19.47	19.47	19.47	19.47		
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{D21}$	Nm/arcmin	200	200	200	200	200	200	200		
	in.lb/arcmin		1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14		
Maximum Radial Load	$F_{2AMax}$	N	14000								
	lb <sub>f</sub>		3147.20								
Maximum Axial Load	$F_{2AMax}$	N	7800								
	lb <sub>f</sub>		1753.44								
Max. Tilting Moment	$M_{2AMax}$	Nm	2350								
	in.lb		20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	22.750	22.590	22.750	22.750	2.750	22.750	22.750		
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	93								
		°C	- 25 to +90								
Operating Temperature		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	76								
	lb <sub>m</sub>		167.55								



Model	SPLF040			SPLF060			SPLF070			SPLF080			SPLF090			SPLF120			SPLF160			SPLF205			SPLF235					
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
K1	Φ45			Φ60			Φ70			Φ80			Φ89			Φ120			Φ175			Φ210			Φ240					
	Φ1.77			Φ2.36			Φ2.76			Φ3.15			Φ3.5			Φ4.72			Φ6.89			Φ8.27			Φ9.45					
K2	88.8	101.8	113.8	116.4	132	147.5	122	145.7	169.4	147	169	191	149	180.3	211.6	198.5	233.5	268.5	275.5	336.5	356	288	348	409	357.5	402	462			
	3.5	4	4.48	4.58	5.2	5.81	4.8	5.74	6.67	5.79	6.65	7.52	5.87	7.1	8.33	7.81	9.19	10.6	10.9	13.3	14.02	11.34	13.7	16.1	14.07	15.83	18.19			
K3	Φ10			Φ14			Φ14			Φ20			Φ20			Φ25			Φ40			Φ55			Φ75					
	Φ0.39			Φ0.55			Φ0.55			Φ0.79			Φ0.79			Φ0.98			Φ1.57			Φ2.17			Φ2.95					
K4	23			30			30			36			36			50			80			82			105					
	0.91			1.18			1.18			1.42			1.42			1.97			3.15			3.23			4.14					
K5	Φ12			Φ17			Φ17			Φ25			Φ25			Φ35			Φ50			Φ60			Φ85					
	Φ0.47			Φ0.67			Φ0.67			Φ0.98			Φ0.98			Φ1.38			Φ1.97			Φ2.36			Φ3.35					
K6	Φ26			Φ50			Φ50			Φ80			Φ80			Φ110			Φ130			Φ160			Φ180					
	Φ1.02			Φ1.97			Φ1.97			Φ3.15			Φ3.15			Φ4.33			Φ5.12			Φ6.30			Φ7.09					
K7	2			3			3			3			3			4			5			15			30					
	0.08			0.12			0.12			0.12			0.12			0.16			0.2			0.59			1.18					
K8	26			35			35			40			40			55			87			105			138					
	1.02			1.38			1.38			1.57			1.57			2.17			3.43			4.13			5.43					
K9	M3X9			M5X12			M5X12			M6X16			M6X16			M10X26			M12X25			M20X40			M20X40					
K10	Φ3.5			Φ5.5			Φ5.5			Φ6.5			Φ6.5			Φ8.5			Φ11			Φ13			Φ17					
	Φ0.14			Φ0.22			0.22			Φ0.26			Φ0.26			Φ0.33			Φ0.43			Φ0.51			Φ0.67					
K11	Φ50			Φ85			Φ85			Φ100			Φ100			Φ130			Φ185			Φ230			Φ275					
	Φ1.97			Φ3.35			Φ3.35			Φ3.94			Φ3.94			Φ5.12			Φ7.28			Φ9.06			Φ10.83					
K12	16			22			22			28			28			40			70			70			90					
	0.63			0.87			0.87			1.1			1.1			1.57			2.76			2.76			3.54					
K13	3			5			5			6			6			8			12			16			20					
	0.12			0.2			0.2			0.24			0.24			0.31			0.47			0.63			0.79					
K14	11.2			16			16			22.5			22.5			28			43			59			79.5					
	0.44			0.63			0.63			0.89			0.89			1.1			1.69			2.32			3.13					
K15	6			8			8			10			10			14			15			18			18					
	0.24			0.31			0.31			0.39			0.39			0.55			0.59			0.71			0.71					
C1	Φ46			Φ70			Φ70			Φ90			Φ90			Φ145			Φ200			Φ145			Φ215			Φ200		
	Φ1.81			Φ2.76			Φ2.76			Φ3.54			Φ3.54			Φ5.71			Φ7.87			Φ5.71			Φ8.46			Φ7.87		
C2	M4X10			M5X12			M5X12			M6X15			M6X15			M8X20			M12X25			M8X20			M12X25			M12X25		
	Φ8			Φ14			Φ14			Φ19			Φ19			Φ24			Φ35			Φ24			Φ35			Φ55		
C3	Φ0.31			Φ0.55			Φ0.55			Φ0.75			Φ0.75			Φ0.94			Φ1.38			Φ0.94			Φ1.65			Φ1.38		
C4	26.1			31.5			32.1			41.6			41.6			56.5			82			61.3			82.5			82		
	1.03			1.24			1.26			1.64			1.64			2.22			3.23			2.41			3.25			3.23		
C5	Φ30			Φ50			Φ50			Φ70			Φ70			Φ110			Φ114.3			Φ110			Φ180			Φ114.3		
	Φ1.18			Φ1.97			Φ1.97			Φ2.76			Φ2.76			Φ4.33			Φ4.5			Φ4.33			Φ7.09			Φ4.5		
C6	6			6.5			6.5			6.5			6.5			8			8			8			8			8		
	0.24			0.26			0.26			0.26			0.26			0.31			0.31			0.31			0.31			0.31		
C7	45			60			70			80			89			120			175			120			190			175		
	1.77			2.36			2.76			3.15			3.5			4.72			6.89			4.72			7.48			6.89		

The dimensions modified as per the applied motor flanges.  
 You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: [www.kofon-motion.com](http://www.kofon-motion.com)

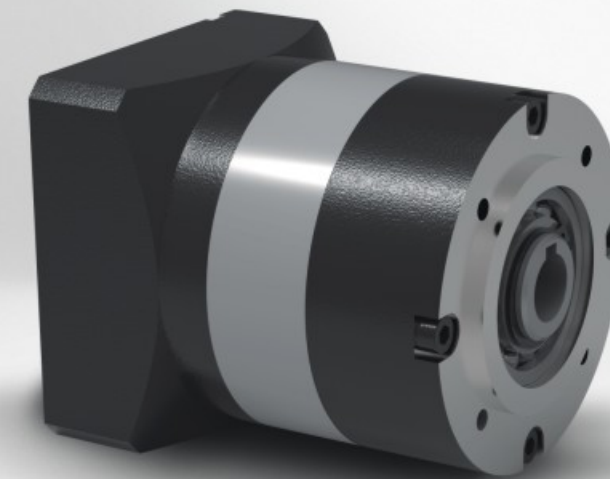
Technical Memo

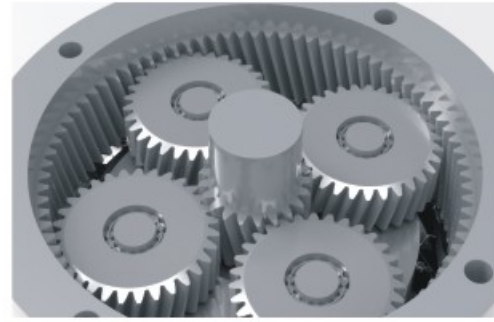


# SPLN

Powerful. Precision. Reliable

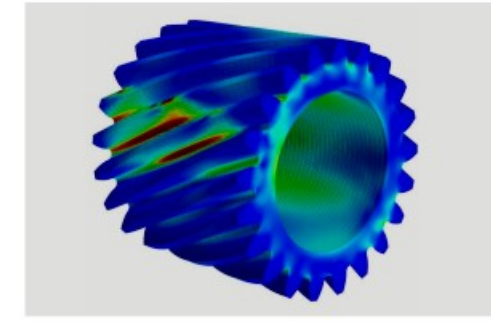
- ▶ Servo Planetary Gearbox  
Valued Gearbox Solution





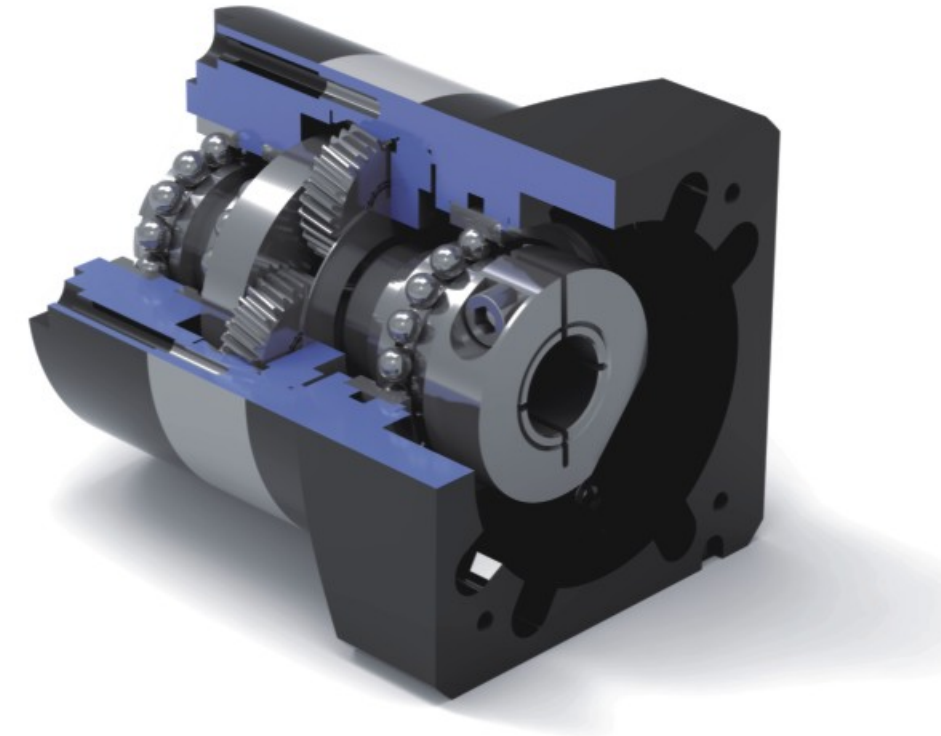
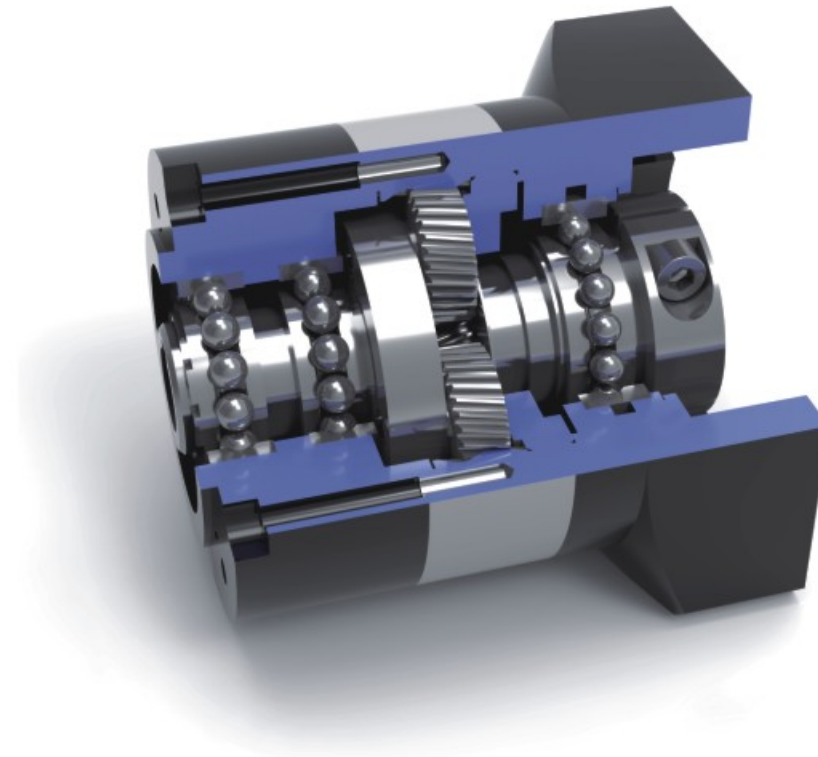
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%.The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



SPLN Series Servo Planetary Gearbox

SPLN Series Servo Planetary Gearbox



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SPLN070 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.650	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.3								
		lb <sub>m</sub>	2.86598								

SPLN070 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{20Max}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.8								
		lb <sub>m</sub>	3.97								

SPLN070 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	38	
		in.lb	398	398	398	398	398	398	398	336	
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	68	
		in.lb	717	717	717	717	717	717	717	605	
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2AMax}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{2OMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2OMax}$	Nm	80								
		in.lb	708.056								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2								
		lb <sub>m</sub>	4.4092								

SPLN090 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.4								
		lb <sub>m</sub>	5.29								

SPLN090 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	110	110	110	110	110	110	95
		in.lb	885	885	974	974	974	974	974	974	841
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	198	198	198	198	198	198	171
		in.lb	1593	1593	1752	1752	1752	1752	1752	1752	1513
Maximum Torque	$T_{2a}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	0.25
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	2.21
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48
Maximum Radial Load	$F_{2Max}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2GMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.6								
		lb <sub>m</sub>	7.94								

SPLN090 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	120	95
		in.lb	1062	1062	1062	1062	1062	1062	1062	1062	841
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	240	190
		in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	216	171
		in.lb	1912	1912	1912	1912	1912	1912	1912	1912	1513
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	240	190
		in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	2.21
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48
Maximum Radial Load	$F_{2Max}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2GMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	4.8								
		lb <sub>m</sub>	10.58								



SPLN120 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1	0.95	0.85	0.81	0.78	0.78	0.78	0.78	
		in.lb	8.85	8.41	7.52	7.17	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2Max}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	6								
		lb <sub>m</sub>	13.23								

SPLN120 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	230	230	255	255	250	210	
		in.lb	1859	1859	2036	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	414	414	459	459	450	378	
		in.lb	3346	3346	3664	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.85	0.95	0.85	0.85	0.78	0.78	0.78	
		in.lb	8.41	7.52	8.41	7.52	7.52	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2Max}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	9								
		lb <sub>m</sub>	19.84								

SPLN120 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.85	0.85	0.85	0.78	0.78	0.78	0.78	0.78	
		in.lb	7.52	7.52	7.52	6.90	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2Max}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{20Max}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{20Max}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	10.5								
		lb <sub>m</sub>	23.15								

SPLN160 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.55	2.45	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	22.57	21.68	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{20Max}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{20Max}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	14.5								
		lb <sub>m</sub>	31.97								

SPLN160 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	27								
		lb <sub>m</sub>	59.52								

SPLN160 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094.4	1094.4	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	30								
		lb <sub>m</sub>	66.14								

SPLN205 1-stage

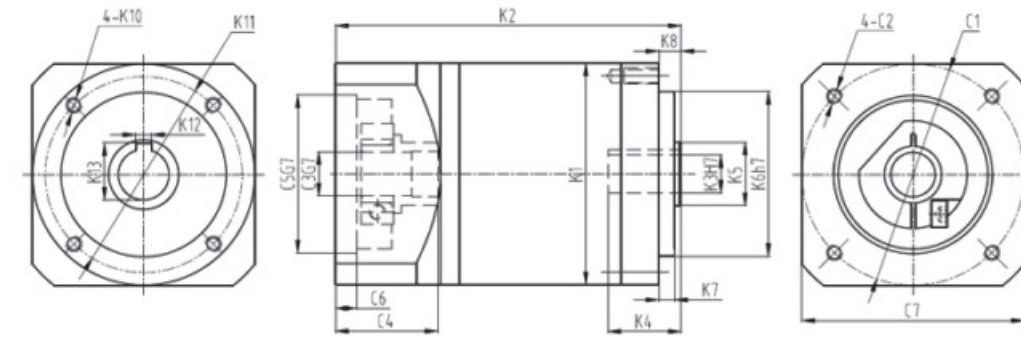
		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.3	3.15	3	3	3	3	3	
		in.lb	30.98	29.21	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	30								
		lb <sub>m</sub>	66.14								

SPLN205 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	650	650	1050	1000	1000	1050	1000	800	
		in.lb	5753	5753	9293	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1170	1170	1890	1800	1800	1890	1800	1440	
		in.lb	10355	10355	16728	15931	15931	16728	15931	12745	
Maximum Torque	$T_{2a}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	38								
		lb <sub>m</sub>	83.77								

SPLN205 3-stages

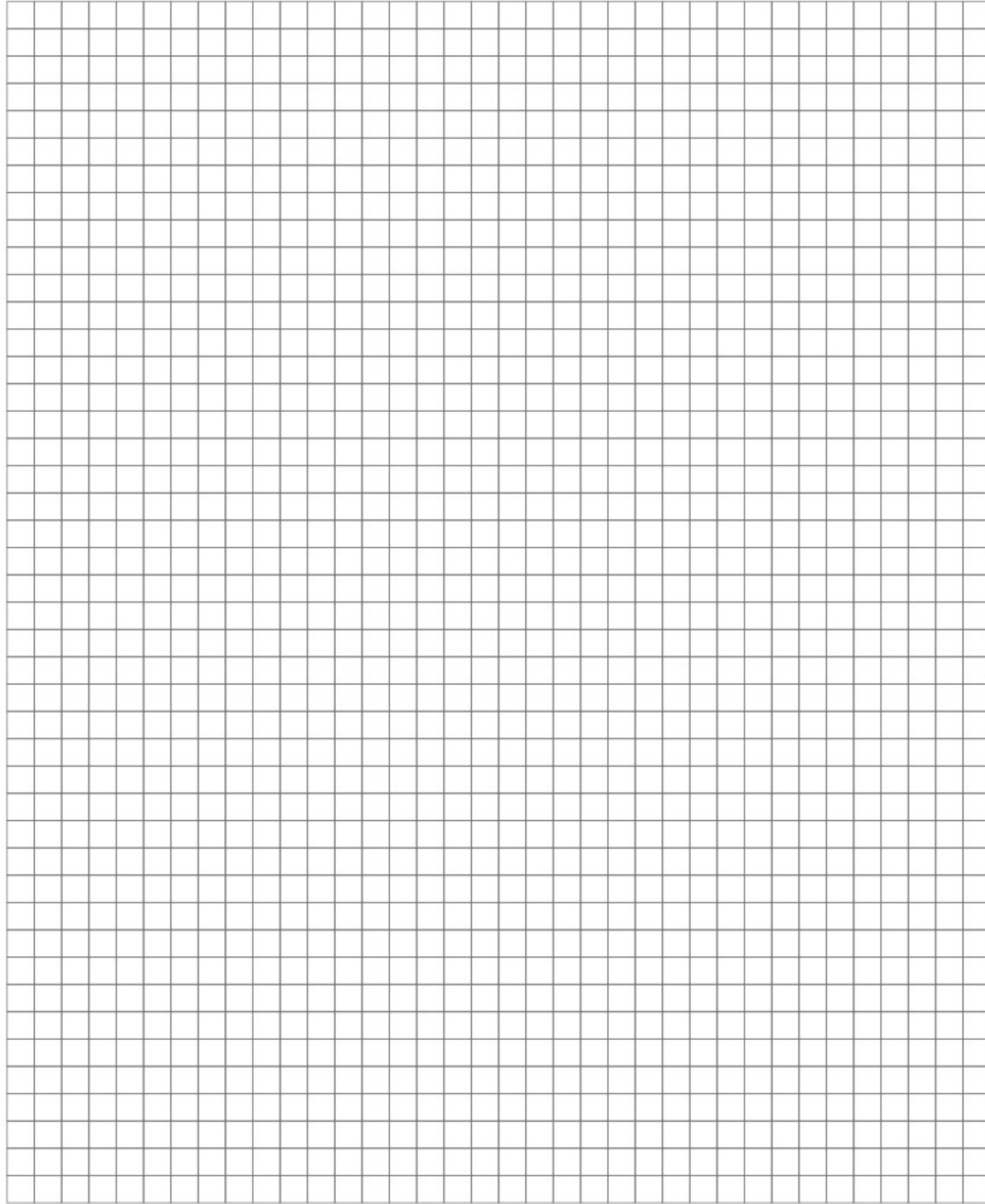
		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1000	1000	1000	1000	1000	1000	1000	800	
		in.lb	8851	8851	8851	8851	8851	8851	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1800	1440	
		in.lb	15931	15931	15931	15931	15931	15931	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Permitted Average Input Speed	$n_{1M}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{D1}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2AMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140	7.14	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	47								
		lb <sub>m</sub>	103.62								



Model	SPLN070			SPLN090			SPLN120			SPLN160			SPLN205				
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
K1	φ70			φ89			φ115.5			φ160			φ205				
	φ2.76			φ3.5			φ4.55			φ6.30			φ8.07				
K2	92	115.7	139.4	113	144.3	175.6	148.5	183.5	218.5	195.5	256.5	276	208	268	327		
	3.62	4.56	5.49	4.45	5.68	6.91	5.85	7.22	8.6	7.70	10.10	10.87	8.19	10.55	12.87		
K3	φ12			φ16			φ20			φ38			M2XZ24XP30XH6				
	φ0.47			φ0.63			φ0.79			φ1.50							
K4	23			25			36			45			48				
	0.91			0.99			1.42			1.77			1.89				
K5	φ20			φ30			φ35			φ60			φ60				
	φ0.79			φ1.18			φ1.38			φ2.36			φ2.36				
K6	φ40			φ60			φ80			φ130			φ160				
	φ1.57			φ2.36			φ3.15			φ5.12			φ6.30				
K7	3			3			4			5			15				
	0.12			0.12			0.16			0.2			0.59				
K8	5			4			5			7			20				
	0.20			0.16			0.20			0.28			0.79				
K10	M5X12			M6X10			M10X20			M12X20			M12X22				
K11	φ52			φ70			φ100			φ145			φ184				
	φ2.05			φ2.76			φ3.94			φ5.71			φ7.24				
K12	4			5			6			10			GB/T3478.1				
	0.16			0.20			0.24			0.39							
K13	13.8			18.3			28.3			41.3			GB/T3478.1				
	0.54			0.72			1.11			1.63							
C1	φ70			φ90			φ145			φ200		φ145		φ215		φ200	
	φ2.76			φ3.54			φ5.71			φ7.87		φ5.71		φ8.46		φ7.87	
C2	M5X12			M6X15			M8X20			M12X25		M8X20		M12X25		M12X25	
C3	φ14			φ19			φ24			φ35		φ24		φ42		φ35	
	φ0.55			φ0.75			φ0.94			φ1.38		φ0.94		φ1.65		φ1.38	
C4	32.1			41.6			56.3			82		61.3		82.5		82	
	1.26			1.64			2.22			3.23		2.41		3.25		3.23	
C5	φ50			φ70			φ110			φ114.3		φ110		φ180		φ114.3	
	φ1.97			φ2.76			φ4.33			φ4.5		φ4.33		φ7.09		φ4.5	
C6	6.5			6.5			8			8		8		8		8	
	0.26			0.26			0.31			0.31		0.31		0.31		0.31	
C7	70			89			120			175		120		190		175	
	2.76			3.5			4.72			6.89		4.72		7.48		6.89	

The dimensions modified as per the applied motor flanges.  
You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: [www.kofon-motion.com](http://www.kofon-motion.com)

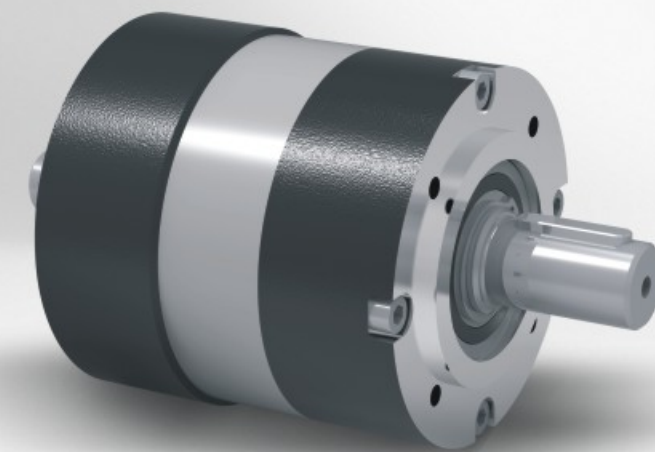
Technical Memo



# SPLS

Powerful. Precision. Reliable

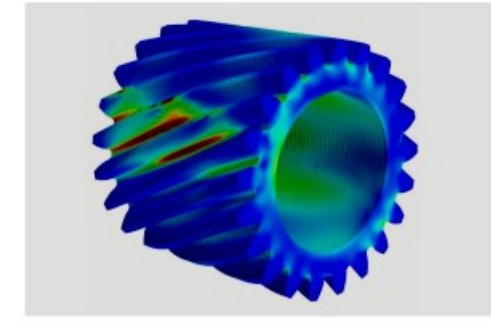
- ▶ Servo Planetary Gearbox  
Valued Gearbox Solution





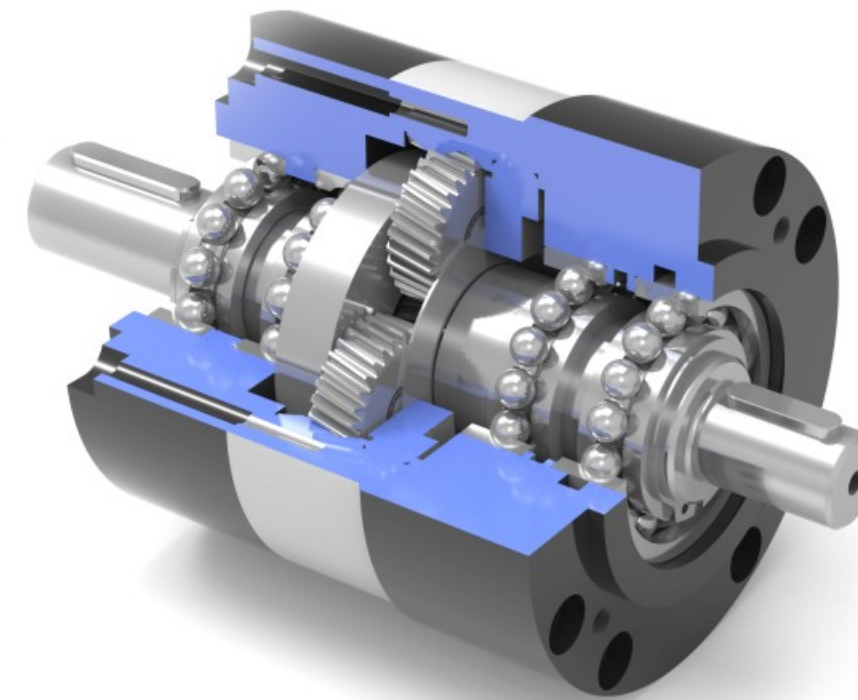
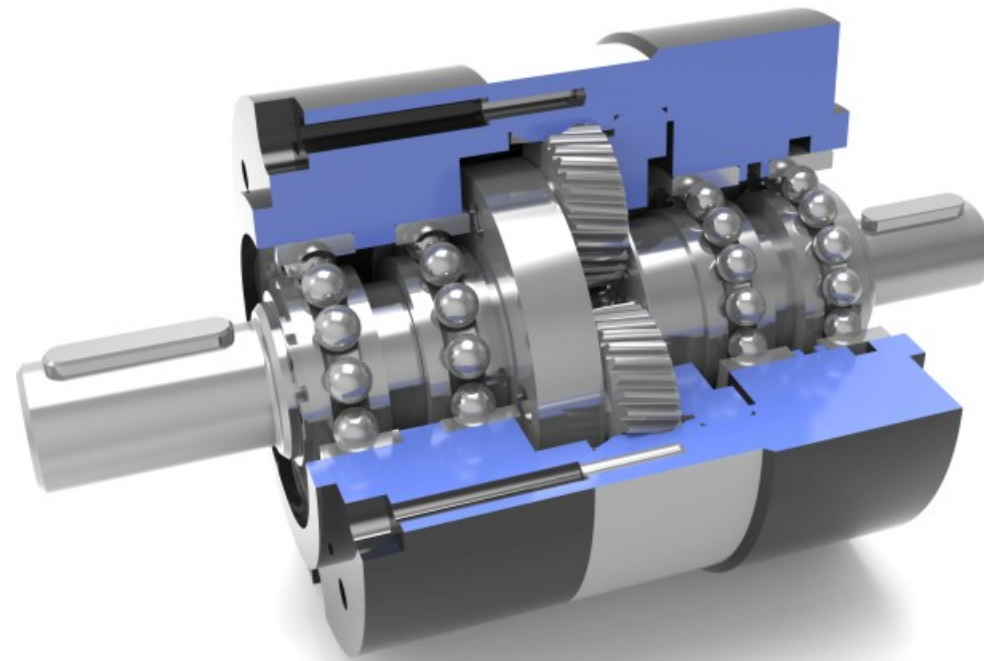
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%.The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SPLS070 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{2GMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.650	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	1.4								
		lb <sub>m</sub>	3.09								

SPLS070 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{2GMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2								
		lb <sub>m</sub>	4.41								

SPLS Series Servo Planetary Gearbox

SPLS Series Servo Planetary Gearbox



SPLS070 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	38	
		in.lb	398	398	398	398	398	398	398	336	
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	68.4	
		in.lb	717	717	717	717	717	717	717	605	
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	299	299	299	299	299	299	229	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2AMax}$	N	550								
		lb <sub>f</sub>	123.64								
Maximum Axial Load	$F_{2OMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2OMax}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.4								
		lb <sub>m</sub>	5.29								

SPLS090 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.7								
		lb <sub>m</sub>	5.95								

SPLS090 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	110	110	110	110	110	95	
		in.lb	885	885	974	974	974	974	974	841	
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	220	220	220	220	220	190	
		in.lb	1770	1770	1947	1947	1947	1947	1947	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	198	198	198	198	198	171	
		in.lb	1593	1593	1752	1752	1752	1752	1752	1513	
Maximum Torque	$T_{2a}$	Nm	200	200	220	220	220	220	220	190	
		in.lb	1770	1770	1947	1947	1947	1947	1947	1682	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.8								
		lb <sub>m</sub>	8.38								

SPLS090 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	95	
		in.lb	1062	1062	1062	1062	1062	1062	1062	841	
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	171	
		in.lb	1912	1912	1912	1912	1912	1912	1912	1513	
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.14								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	5								
		lb <sub>m</sub>	11.02								

SPLS120 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1	0.95	0.85	0.81	0.78	0.78	0.78	0.78	
		in.lb	8.85	8.41	7.52	7.17	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	6.5								
		lb <sub>m</sub>	14.33								

SPLS120 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	230	230	255	255	250	210	
		in.lb	1859	1859	2036	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	414	414	459	459	450	378	
		in.lb	3346	3346	3664	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.85	0.95	0.85	0.85	0.78	0.78	0.78	
		in.lb	8.41	7.52	8.41	7.52	7.52	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10			≤ 10					
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	9.5								
		lb <sub>m</sub>	20.94								

SPLS120 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.85	0.85	0.85	0.78	0.78	0.78	0.78	0.78	
		in.lb	7.52	7.52	7.52	6.90	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{021}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>r</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>a</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	11								
		lb <sub>m</sub>	24.25								

SPLS160 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.55	2.45	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	22.57	21.68	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{021}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>r</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>a</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	15.5								
		lb <sub>m</sub>	34.17								

SPLS160 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	28								
		lb <sub>m</sub>	61.73								

SPLS160 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094.4	1094.4	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_n$	h	20,000(Continuous Operation)								
Weight	$m$	kg	30.5								
		lb <sub>m</sub>	67.24								

SPLS205 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.3	3.15	3	3	3	3	3	
		in.lb	30.98	29.21	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	31								
		lb <sub>m</sub>	68.34								

SPLS205 2-stages

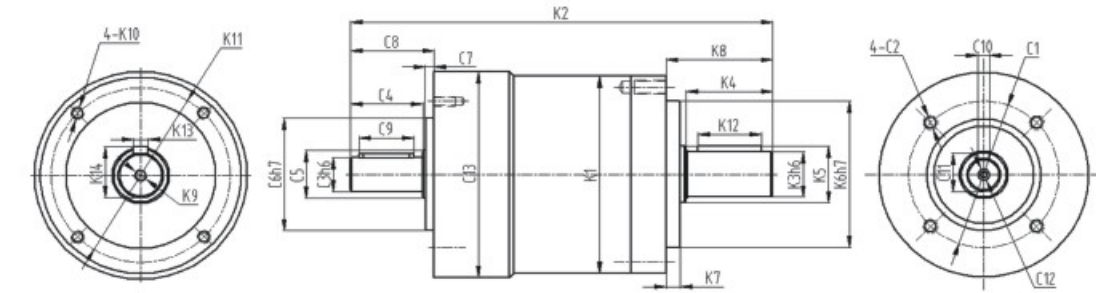
		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	650	650	1050	1000	1000	1050	1000	800	
		in.lb	5753	5753	9293	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	39								
		lb <sub>m</sub>	85.98								

SPLS Series Servo Planetary Gearbox

SPLS Series Servo Planetary Gearbox

SPLS205 3-stages

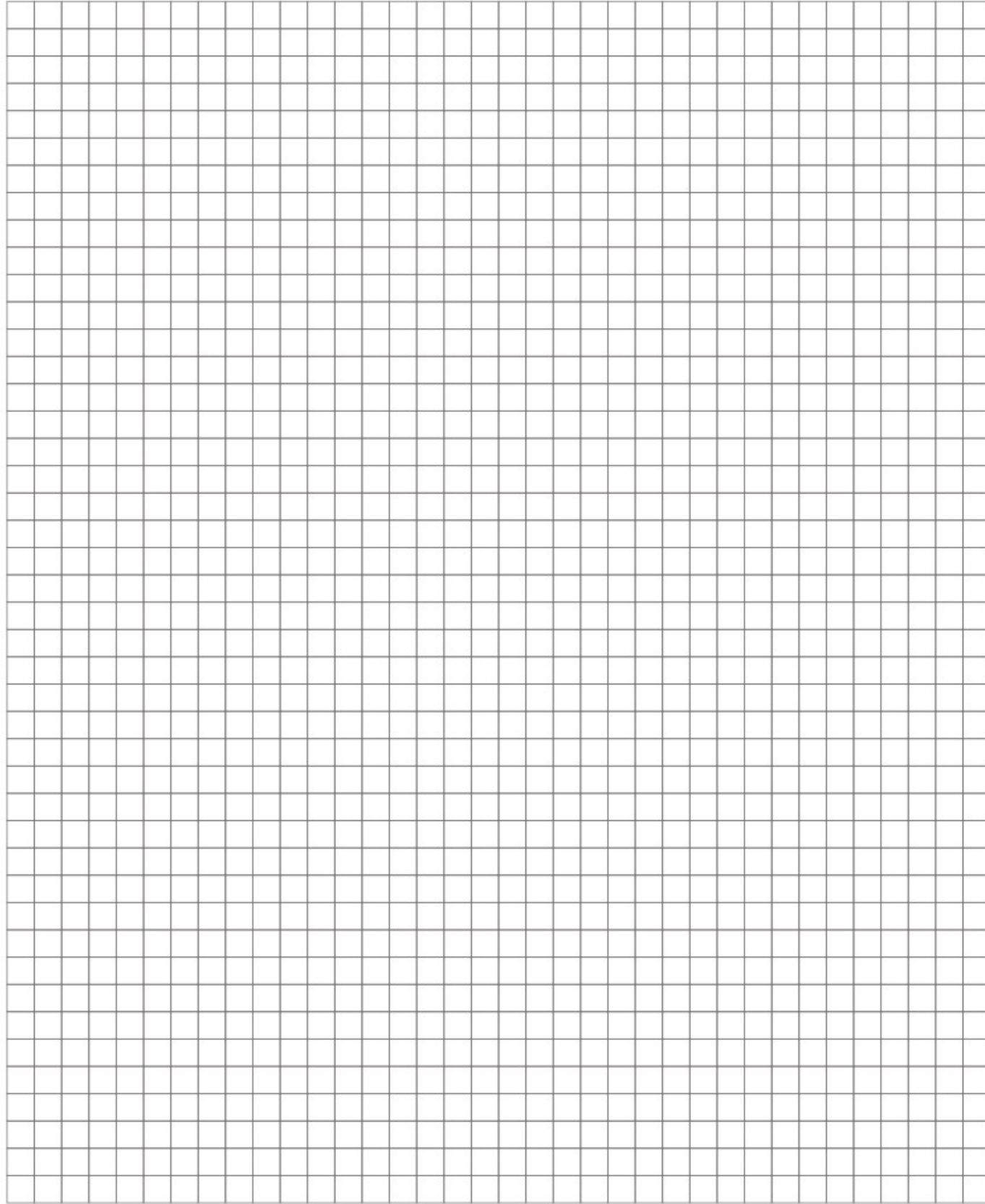
		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1000	1000	1000	1000	1000	1000	1000	800	
		in.lb	8851	8851	8851	8851	8851	8851	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1800	1440	
		in.lb	15931	15931	15931	15931	15931	15931	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Permitted Average Input Speed	$n_{1M}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{D21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2AMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2AMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_i$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140	7.140	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	48								
		lb <sub>m</sub>	105.82								



Model	SPLS070			SPLS090			SPLS120			SPLS160			SPLS205		
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
K1	φ70			φ89			φ115.5			φ160			φ205		
	φ2.76			φ3.5			φ4.55			φ6.30			φ8.07		
K2	145.5	169.2	192.9	163.7	195	226.3	213	248	283	294	355	375	355	366.5	427.5
	5.73	6.67	7.60	6.45	7.68	8.92	8.39	9.77	11.15	11.58	13.99	14.78	13.99	14.44	16.84
K3	φ14			φ20			φ25			φ40			φ55		
	φ0.55			φ0.79			φ0.98			φ1.58			φ2.17		
K4	30			36			50			80			82		
	1.18			1.42			1.97			3.15			3.23		
K5	φ17			φ25			φ35			φ50			φ60		
	φ0.67			φ0.99			φ1.38			φ1.97			φ2.36		
K6	φ40			φ60			φ80			φ130			φ160		
	φ1.57			φ2.36			φ3.15			φ5.12			φ6.30		
K7	3			3			4			5			20		
	0.12			0.12			0.16			0.2			0.79		
K8	35			40			55			87			105		
	1.38			1.58			2.17			3.43			4.14		
K9	M5X12			M6X16			M10X26			M12X25			M20X40		
K10	M5X12			M6X15			M10X20			M12X25			M12X22		
K11	φ52			φ70			φ100			φ145			φ184		
	φ2.05			φ2.76			φ3.94			φ5.71			φ7.24		
K12	22			28			40			70			70		
	0.87			1.10			1.58			2.76			2.76		
K13	5			6			8			12			16		
	0.20			0.24			0.32			0.47			0.63		
K14	16.00			22.5			28			43			59		
	0.63			0.89			1.10			1.69			2.32		
C1	φ52			φ70			φ100			φ145		φ100	φ135	φ145	
	φ2.05			φ2.76			φ3.94			φ5.71		φ3.94	φ5.32	φ5.71	
C2	M5X11			M6X12			M10X20			M12X20		M8X22	M8X14	M12X20	
	φ12			φ16			φ20			φ35		φ22	φ40	φ35	
C3	φ0.47			φ0.63			φ0.79			φ1.38		φ0.88	φ1.58	φ1.38	
	25			26			40			57		40	70	57	
C4	0.99			1.02			1.58			2.25		1.58	2.76	2.25	
	φ17			25			φ35			φ50		φ35	φ50	φ50	
C5	φ0.67			0.99			φ1.38			φ1.97		φ1.38	φ1.97	φ1.97	
	φ40			φ60			φ80			φ130		φ80	φ120	φ130	
C6	φ1.58			2.36			φ3.15			φ5.12		φ3.15	φ4.73	φ5.12	
	3			3			4			5		4	8	5	
C7	0.12			0.12			0.16			0.20		0.16	0.32	0.20	
	29			30			45			65		45	80	65	
C8	1.14			1.18			1.77			2.56		1.77	3.15	2.56	
	18			20			30			45		30	60	45	
C9	0.71			0.79			1.18			1.77		1.18	2.36	1.77	
	4			5			6			10		6	12	10	
C10	0.16			0.20			0.24			0.39		0.24	0.47	0.39	
	13.5			18			22.5			38		24.5	43	38	
C11	0.53			0.71			0.89			1.50		0.97	1.69	1.50	
	M4X8			M5X10			M6X16			M12X25		M6X16	M12X25	M12X25	
C12	φ73			φ92			φ120			φ162		φ123	φ150	φ162	
	φ2.88			φ3.63			φ4.73			φ6.38		φ4.85	φ5.91	φ6.38	
C13	φ73			φ92			φ120			φ162		φ123	φ150	φ162	
	φ2.88			φ3.63			φ4.73			φ6.38		φ4.85	φ5.91	φ6.38	

The dimensions modified as per the applied motor flanges.  
 You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: [www.kofon-motion.com](http://www.kofon-motion.com)

Technical Memo

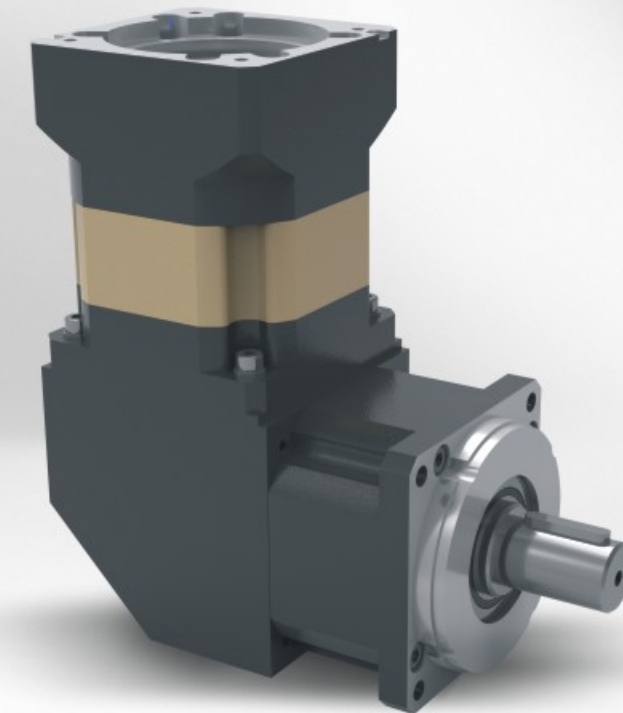


# SVX

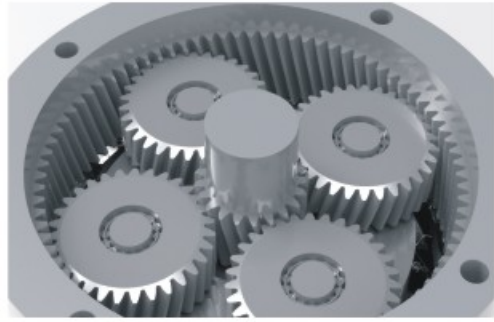
Powerful. Precision. Reliable

▶ Servo Planetary Gearbox

Valued Gearbox Solution

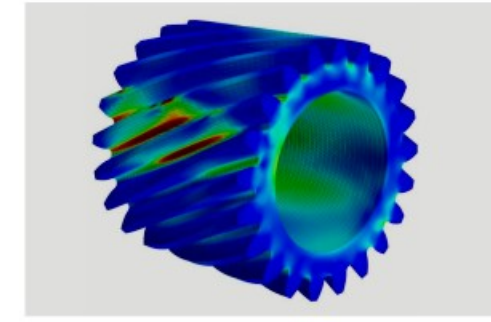






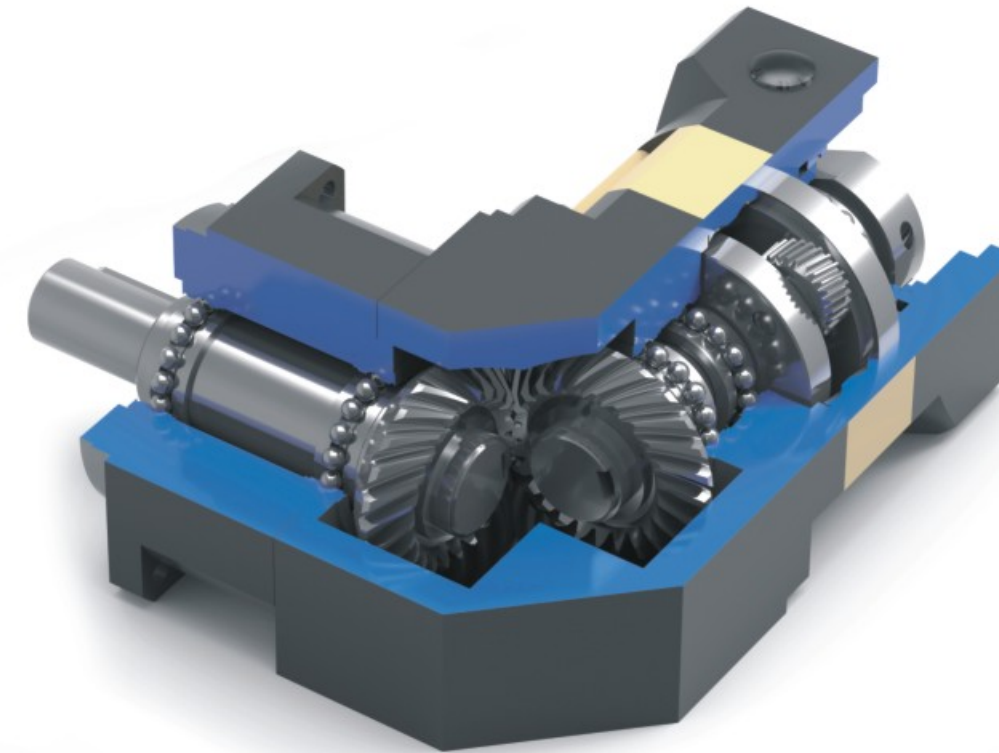
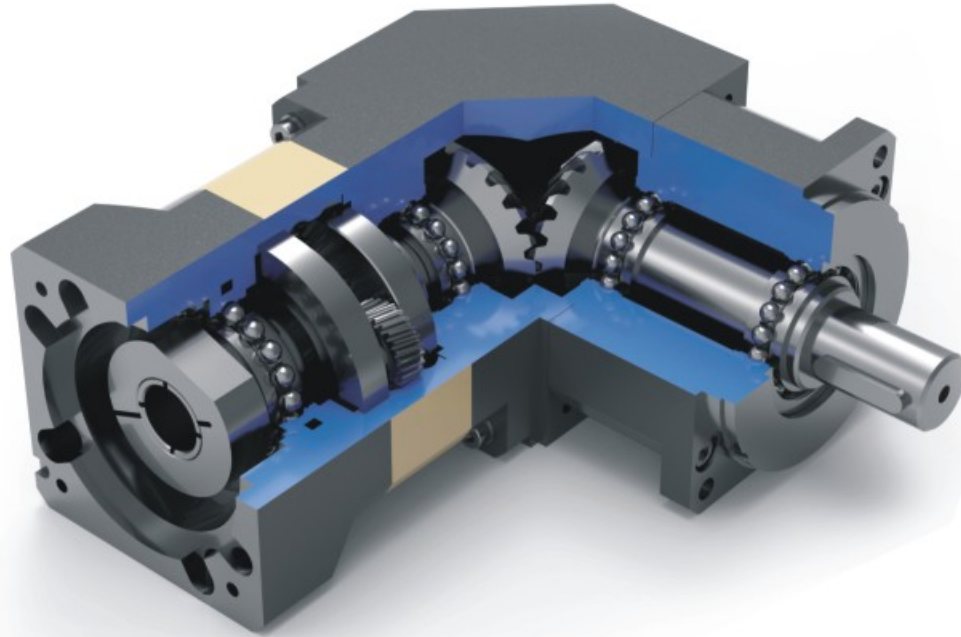
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%. The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



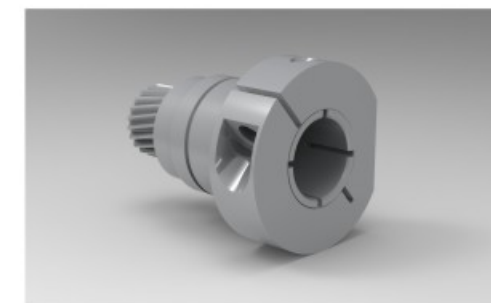
**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SVX065 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.24	0.2	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	2.12	1.77	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2AMax}$	N	550								
		lb <sub>f</sub>	123.60								
Maximum Axial Load	$F_{2OMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2OMax}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.065	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.3								
		lb <sub>m</sub>	4.41								

SVX065 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.2	0.17	0.2	0.17	0.17	0.15	0.15	0.15	
		in.lb	1.77	1.50	1.77	1.50	1.50	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2AMax}$	N	550								
		lb <sub>f</sub>	123.60								
Maximum Axial Load	$F_{2OMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2OMax}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	2.8								
		lb <sub>m</sub>	6.17								

SVX065 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	38	
		in.lb	398	398	398	398	398	398	398	336	
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	68.4	
		in.lb	717	717	717	717	717	717	717	605	
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	76	
		in.lb	797	797	797	797	797	797	797	673	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.15	
		in.lb	1.50	1.50	1.50	1.33	1.33	1.33	1.33	1.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2AMax}$	N	550								
		lb <sub>f</sub>	123.60								
Maximum Axial Load	$F_{2OMax}$	N	375								
		lb <sub>f</sub>	84.30								
Max. Tilting Moment	$M_{2OMax}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3.4								
		lb <sub>m</sub>	7.50								

SVX085 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.38	0.36	0.31	0.29	0.25	0.25	0.25	0.25	
		in.lb	3.36	3.19	2.74	2.57	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.10								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	5.4								
		lb <sub>m</sub>	11.90								

SVX085 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	110	110	110	110	110	95	
		in.lb	885	885	974	974	974	974	974	841	
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	220	220	220	220	220	190	
		in.lb	1770	1770	1947	1947	1947	1947	1947	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	198	198	198	198	198	171	
		in.lb	1593	1593	1752	1752	1752	1752	1752	1513	
Maximum Torque	$T_{2a}$	Nm	200	200	220	220	220	220	220	190	
		in.lb	1770	1770	1947	1947	1947	1947	1947	1682	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.36	0.31	0.36	0.31	0.31	0.25	0.25	0.25	
		in.lb	3.19	2.74	3.19	2.74	2.74	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.10								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	6.8								
		lb <sub>m</sub>	14.99								

SVX085 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	95	
		in.lb	1062	1062	1062	1062	1062	1062	1062	841	
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	171	
		in.lb	1912	1912	1912	1912	1912	1912	1912	1513	
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	190	
		in.lb	2124	2124	2124	2124	2124	2124	2124	1682	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.74	2.74	2.74	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{2AMax}$	N	1020								
		lb <sub>f</sub>	229.30								
Maximum Axial Load	$F_{2OMax}$	N	570								
		lb <sub>f</sub>	128.10								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	8								
		lb <sub>m</sub>	17.64								

SVX115 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1	0.95	0.85	0.81	0.78	0.78	0.78	0.78	
		in.lb	8.85	8.41	7.52	7.17	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	12								
		lb <sub>m</sub>	26.46								

SVX115 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	230	230	255	255	250	210	
		in.lb	1859	1859	2036	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	414	414	459	459	450	378	
		in.lb	3346	3346	3664	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.85	0.95	0.85	0.85	0.78	0.78	0.78	
		in.lb	8.41	7.52	8.41	7.52	7.52	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	15								
		lb <sub>m</sub>	33.07								

SVX115 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.85	0.85	0.85	0.78	0.78	0.78	0.78	0.78	
		in.lb	7.52	7.52	7.52	6.90	6.90	6.90	6.90	6.90	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	2070								
		lb <sub>f</sub>	465.34								
Maximum Axial Load	$F_{2OMax}$	N	970								
		lb <sub>f</sub>	218.06								
Max. Tilting Moment	$M_{2AMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	18								
		lb <sub>m</sub>	39.68								

SVX142 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.55	2.45	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	22.57	21.68	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2AMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	23								
		lb <sub>m</sub>	50.71								

SVX Series Servo Planetary Gearbox

SVX Series Servo Planetary Gearbox

SVX142 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.45	2.3	2.45	2.3	2.3	2.2	2.2	2.2	
		in.lb	21.68	20.36	21.68	20.36	20.36	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	31								
		lb <sub>m</sub>	68.34								

SVX142 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094.4	1094.4	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	
		in.lb	20.36	20.36	20.36	19.47	19.47	19.47	19.47	19.47	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	7300								
		lb <sub>f</sub>	1641.04								
Maximum Axial Load	$F_{2OMax}$	N	6400								
		lb <sub>f</sub>	1438.72								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	40								
		lb <sub>m</sub>	88.18								

SVX180 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.3	3.15	3	3	3	3	3	
		in.lb	30.98	29.21	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	45								
		lb <sub>m</sub>	99.21								

SVX180 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	650	650	1050	1000	1000	1050	1000	800	
		in.lb	5753	5753	9293	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1170	1170	1890	1800	1800	1890	1800	1440	
		in.lb	10355	10355	16728	15931	15931	16728	15931	12745	
Maximum Torque	$T_{2a}$	Nm	1300	1300	2100	2000	2000	2100	2000	1600	
		in.lb	11506	11506	18586	17701	17701	18586	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.3	3.15	3.3	3.15	3.15	3	3	3	
		in.lb	29.21	27.88	29.21	27.88	27.88	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{2OMax}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	50								
		lb <sub>m</sub>	110.23								



SVX180 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1000	1000	1000	1000	1000	1000	1000	800	
		in.lb	8851	8851	8851	8851	8851	8851	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1800	1440	
		in.lb	15931	15931	15931	15931	15931	15931	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	2000	1600	
		in.lb	17701	17701	17701	17701	17701	17701	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.15	3.15	3.15	3	3	3	3	3	
		in.lb	27.88	27.88	27.88	26.55	26.55	26.55	26.55	26.55	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2Max}$	N	12000								
		lb <sub>f</sub>	2697.60								
Maximum Axial Load	$F_{20Max}$	N	6800								
		lb <sub>f</sub>	1528.64								
Max. Tilting Moment	$M_{20Max}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140	7.140	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	56								
		lb <sub>m</sub>	123.46								

SVX220 1-stage

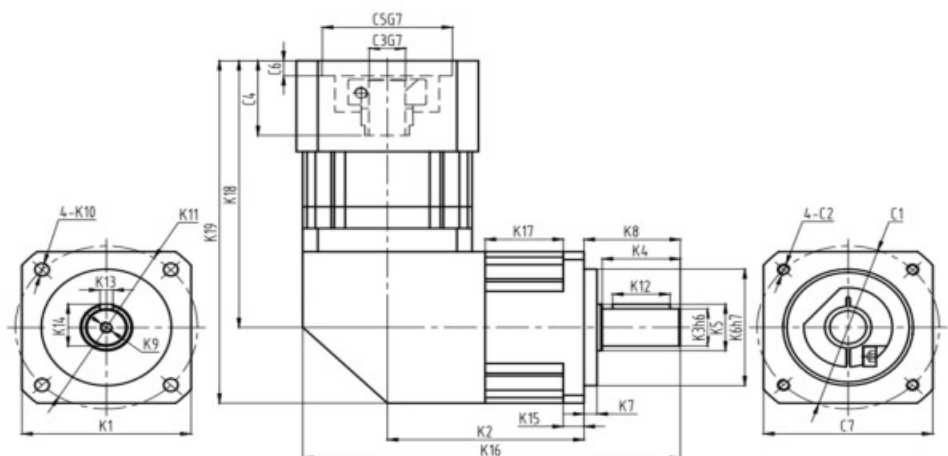
		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	1000	1600	1850	1650	1550	1350	1300	1300	
		in.lb	8851	14161	16374	14604	13719	11948	11506	11506	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	2880	3330	2970	2790	2430	2340	2340	
		in.lb	15931	25490	29473	26287	24693	21507	20711	20711	
Maximum Torque	$T_{2a}$	Nm	2000	3200	3700	3300	3100	2700	2600	2600	
		in.lb	17701	28322	32748	29207	27437	23897	23012	23012	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	5.2	5	4.85	4.67	4.67	4.67	4.67	4.67	
		in.lb	46.02	44.25	42.93	41.33	41.33	41.33	41.33	41.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2Max}$	N	14000								
		lb <sub>f</sub>	3147.20								
Maximum Axial Load	$F_{20Max}$	N	7800								
		lb <sub>f</sub>	1753.44								
Max. Tilting Moment	$M_{20Max}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	69.610	54.370	53.270	50.840	50.840	50.840	50.840	50.560	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	96								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	68								
		lb <sub>m</sub>	149.91								

SVX220 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	1000	1000	1600	1850	1850	1800	1850	1350	
		in.lb	8851	8851	14161	16374	16374	15931	16374	11948	
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	3200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	28322	32748	32748	31863	32748	23897	
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	2880	3330	3330	3240	3330	2430	
		in.lb	15931	15931	25490	29473	29473	28676	29473	21507	
Maximum Torque	$T_{2a}$	Nm	2000	2000	3200	3700	3700	3600	3700	2700	
		in.lb	17701	17701	28322	32748	32748	31863	32748	23897	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	5	4.85	5	4.85	4.85	4.67	4.67	4.67	
		in.lb	44.25	42.93	44.25	42.93	42.93	41.33	41.33	41.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2AMax}$	N	14000								
		lb <sub>f</sub>	3147.20								
Maximum Axial Load	$F_{2OMax}$	N	7800								
		lb <sub>f</sub>	1753.44								
Max. Tilting Moment	$M_{2OMax}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	59.610	48.610	23.670	22.750	22.750	22.590	22.590	22.590	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	94								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	78								
		lb <sub>m</sub>	171.96								

SVX220 3-stages

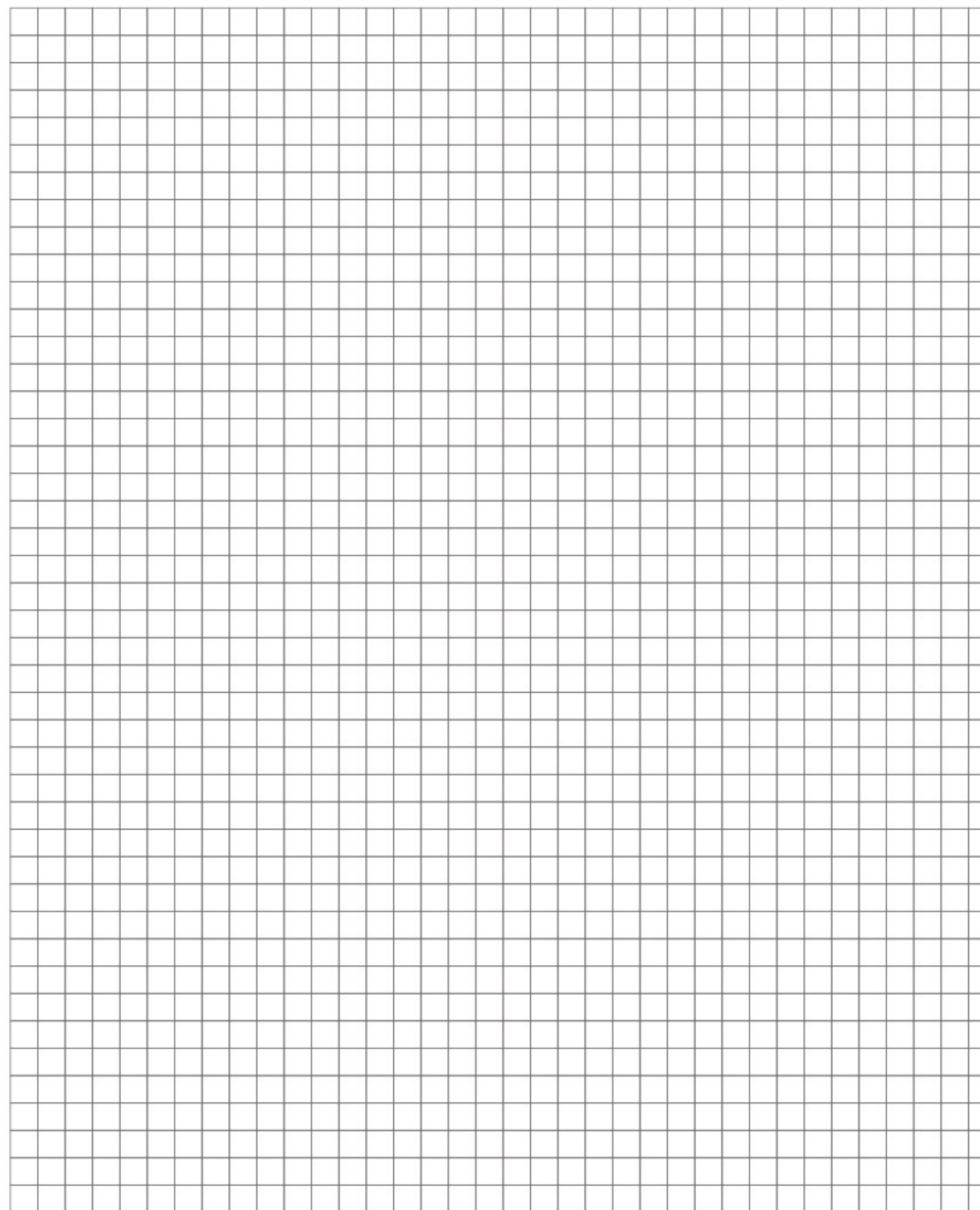
		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	1850	1850	1850	1850	1850	1850	1850	1350	
		in.lb	16374	16374	16374	16374	16374	16374	16374	11948	
Emergency Stop Torque	$T_{2Max}$	Nm	3700	3700	3700	3700	3700	3700	3700	2700	
		in.lb	32748	32748	32748	32748	32748	32748	32748	23897	
Maximum Acceleration Torque	$T_{2a}$	Nm	3330	3330	3330	3330	3330	3330	3330	2430	
		in.lb	29473	29473	29473	29473	29473	29473	29473	21507	
Maximum Torque	$T_{2a}$	Nm	3700	3700	3700	3700	3700	3700	3700	2700	
		in.lb	32748	32748	32748	32748	32748	32748	32748	23897	
Permitted Average Input Speed	$n_{1N}$	rpm	1500								
Maximum Input Speed	$n_{1Max}$	rpm	3000								
Mean No Load Running Torque	$T_{012}$	Nm	4.85	4.85	4.85	4.67	4.67	4.67	4.67	4.67	
		in.lb	42.93	42.93	42.93	41.33	41.33	41.33	41.33	41.33	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 15								
Torsional Rigidity	$C_{21}$	Nm/arcmin	200	200	200	200	200	200	200	200	
		in.lb/arcmin	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	1770.14	
Maximum Radial Load	$F_{2AMax}$	N	14000								
		lb <sub>f</sub>	3147.20								
Maximum Axial Load	$F_{2OMax}$	N	7800								
		lb <sub>f</sub>	1753.44								
Max. Tilting Moment	$M_{2OMax}$	Nm	2350								
		in.lb	20799.15								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	22.750	22.590	22.750	22.750	22.750	22.750	22.750	22.590	
Operating Noise Level	$L_{PA}$	dB(A)	< 72								
Efficiency at Full loading	$\eta$	%	92								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	85								
		lb <sub>m</sub>	187.39								



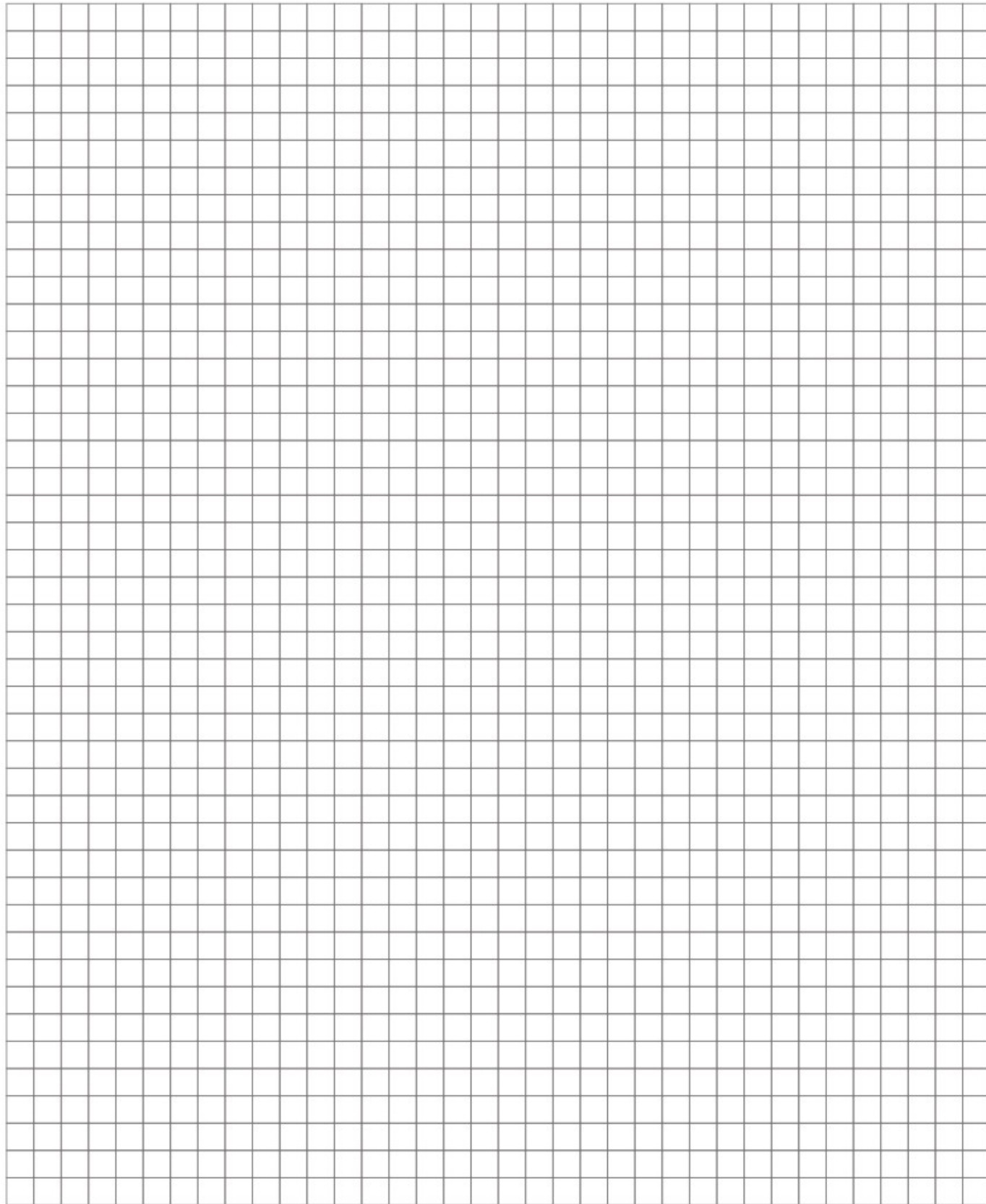
Model	SVX065			SVX085			SVX115			SVX142			SVX180			SVX220		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
K2	75.5	93	116.7	95	113.7	145	119.5	154	195.8	141	202	263	204.5	204.5	266.5	220	285.5	285.5
	2.97	3.66	4.60	3.74	4.48	5.71	4.71	6.07	7.71	5.56	7.96	10.36	8.06	8.06	10.50	8.67	11.25	11.25
K3	16	22	32	22	32	40	32	40	55	40	55	75	55	75	96	75	96	110
	0.63	0.87	1.26	0.87	1.26	1.58	1.26	1.58	2.17	1.58	2.17	2.96	2.17	2.96	3.54	2.96	3.54	4.12
K4	30	36	50	36	50	80	50	80	105	80	105	138	105	138	176	138	176	200
	1.18	1.42	1.97	1.42	1.97	3.15	1.97	3.15	4.14	3.15	4.14	5.44	4.14	5.44	6.66	5.44	6.66	7.71
K5	20	25	40	25	40	55	25	40	60	40	60	85	60	85	110	85	110	138
	0.79	0.99	1.58	0.99	1.58	2.17	0.99	1.58	2.36	1.58	2.36	3.35	2.36	3.35	4.12	3.35	4.12	5.00
K6	50	80	110	80	110	160	110	160	220	160	220	300	220	300	400	300	400	500
	1.97	3.15	4.33	3.15	4.33	6.30	4.33	6.30	8.06	6.30	8.06	10.36	8.06	10.36	13.27	10.36	13.27	16.39
K7	5	10	12	10	12	15	12	15	20	15	20	30	20	30	40	30	40	50
	0.20	0.39	0.47	0.39	0.47	0.59	0.47	0.59	0.79	0.59	0.79	1.18	0.79	1.18	1.57	1.18	1.57	2.06
K8	37	48	65	48	65	97	65	97	138	97	138	180	138	180	230	180	230	280
	1.46	1.89	2.56	1.89	2.56	3.82	2.56	3.82	5.44	3.82	5.44	7.14	5.44	7.14	9.12	7.14	9.12	11.39
K9	M5X12	M6X16	M10X22	M6X16	M10X22	M12X26	M10X22	M12X26	M20X40	M12X26	M20X40	M20X40	M20X40	M20X40	M20X40	M20X40	M20X40	M20X40
	5.5	6.5	9	6.5	9	11	9	11	13	11	13	17	13	17	20	17	20	25
K10	0.22	0.26	0.35	0.26	0.35	0.43	0.35	0.43	0.51	0.43	0.51	0.67	0.51	0.67	0.85	0.67	0.85	1.00
	0.70	1.00	1.30	1.00	1.30	1.65	1.30	1.65	2.15	1.65	2.15	2.50	2.15	2.50	3.20	2.50	3.20	4.00
K11	2.76	3.94	5.12	3.94	5.12	6.50	5.12	6.50	8.47	6.50	8.47	10.95	8.47	10.95	14.14	10.95	14.14	18.00
	0.71	1.00	1.30	1.00	1.30	1.65	1.30	1.65	2.15	1.65	2.15	2.76	2.15	2.76	3.54	2.76	3.54	4.44
K12	22	28	40	28	40	70	40	70	90	70	90	110	90	110	140	110	140	180
	0.87	1.10	1.58	1.10	1.58	2.76	1.58	2.76	3.55	2.76	3.55	4.54	3.55	4.54	5.83	4.54	5.83	7.42
K13	5	6	10	6	10	12	10	12	16	12	16	20	16	20	25	20	25	30
	0.20	0.24	0.39	0.24	0.39	0.47	0.39	0.47	0.63	0.47	0.63	0.79	0.63	0.79	1.00	0.79	1.00	1.25
K14	18.00	24.5	35	24.5	35	43	35	43	59	43	59	79.5	59	79.5	100	79.5	100	125
	0.71	0.97	1.38	0.97	1.38	1.69	1.38	1.69	2.32	1.69	2.32	3.13	2.32	3.13	4.00	3.13	4.00	5.00
K15	8	10	14	10	14	15	14	15	20	15	20	20	20	20	20	20	20	20
	0.32	0.39	0.55	0.39	0.55	0.59	0.55	0.59	0.79	0.59	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
K16	145.0	162.5	186.2	185.5	204.2	235.5	239.5	274.0	315.8	309	370	418.5	380.5	410	442.5	429	494.5	494.5
	5.71	6.40	7.34	7.31	8.05	9.28	9.44	10.80	12.44	12.17	14.58	16.49	14.99	16.15	17.43	16.90	19.48	19.48
K17	30.0	31	54.70	37.5	46.2	77.5	42.5	63	104.8	55	101	149.5	69	69	69	76	76	76
	1.18	1.22	2.16	1.48	1.82	3.05	1.67	2.48	4.13	2.17	3.98	5.89	2.72	2.72	2.72	2.99	2.99	2.99
K18	114.50		150.00		194.00			246.50			170	246.50		204	169	246.5		
	4.51		5.91		18.24			9.71			6.698	9.71		8.04	6.66	9.71		
K19	147.00		192.50		249.00			317.50			240	317.50		275	240	317.5		
	5.79		7.58		9.81			12.51			9.46	12.51		10.84	9.46	12.51		
C1	70	90	145		200			200			200			215	200	200		
	2.76	3.55	5.71		7.88			7.88			7.88			8.46	7.88	7.88		
C2	M5X12	M6X15	M8X20		M12X12			M12X12			M12X25			M12X25		M12X25	M12X25	M12X25
	14	19	24		35			35			35			42	35	35	35	35
C3	0.55	0.75	0.95		1.38			1.38			1.38			1.65	1.38	1.38	1.38	1.38
	32.1	41.3	61.3		81.3			81.3			81.3			204	81.3	81.3	81.3	81.3
C4	1.26	1.63	2.42		3.20			3.20			3.20			4.04	3.20	3.20	3.20	3.20
	50	70	110		114.3			114.3			114.3			180	114.3	114.3	114.3	114.3
C5	1.97	2.76	4.33		4.5			4.5			4.5			7.09	4.5	4.5	4.5	4.5
	6.5	6.5	8		6.5			8			8			8	8	8	8	8
C6	0.26	0.26	0.32		0.26			0.26			0.32			0.32	0.32	0.32	0.32	0.32
	65	85	120		175			175			175			190	175	175	175	175
C7	2.56	3.35	4.73		6.90			6.90			6.90			7.49	6.90	6.90	6.90	6.90

The dimensions modified as per the applied motor flanges.  
 You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: www.kofon-motion.com

Technical Memo



Technical Memo

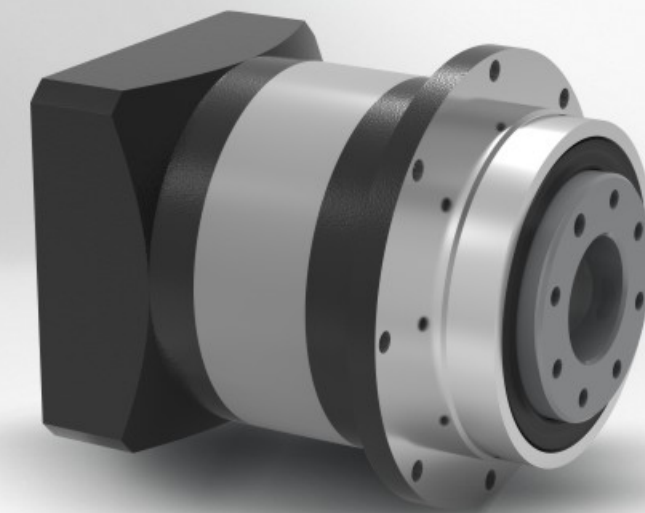


SVX Series Servo Planetary Gearbox

# SPH

Powerful. Precision. Reliable

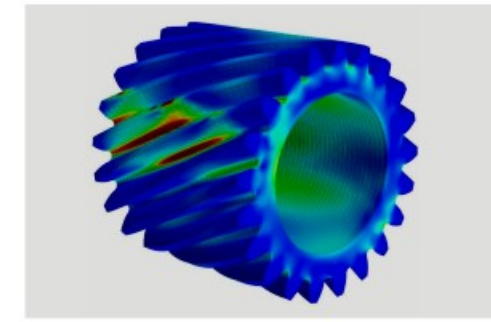
- ▶ Servo Planetary Gearbox  
Valued Gearbox Solution





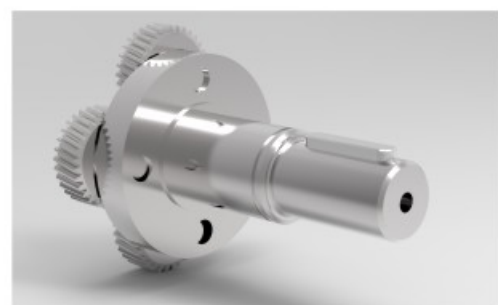
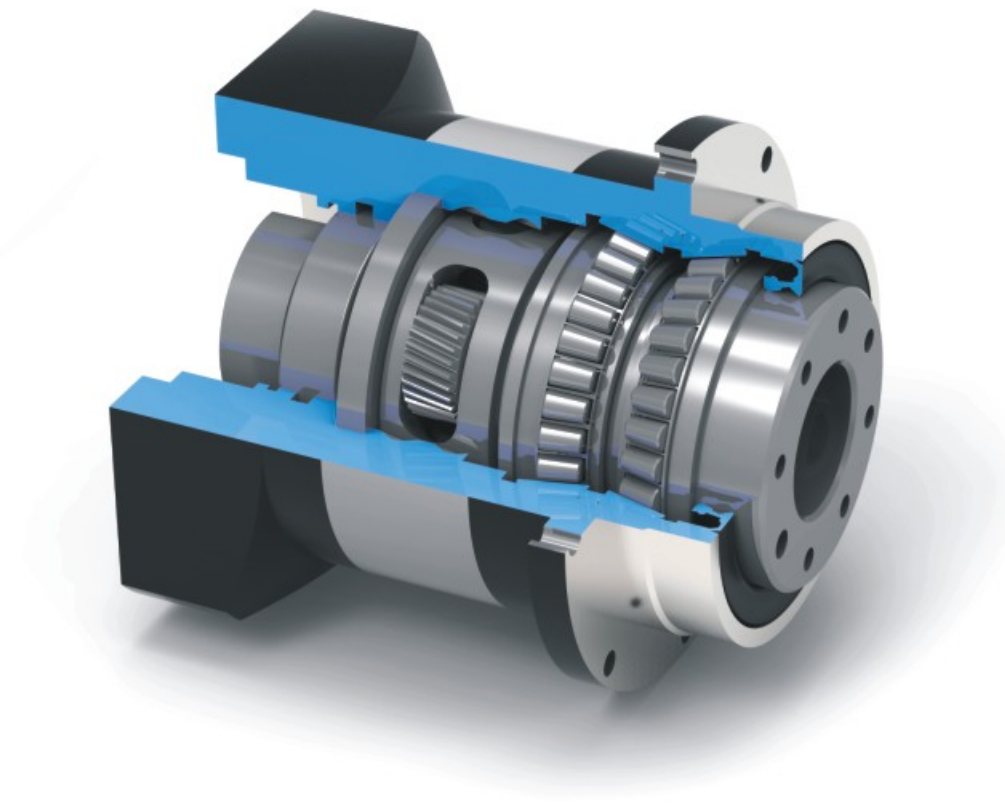
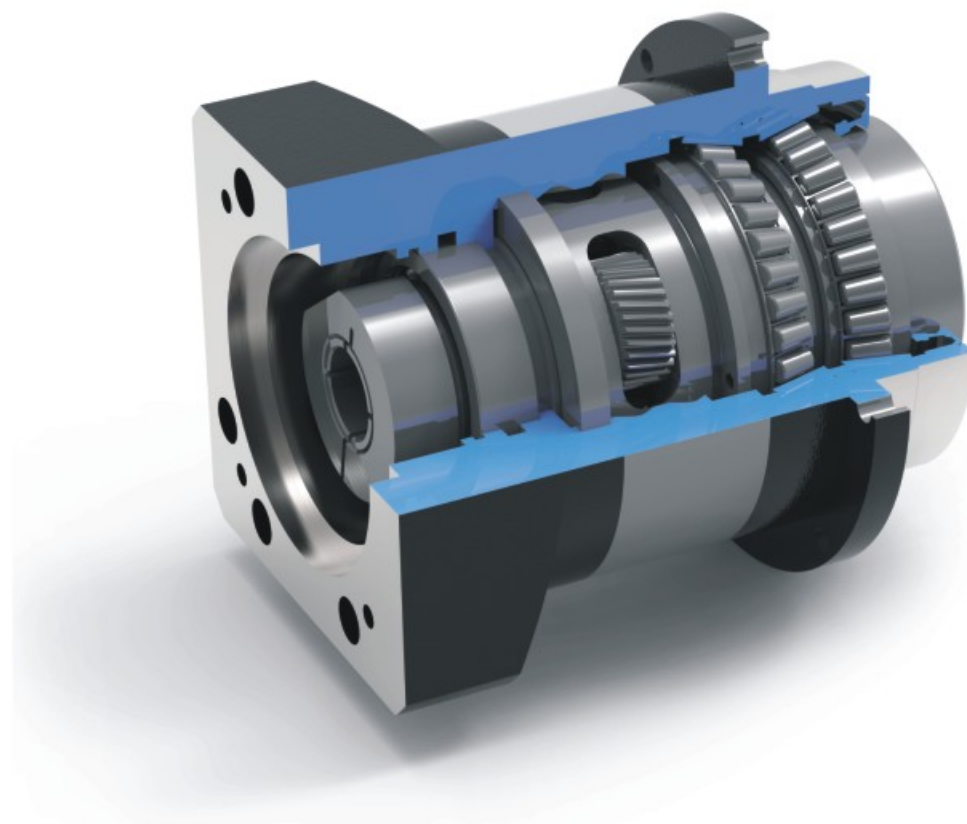
**Helical Gear System Technology**

Thanks to the tooth to tooth compact ratio more than 60%.The helical gearing and full needle bearing bring the benefits including higher torque capacity, smooth and lower noise running, decreased backlash and higher efficiency.



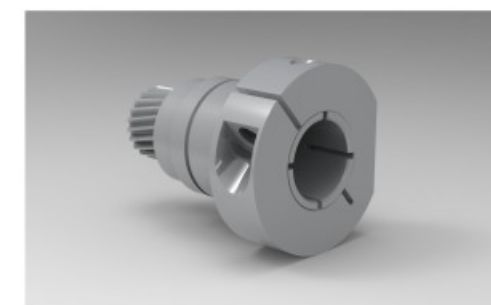
**Gear Grinding and Heat Treatment Technology**

The global leading gear grinding technology brings the great improvement for the tooth profile optimization, with the high level carburizing and quenching heat treatment technology to reach high precision and gear harden performance.



**The Powerful Cantilever Planetary Carrier**

The powerful cantilever planetary carrier provide great mechanical support for planetary gears, thus the complete gearbox can reach high level stability. Synthetic grease lubrication allows maintenance free for gearbox whole service life.



**Dynamic Balance Clamping and Sealing System**

For the gearbox input dynamic balance clamping design with perfect concentricity to decrease backlash and increase gearbox operation stability. The ultra sealing system offers grease leakage protection and support gearbox to reach IP65.

SPH070 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	35	42	44	40	40	38	36	32	
		in.lb	310	372	389	354	354	336	319	283	
Emergency Stop Torque	$T_{2Max}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Maximum Acceleration Torque	$T_{2a}$	Nm	63	75.6	79.2	72	72	68.4	64.8	57.6	
		in.lb	558	669	701	637	637	605	574	510	
Maximum Torque	$T_{2a}$	Nm	70	84	88	80	80	76	72	64	
		in.lb	620	743	779	708	708	673	637	566	
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.3	0.27	0.25	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.66	2.39	2.21	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{2Max}$	N	2000								
		lb <sub>f</sub>	449.60								
Maximum Axial Load	$F_{20Max}$	N	1600								
		lb <sub>f</sub>	359.68								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.135	0.093	0.078	0.070	0.069	0.065	0.065	0.065	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	2								
		lb <sub>m</sub>	4.41								

SPH070 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	37	37	44	44	44	44	44	44	38
		in.lb	327	327	389	389	389	389	389	389	336
Emergency Stop Torque	$T_{2Max}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Maximum Acceleration Torque	$T_{2a}$	Nm	66.6	66.6	79.2	79.2	79.2	79.2	79.2	79.2	68.4
		in.lb	589	589	701	701	701	701	701	701	605
Maximum Torque	$T_{2a}$	Nm	74	74	88	88	88	88	88	88	76
		in.lb	655	655	779	779	779	779	779	779	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.27	0.25	0.27	0.25	0.25	0.25	0.25	0.25	
		in.lb	2.39	2.21	2.39	2.21	2.21	2.21	2.21	2.21	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	
Maximum Radial Load	$F_{20Max}$	N	2000								
		lb <sub>f</sub>	449.60								
Maximum Axial Load	$F_{20Max}$	N	1600								
		lb <sub>f</sub>	359.68								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.105	0.095	0.088	0.075	0.075	0.064	0.064	0.064	
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	2.5								
		lb <sub>m</sub>	5.51								

SPH070 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	45	45	45	45	45	45	45	45	38
		in.lb	398	398	398	398	398	398	398	398	336
Emergency Stop Torque	$T_{2Max}$	Nm	90	90	90	90	90	90	90	90	76
		in.lb	797	797	797	797	797	797	797	797	673
Maximum Acceleration Torque	$T_{2a}$	Nm	81	81	81	81	81	81	81	81	68.4
		in.lb	717	717	717	717	717	717	717	717	605
Maximum Torque	$T_{2a}$	Nm	90	90	90	90	90	90	90	90	76
		in.lb	797	797	797	797	797	797	797	797	673
Permitted Average Input Speed	$n_{1N}$	rpm	4000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
		in.lb	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	3	3	3	3	3	3	3	3	3
		in.lb/arcmin	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55	26.55
Maximum Radial Load	$F_{2Max}$	N	2000								
		lb <sub>f</sub>	449.60								
Maximum Axial Load	$F_{20Max}$	N	1600								
		lb <sub>f</sub>	359.68								
Max. Tilting Moment	$M_{20Max}$	Nm	80								
		in.lb	708.06								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.075	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064
Operating Noise Level	$L_{PA}$	dB(A)	< 58								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	3								
		lb <sub>m</sub>	6.61								

SPH090 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	100	110	115	105	100	95	90	81	
		in.lb	885	974	1018	929	885	841	797	717	
Emergency Stop Torque	$T_{2Max}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Maximum Acceleration Torque	$T_{2a}$	Nm	180	198	207	189	180	171	162	145.8	
		in.lb	1593	1752	1832	1673	1593	1513	1434	1290	
Maximum Torque	$T_{2a}$	Nm	200	220	230	210	200	190	180	162	
		in.lb	1770	1947	2036	1859	1770	1682	1593	1434	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.46	0.41	0.39	0.35	0.35	0.35	0.35	0.35	
		in.lb	4.07	3.63	3.45	3.10	3.10	3.10	3.10	3.10	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	
Maximum Radial Load	$F_{20Max}$	N	4000								
		lb <sub>f</sub>	899.20								
Maximum Axial Load	$F_{20Max}$	N	3000								
		lb <sub>f</sub>	674.40								
Max. Tilting Moment	$M_{20Max}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.770	0.520	0.450	0.420	0.400	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	5.5								
		lb <sub>m</sub>	12.13								

SPH090 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	100	100	110	110	110	110	110	110	95
		in.lb	885	885	974	974	974	974	974	974	841
Emergency Stop Torque	$T_{2Max}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	180	180	198	198	198	198	198	198	171
		in.lb	1593	1593	1752	1752	1752	1752	1752	1752	1513
Maximum Torque	$T_{2a}$	Nm	200	200	220	220	220	220	220	220	190
		in.lb	1770	1770	1947	1947	1947	1947	1947	1947	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.41	0.39	0.41	0.39	0.39	0.35	0.35	0.35	0.35
		in.lb	3.63	3.45	3.63	3.45	3.45	3.10	3.10	3.10	3.10
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48
Maximum Radial Load	$F_{2AMax}$	N	4000								
		lb <sub>f</sub>	899.20								
Maximum Axial Load	$F_{2OMax}$	N	3000								
		lb <sub>f</sub>	674.40								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.670	0.510	0.500	0.440	0.440	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	6.5								
		lb <sub>m</sub>	14.33								

SPH090 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	120	120	120	120	120	120	120	120	95
		in.lb	1062	1062	1062	1062	1062	1062	1062	1062	841
Emergency Stop Torque	$T_{2Max}$	Nm	240	240	240	240	240	240	240	240	190
		in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1682
Maximum Acceleration Torque	$T_{2a}$	Nm	216	216	216	216	216	216	216	216	171
		in.lb	1912	1912	1912	1912	1912	1912	1912	1912	1513
Maximum Torque	$T_{2a}$	Nm	240	240	240	240	240	240	240	240	190
		in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1682
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.39	0.39	0.39	0.35	0.35	0.35	0.35	0.35	0.35
		in.lb	3.45	3.45	3.45	3.10	3.10	3.10	3.10	3.10	3.10
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		in.lb/arcmin	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48	42.48
Maximum Radial Load	$F_{2AMax}$	N	4000								
		lb <sub>f</sub>	899.20								
Maximum Axial Load	$F_{2OMax}$	N	3000								
		lb <sub>f</sub>	674.40								
Max. Tilting Moment	$M_{2OMax}$	Nm	200								
		in.lb	1770.14								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	0.500	0.440	0.700	0.390	0.390	0.390	0.390	0.390	
Operating Noise Level	$L_{PA}$	dB(A)	< 60								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	7.5								
		lb <sub>m</sub>	16.53								



SPH120 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	190	240	245	240	235	210	200	196	
		in.lb	1682	2124	2168	2124	2080	1859	1770	1735	
Emergency Stop Torque	$T_{2Max}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Maximum Acceleration Torque	$T_{2a}$	Nm	342	432	441	432	423	378	360	352.8	
		in.lb	3027	3824	3903	3824	3744	3346	3186	3123	
Maximum Torque	$T_{2a}$	Nm	380	480	490	480	470	420	400	392	
		in.lb	3363	4248	4337	4248	4160	3717	3540	3469	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	1.05	0.95	0.91	0.88	0.88	0.88	0.88	0.88	
		in.lb	9.29	8.41	8.05	7.79	7.79	7.79	7.79	7.79	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7800								
		lb <sub>f</sub>	1753.44								
Maximum Axial Load	$F_{2OMax}$	N	7000								
		lb <sub>f</sub>	1573.60								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	2.630	1.790	1.530	1.500	1.400	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	10								
		lb <sub>m</sub>	22.05								

SPH120 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	210	210	230	230	255	255	250	210	
		in.lb	1859	1859	2036	2036	2257	2257	2213	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	378	378	414	414	459	459	450	378	
		in.lb	3346	3346	3664	3664	4062	4062	3983	3346	
Maximum Torque	$T_{2a}$	Nm	420	420	460	460	510	510	500	420	
		in.lb	3717	3717	4071	4071	4514	4514	4425	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.95	0.91	0.95	0.91	0.91	0.88	0.88	0.88	
		in.lb	8.41	8.05	8.41	8.05	8.05	7.79	7.79	7.79	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7800								
		lb <sub>f</sub>	1753.44								
Maximum Axial Load	$F_{2OMax}$	N	7000								
		lb <sub>f</sub>	1573.60								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.630	1.670	1.750	1.530	1.490	1.320	1.320	1.320	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	12.5								
		lb <sub>m</sub>	27.56								

SPH120 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	255	255	255	255	255	255	255	210	
		in.lb	2257	2257	2257	2257	2257	2257	2257	1859	
Emergency Stop Torque	$T_{2Max}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Maximum Acceleration Torque	$T_{2a}$	Nm	459	459	459	459	459	459	459	378	
		in.lb	4062	4062	4062	4062	4062	4062	4062	3346	
Maximum Torque	$T_{2a}$	Nm	510	510	510	510	510	510	510	420	
		in.lb	4514	4514	4514	4514	4514	4514	4514	3717	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	0.91	0.91	0.91	0.88	0.88	0.88	0.88	0.88	
		in.lb	8.05	8.05	8.05	7.79	7.79	7.79	7.79	7.79	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{021}$	Nm/arcmin	10	10	10	10	10	10	10	10	
		in.lb/arcmin	88.51	88.51	88.51	88.51	88.51	88.51	88.51	88.51	
Maximum Radial Load	$F_{2AMax}$	N	7800								
		lb <sub>f</sub>	1753.44								
Maximum Axial Load	$F_{2OMax}$	N	7000								
		lb <sub>f</sub>	1573.60								
Max. Tilting Moment	$M_{2OMax}$	Nm	400								
		in.lb	3540.28								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	1.530	1.490	2.570	1.300	1.300	1.300	1.300	1.300	
Operating Noise Level	$L_{PA}$	dB(A)	< 62								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	15.3								
		lb <sub>m</sub>	33.73								

SPH160 1-stage

		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	440	544	585	500	480	450	415	400	
		in.lb	3894	4815	5178	4425	4248	3983	3673	3540	
Emergency Stop Torque	$T_{2Max}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Maximum Acceleration Torque	$T_{2a}$	Nm	792	979.2	1053	900	864	810	747	720	
		in.lb	7010	8667	9320	7966	7647	7169	6611	6373	
Maximum Torque	$T_{2a}$	Nm	880	1088	1170	1000	960	900	830	800	
		in.lb	7789	9630	10355	8851	8497	7966	7346	7081	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.4	
		in.lb	23.01	22.13	21.24	21.24	21.24	21.24	21.24	21.24	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{021}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2AMax}$	N	10000								
		lb <sub>f</sub>	2248.00								
Maximum Axial Load	$F_{2OMax}$	N	8000								
		lb <sub>f</sub>	1798.40								
Max. Tilting Moment	$M_{2OMax}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	12.100	7.750	6.000	5.520	5.100	3.740	3.620	3.620	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	m	kg	22								
		lb <sub>m</sub>	48.50								

SPH160 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	450	450	450	564	608	608	608	450	
		in.lb	3983	3983	3983	4992	5381	5381	5381	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	810	810	810	1015.2	1094.4	1094.4	1094.4	810	
		in.lb	7169	7169	7169	8985	9686	9686	9686	7169	
Maximum Torque	$T_{2a}$	Nm	900	900	900	1128	1216	1216	1216	900	
		in.lb	7966	7966	7966	9984	10762	10762	10762	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	
		in.lb	22.13	21.24	22.13	21.24	21.24	21.24	21.24	21.24	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2Max}$	N	10000								
		lb <sub>f</sub>	2248.00								
Maximum Axial Load	$F_{20Max}$	N	8000								
		lb <sub>f</sub>	1798.40								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	10.100	8.100	7.470	6.650	5.810	6.340	5.360	4.080	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	25								
		lb <sub>m</sub>	55.12								

SPH160 3-stages

		3-stages									
Ratio	i		80	100	125	160	200	256	320	512	
Nominal Output Torque		Nm	580	580	580	580	608	608	580	450	
		in.lb	5133	5133	5133	5133	5381	5381	5133	3983	
Emergency Stop Torque	$T_{2Max}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Maximum Acceleration Torque	$T_{2a}$	Nm	1044	1044	1044	1044	1094.4	1094.4	1044	810	
		in.lb	9240	9240	9240	9240	9686	9686	9240	7169	
Maximum Torque	$T_{2a}$	Nm	1160	1160	1160	1160	1216	1216	1160	900	
		in.lb	10267	10267	10267	10267	10762	10762	10267	7966	
Permitted Average Input Speed	$n_{1N}$	rpm	3000								
Maximum Input Speed	$n_{1Max}$	rpm	6000								
Mean No Load Running Torque	$T_{012}$	Nm	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
		in.lb	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{21}$	Nm/arcmin	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	
		in.lb/arcmin	254.02	254.02	254.02	254.02	254.02	254.02	254.02	254.02	
Maximum Radial Load	$F_{2Max}$	N	10000								
		lb <sub>f</sub>	2248.00								
Maximum Axial Load	$F_{20Max}$	N	8000								
		lb <sub>f</sub>	1798.40								
Max. Tilting Moment	$M_{20Max}$	Nm	850								
		in.lb	7523.10								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.400	7.300	7.300	6.500	6.500	6.500	6.500	6.500	
Operating Noise Level	$L_{PA}$	dB(A)	< 68								
Efficiency at Full loading	$\eta$	%	93								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	28								
		lb <sub>m</sub>	61.73								

SPH205 1-stage

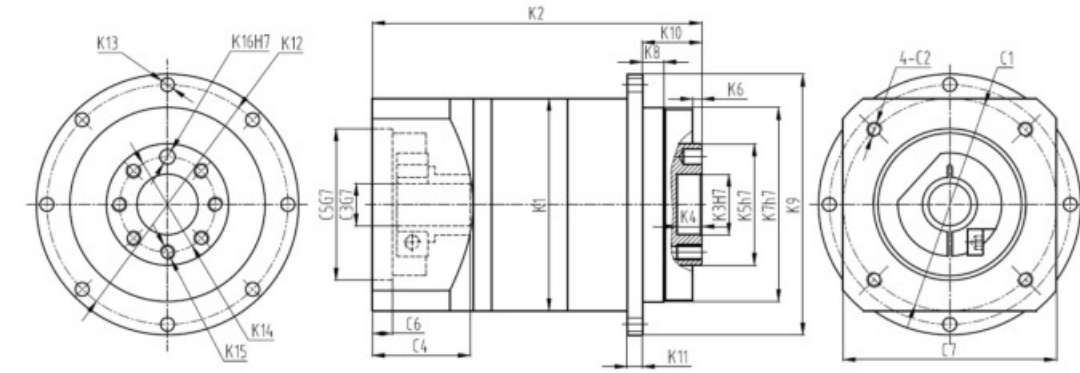
		1-stage									
Ratio	i		3	4	5	6	7	8	9	10	
Nominal Output Torque		Nm	600	1050	1000	800	800	800	710	710	
		in.lb	5310	9293	8851	7081	7081	7081	6284	6284	
Emergency Stop Torque	$T_{2Max}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Maximum Acceleration Torque	$T_{2a}$	Nm	1080	1890	1800	1440	1440	1440	1278	1278	
		in.lb	9559	16728	15931	12745	12745	12745	11311	11311	
Maximum Torque	$T_{2a}$	Nm	1200	2100	2000	1600	1600	1600	1420	1420	
		in.lb	10621	18586	17701	14161	14161	14161	12568	12568	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.5	3.4	3.2	3.2	3.2	3.2	3.2	3.2	
		in.lb	30.98	30.09	28.32	28.32	28.32	28.32	28.32	28.32	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 8								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	16000								
		lb <sub>f</sub>	3596.80								
Maximum Axial Load	$F_{2OMax}$	N	13000								
		lb <sub>f</sub>	2922.40								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	28.980	23.670	22.750	22.480	22.480	22.590	22.590	22.550	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	97								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	37								
		lb <sub>m</sub>	81.57								

SPH205 2-stages

		2-stages									
Ratio	i		12	15	16	20	25	32	40	64	
Nominal Output Torque		Nm	1050	650	1050	1000	1000	1050	1000	800	
		in.lb	9293	5753	9293	8851	8851	9293	8851	7081	
Emergency Stop Torque	$T_{2Max}$	Nm	2100	1300	2100	2000	2000	2100	2000	1600	
		in.lb	18586	11506	18586	17701	17701	18586	17701	14161	
Maximum Acceleration Torque	$T_{2a}$	Nm	1890	1170	1890	1800	1800	1890	1800	1440	
		in.lb	16728	10355	16728	15931	15931	16728	15931	12745	
Maximum Torque	$T_{2a}$	Nm	2100	1300	2100	2000	2000	2100	2000	1600	
		in.lb	18586	11506	18586	17701	17701	18586	17701	14161	
Permitted Average Input Speed	$n_{1N}$	rpm	2000								
Maximum Input Speed	$n_{1Max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.4	3.2	3.4	3.2	3.2	3.2	3.2	3.2	
		in.lb	30.09	28.32	30.09	28.32	28.32	28.32	28.32	28.32	
Maximum Torsional Backlash	$j_i$	arcmin	≤ 10								
Torsional Rigidity	$C_{21}$	Nm/arcmin	120	120	120	120	120	120	120	120	
		in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	
Maximum Radial Load	$F_{2AMax}$	N	16000								
		lb <sub>f</sub>	3596.80								
Maximum Axial Load	$F_{2OMax}$	N	13000								
		lb <sub>f</sub>	2922.40								
Max. Tilting Moment	$M_{2OMax}$	Nm	1280								
		in.lb	11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	18.980	16.980	7.540	7.420	7.540	7.140	7.140	7.540	
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	95								
Operating Temperature		°C	- 25 to +90								
		F	-13 to +194								
Lubrication			Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	42								
		lb <sub>m</sub>	92.59								

SPH205 3-stages

		3-stages									
Ratio	i	80	100	125	160	200	256	320	512		
Nominal Output Torque	Nm	1000	1000	1000	1000	1000	1000	1000	800		
	in.lb	8851	8851	8851	8851	8851	8851	8851	7081		
Emergency Stop Torque	$T_{2Max}$	Nm	2000	2000	2000	2000	2000	2000	1600		
	in.lb	17701	17701	17701	17701	17701	17701	17701	14161		
Maximum Acceleration Torque	$T_{2a}$	Nm	1800	1800	1800	1800	1800	1800	1440		
	in.lb	15931	15931	15931	15931	15931	15931	15931	12745		
Maximum Torque	$T_{2a}$	Nm	2000	2000	2000	2000	2000	2000	1600		
	in.lb	17701	17701	17701	17701	17701	17701	17701	14161		
Permitted Average Input Speed	$n_{1av}$	rpm	2000								
Maximum Input Speed	$n_{1max}$	rpm	4000								
Mean No Load Running Torque	$T_{012}$	Nm	3.2	3.2	3.2	3.2	3.2	3.2	3.2		
	in.lb	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32		
Maximum Torsional Backlash	$j_i$	arcmin	≤ 12								
Torsional Rigidity	$C_{D1}$	Nm/arcmin	120	120	120	120	120	120	120		
	in.lb/arcmin	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08	1062.08		
Maximum Radial Load	$F_{2Max}$	N	16000								
	lb <sub>f</sub>		3596.80								
Maximum Axial Load	$F_{2CMax}$	N	13000								
	lb <sub>f</sub>		2922.40								
Max. Tilting Moment	$M_{2Max}$	Nm	1280								
	in.lb		11328.90								
Mass Moment of Inertia	$j_1$	kgcm <sup>2</sup>	7.540	7.420	7.420	7.140	7.140	7.140	7.140		
Operating Noise Level	$L_{PA}$	dB(A)	< 70								
Efficiency at Full loading	$\eta$	%	93								
		°C	- 25 to +90								
Operating Temperature		F	-13 to +194								
	Lubrication		Synthetic Lubrication Grease								
Mouting Position			Any Directions								
Protection Class			IP 65								
Service lifetime	$L_h$	h	20,000(Continuous Operation)								
Weight	$m$	kg	48								
	lb <sub>m</sub>		105.82								



Model	SPH070			SPH090			SPH120			SPH160			SPH205		
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
K1	Φ70			Φ97			Φ193.2			Φ160			Φ210		
	Φ2.76			Φ3.82			Φ7.61			Φ6.30			Φ8.27		
K2	88	111.7	135.4	120	148.5	179.8	141	185	203	196	257	318	235	297	358
	3.47	4.40	5.33	4.73	5.85	7.08	5.56	7.29	8.00	7.72	10.13	12.53	9.26	11.70	14.11
K3	Φ20			Φ31.5			Φ40			Φ50			Φ80		
	Φ0.79			Φ1.24			Φ1.58			Φ1.97			Φ3.15		
K4	8			12			12			12			22.5		
	0.32			0.47			0.47			0.47			0.89		
K5	Φ40			Φ63			Φ80			Φ100			Φ160		
	Φ1.58			Φ2.48			Φ3.15			Φ3.94			Φ6.30		
K6	3			6			6			6			6		
	0.12			0.24			0.24			0.24			0.24		
K7	Φ64			Φ90			Φ110			Φ140			Φ200		
	Φ2.52			Φ3.55			Φ4.33			Φ5.52			Φ7.88		
K8	7			10			10			14.6			15		
	0.28			0.39			0.39			0.58			0.59		
K9	Φ86			Φ118			Φ145			Φ179			Φ247		
	Φ3.39			Φ4.65			Φ5.71			Φ7.05			Φ9.73		
K10	19.5			30			29			38			56		
	0.77			1.18			1.14			1.50			2.21		
K11	5			8			10			10			12		
	0.20			0.32			0.39			0.39			0.47		
K12	Φ79			Φ109			Φ135			Φ168			Φ233		
	Φ3.11			Φ4.30			Φ5.32			Φ6.62			Φ9.18		
K13	8-Φ4.5			8-Φ5.5			8-Φ5.5			12-Φ6.6			12-Φ9		
	Φ31.5			Φ50			Φ63			Φ80			Φ125		
K14	Φ1.24			Φ1.97			Φ2.48			Φ3.15			Φ4.93		
	7-M5X8			7-M6X12			11-M6X15			11-M8X18			11-M10X17		
K16	Φ5X6			Φ6X7			Φ6X7			Φ8X8			Φ10X10		
	Φ70			Φ90			Φ145			Φ90			Φ200		
C1	Φ2.76			Φ3.54			Φ5.71			Φ3.55			Φ7.87		
	M5X12			M6X15			M8X20			M6X15			M12X25		
C2	Φ14			Φ19			Φ24			Φ19			Φ35		
	Φ0.55			Φ0.75			Φ0.94			Φ0.75			Φ1.38		
C3	32.1			41.6			61.3			41.6			82		
	1.26			1.64			2.42			1.64			3.23		
C4	Φ50			Φ70			Φ110			Φ70			Φ114.3		
	Φ1.97			Φ2.76			Φ4.33			Φ2.76			Φ4.5		
C5	6.5			6.5			8			6.5			8		
	0.26			0.26			0.32			0.26			0.32		
C6	70			97			120			89			175		
	2.76			3.82			4.73			3.51			6.90		
C7	Φ200			Φ145			Φ90			Φ200			Φ145		
	Φ8.46			Φ5.71			Φ3.55			Φ7.87			Φ5.71		
C8	M12X25			M8X20			M12X25			M8X20			M12X25		
	Φ42			Φ24			Φ35			Φ24			Φ42		
C9	Φ1.38			Φ0.94			Φ0.75			Φ1.38			Φ0.94		
	82.5			61.3			41.6			82			61.3		
C10	Φ4.5			Φ4.33			Φ2.76			Φ4.5			Φ4.33		
	8			8			8			8			8		
C11	120			190			175			120			190		
	4.73			7.49			6.90			4.73			7.49		

The dimensions modified as per the applied motor flanges.  
You can get the specific gearbox drawing solution by KDP(Kofon Design Programme) on line from our website: [www.kofon-motion.com](http://www.kofon-motion.com)

Technical Memo

A large grid area for technical drawing or notes, consisting of 20 columns and 30 rows of small squares.

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A large grid area for technical drawing or notes, consisting of 20 columns and 30 rows of small squares.

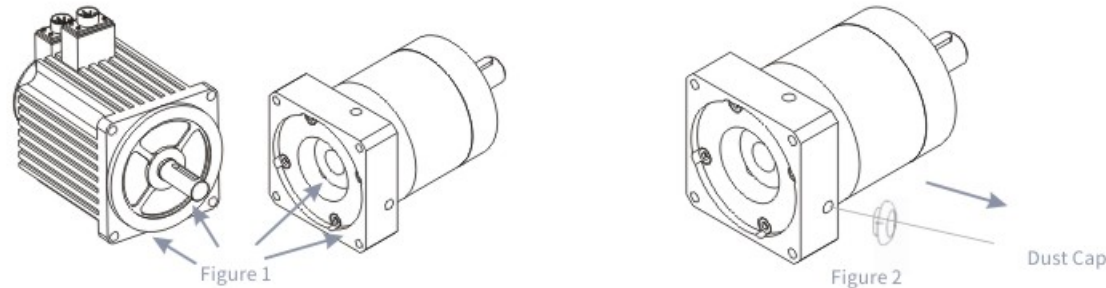
### Installation Instruction

The correct installation, use and maintenance of the gearboxes, are important parts to ensure the normal operation of mechanical equipment, therefore, when you install KOFON gearboxes, be sure to strictly follow the installation related matters to assemble and use seriously.

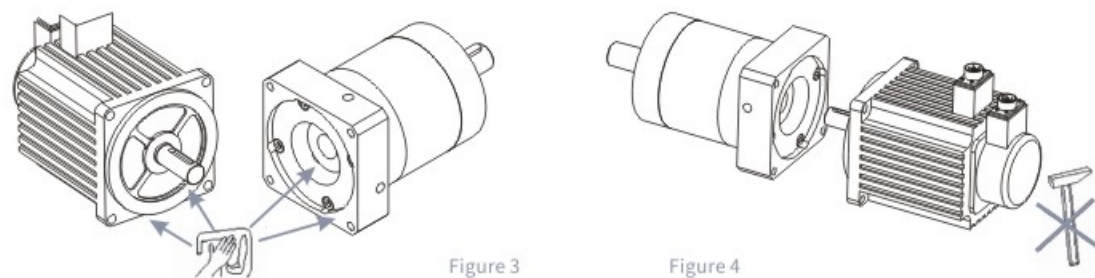
#### The Connection to the Prime Engine

**Step 1.** Before installation confirm the motor and gearboxes are intact, and strictly check whether the size of the various parts of the motors and gearboxes be connected matched, mainly refers to the size of the spigot of the motor and gearboxes notch size and fit tolerance.

**Step 2.** Remove the dust cover on the technological bores of the gearboxes flange outside. Adjust input shaft elastic clamping device so that the fastening bolt is aligned with the technological bore. Insert hex wrench to loosen the fastening bolts. This step is suitable for tube clip locking mechanism coupling.



**Step 3.** Then wipe the anti-rust oil on the motor output shaft, the positioning spigot and gearboxes coupling parts with gasoline or zinc sodium water. Its purpose is to ensure that the coupling tightness and operation flexibility, and to prevent unnecessary wear. Naturally connect the motor and gearboxes, ensure that the concentricity of the gear output shaft and the motor of the input shaft are the same, and both the outside of the flange be parallel. If the concentricity is inconsistency, will cause broken motor shaft and gearboxes gear wear, further, when installed, do not hit with a hammer or other objects, to prevent axial force is so large that damage the bearing of gear.



**Step 4.** Before connecting the motor and gearboxes, please machine of decelerate of motor bearing and azimuth alignment as far as possible, in order to ensure uniform force, please spin on mounting bolts in the any angular positing, but do, spin on the other two on the angular positing of the mounting bolts and then tighten the four mounting bolts one by one. Finally, tighten the bolts, all fastening bolts are required to use torque wrench fixed torsional moment data indicated to fix and check.

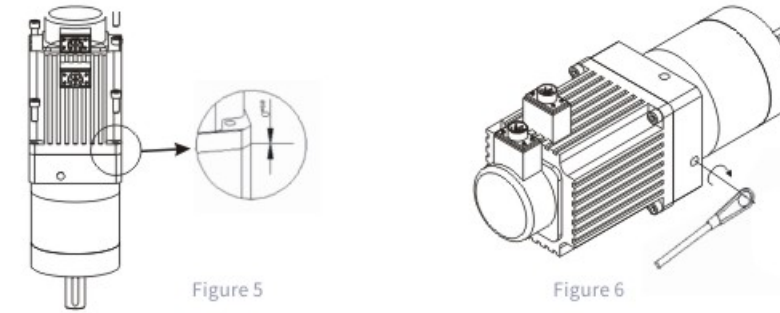


Table 1

	Product Model	KPL50/KPX45	KPL70/KPX65	KPL90/KPX85	KPL120/KPX115	KPL160/KPX142	KPX180/KPX220
Tightening Torque	TA (Nm)	4.5	9	15	36	36	81
Bolt Size	Sw (mm)	M4	M5	M6	M8	M8	M10

#### The connection of the Work Machine

When the installation of the working matching, we should attach importance to the transmission center axis aligned, and the error should not be greater than the amount of coupling the use of compensation. Aligning well can extend the service life and to obtain the desired transmission efficiency, when install transmission parts on the output shaft, not allowed to tap with a hammer, usually use the internal parts of the reducer, best not to use steel fixed coupling, because class coupling improper installation will cause unnecessary applied load, and resulting in early bearing damage, serve or ever cause the output shaft fracture.

#### The Gearboxes Fixing

Gearboxes should be securely mounted on a stable foundation or bearing, and the cooling air circulation flowing, unstable foundation will cause vibration and noise during operation, and promote the bearing and gear damage. When the drive couplings with protrusion or gear and sprocket, you should consider the installation of protective devices, after installation, you should have a in-order comprehensive check of the accuracy of the installation location and the reliability of fasteners clamping. The machine should be flexible rotation after installation. The operation should be smooth without shock, vibration, noise and oil leakage phenomenon. Abnormal should be immediately removed. If the ambient temperature is too high or to low, the grades of grease need to be changed.

