

## High Precision Planetary Reducer

Model No.		Unit	Ratio	47	64	90	110	140	200	255
Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	20	22	60	160	335	650	1,200	2,020
			25	20	50	155	333	618	1,189	2,010
			35	19	47	142	309	573	1,108	1,870
			40	22	60	160	335	650	1,200	2,020
			50	20	50	155	333	618	1,189	2,010
			70	19	47	142	309	573	1,108	1,870
			100	16	43	136	294	549	1,059	1,779
Max. Acceleration Torque	$T_{2B}$	Nm	20 ~ 100	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	$T_{2NOT}$	Nm	20 ~ 100	3 Times of Rated Output Torque						
Rated Input Speed	$n_{1N}$	rpm	20 ~ 100	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Max. Input Speed	$n_{1B}$	rpm	20 ~ 100	6,000	6,000	6,000	6,000	5,000	4,000	3,000
Backlash Ps		arcmin	20 ~ 100	-	-	-	≤ 3	≤ 3	≤ 3	≤ 3
Backlash P0		arcmin	20 ~ 100	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
Backlash P1		arcmin	20 ~ 100	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
Backlash P2		arcmin	20 ~ 100	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
Torsional Rigidity		Nm/arcmin	20 ~ 100	6	14	30	86	155	450	1,126
Max. Radial Force Ball Bearing	$F_{2rB}$	N	4 ~ 10	2,040	2,520	8,460	12,720	14,070	35,200	39,600
Max. Axial Force Ball Bearing	$F_{2aB}$	N	4 ~ 10	1,020	1,260	4,230	6,360	7,035	17,600	19,800
Max. Radial Force Taper Bearing	$F_{2rB}$	N	4 ~ 10	-	-	14,660	23,000	37,200	73,600	107,200
Max. Axial Force Taper Bearing	$F_{2aB}$	N	4 ~ 10	-	-	7,330	11,500	18,600	36,800	53,600
Max. Tilting Moment Ball Bearing ※	$M_{2K}$	Nm	4 ~ 10	31	98	185	320	940	2,200	4,300
Max. Tilting Moment Taper Bearing ※	$M_{2K}$	Nm	4 ~ 10	-	-	280	480	1,400	3,300	6,480
Service Life	$L_H$	hr	20 ~ 100	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
Efficiency	$\eta$	%	20 ~ 100	≥ 94%						
Operating Temperature		°C	20 ~ 100	- 25° C ~ + 90° C						
Lubrication			20 ~ 100	Synthetic Grease						
Protection Class			20 ~ 100	IP65						
Mounting Position			20 ~ 100	Any						
Noise Level		dB	20 ~ 100	≤ 56	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70
Weight ±3%		Kg	20 ~ 100	1	1.9	4.8	9.4	16.7	40.12	64

※Applied to the output shaft center at 100 rpm.

### ■ Mass Moments of Inertia (kg.cm<sup>2</sup>)

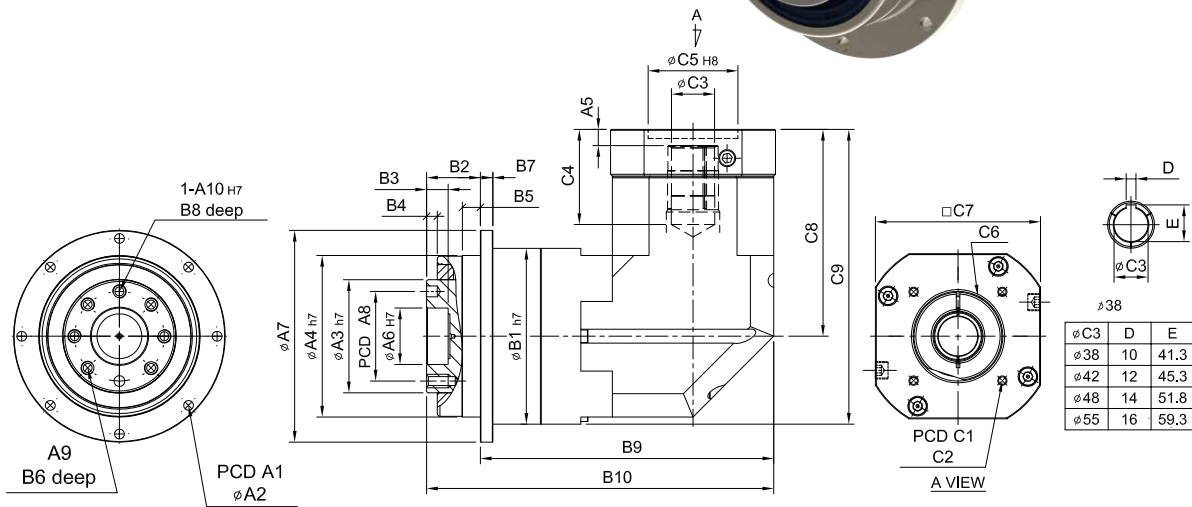
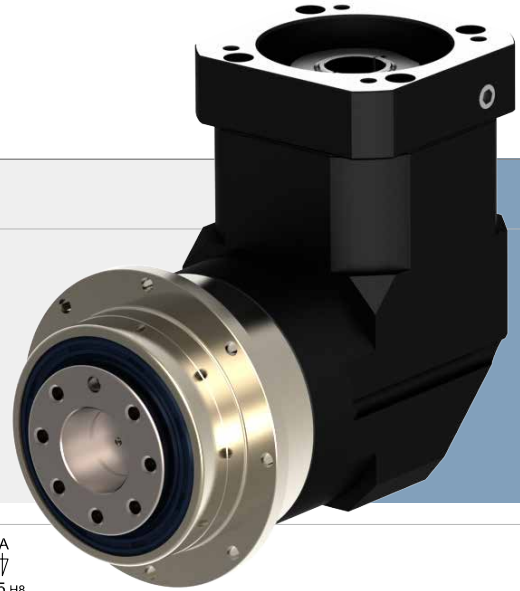
Ratio	47	64	90	110	140	200	255
20	0.03	0.03	0.15	0.45	2.7	7.22	23.22
25	0.03	0.03	0.15	0.45	2.7	7.22	23.22
35	0.03	0.03	0.15	0.45	2.7	7.22	23.22
40	0.03	0.03	0.15	0.45	2.7	7.22	23.22
50	0.03	0.03	0.14	0.4	2.6	7.05	23.07
70	0.03	0.03	0.14	0.4	2.6	7.05	23.07
100	0.03	0.03	0.14	0.4	2.6	7.01	22.67

# SERVOBOX Planetary Reducers

## MODEL : SDL

1-Stage

RATIO : 4, 5, 7, 10, 14, 20



unit: mm

Model Code	47	64	90	110	140	200	255
<b>A</b>							
A1	67	79	109	135	168	233	280
A2	8-3.4	8-4.5	8-5.5	8-5.5	12-6.6	12-9.0	16-13.5
A3	28	40	63	80	100	160	180
A4	47	64	90	110	140	200	255
A5	6	6	9 · 23.5	10 · 20	10	12.5 · 14.5	12.5 · 14.5
A6	12	20	31.5	40	50	80	100
A7	72	86	118	146	179	248	300
A8	20	31.5	50	63	80	125	140
A9	4 - M3 x P0.5	7 - M5 x P0.8	7 - M6 x P1.0	11 - M6 x P1.0	11 - M8 x P1.25	11 - M10 x P1.5	12 - M16 x P2.0
A10	3	5	6	6	8	10	12
<b>B</b>							
B1	59	70	98	125	156	212	255
B2	19.5	19.5	30	29	38	50	66
B3	5	7	12	12	12	16	20
B4	3	4	6	6	6	8	12
B5	5	6	10	10	15	15	20
B6	6.5	8	12	12	16	22	32
B7	4	5	7	8	10	12	18
B8	4	6	6	7	7	10	10
B9	84.2	105.5	163.6	203	227.5	313	332.5
B10	103.7	125	193.6	232	265.5	363	398.5
<b>C</b>							
C1	46 · 60 · 63	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 215	200 · 215 · 265	200 · 265 · 300
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M10 · M12 · M16	M12 · M16
C3	8 · 9 · 11	11 · 14 · 19	16 · 19 · 22 · 24	24 · 28 · 32	32 · 35 · 38	35 · 38 · 42 · 48 · 55	38 · 42 · 48 · 55
C4	27	33.5 · 42	53 · 67.5	67 · 77	85	132 · 134	132 · 134
C5	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230	220 · 250 · 265
C6	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5	M10 x P1.5
C7	46 · 55	64 · 70 · 80	92 · 110 · 130	122 · 130 · 150	146 · 150 · 190	182 · 200 · 250	222 · 250 · 265
C8	61	77 · 85	115.3 · 129.8	141 · 151	165.7	235 · 237	235 · 273
C9	90.5	112 · 120	164.3 · 178.8	203.5 · 213.5	243.7	341 · 343	362 · 364

## High Precision Planetary Reducer

Model No.		Unit	Ratio	47	64	90	110	140	200	255
Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	4	22	60	160	335	650	1,200	2,020
			5	20	50	155	333	618	1,189	2,010
			7	19	47	142	309	573	1,108	1,870
			10	20	50	136	294	549	1,059	1,779
			14	19	47	142	309	573	1,108	1,870
			20	16	43	136	294	549	1,059	1,779
Max. Acceleration Torque	$T_{2B}$	Nm	4 ~ 20	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	$T_{2NOT}$	Nm	4 ~ 20	3 Times of Rated Output Torque						
Rated Input Speed	$n_{IN}$	rpm	4 ~ 20	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Max. Input Speed	$n_{IB}$	rpm	4 ~ 20	6,000	6,000	6,000	6,000	5,000	4,000	3,000
Backlash Ps		arcmin	4 ~ 20	-	-	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
Backlash P0		arcmin	4 ~ 20	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
Backlash P1		arcmin	4 ~ 20	≤ 6	≤ 6	≤ 6	≤ 6	≤ 6	≤ 6	≤ 6
Backlash P2		arcmin	4 ~ 20	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8
Torsional Rigidity		Nm/arcmin	4 ~ 20	6	14	30	86	155	450	1,126
Max. Radial Force Ball Bearing	$F_{2rB}$	N	4 ~ 10	2,040	2,520	8,460	12,720	14,070	35,200	39,600
Max. Axial Force Ball Bearing	$F_{2aB}$	N	4 ~ 10	1,020	1,260	4,230	6,360	7,035	17,600	19,800
Max. Radial Force Taper Bearing	$F_{2rB}$	N	4 ~ 10	-	-	14,660	23,000	37,200	73,600	107,200
Max. Axial Force Taper Bearing	$F_{2aB}$	N	4 ~ 10	-	-	7,330	11,500	18,600	36,800	53,600
Max. Tilting Moment Ball Bearing ※	$M_{2K}$	Nm	4 ~ 10	31	98	185	320	940	2,200	4,300
Max. Tilting Moment Taper Bearing ※	$M_{2K}$	Nm	4 ~ 10	-	-	280	480	1,400	3,300	6,480
Service Life	$L_H$	hr	4 ~ 20	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
Efficiency	$\eta$	%	4 ~ 20	≥ 95%						
Operating Temperature		°C	4 ~ 20	- 25° C ~ + 90° C						
Lubrication			4 ~ 20	Synthetic Grease						
Protection Class			4 ~ 20	IP65						
Mounting Position			4 ~ 20	Any						
Noise Level		dB	4 ~ 20	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74	≤ 76	≤ 78
Weight ±3%		Kg	4 ~ 20	1.1	2.3	6.9	13.4	23	80	90

※Applied to the output shaft center at 100 rpm.

### ■ Mass Moments of Inertia (kg.cm<sup>2</sup>)

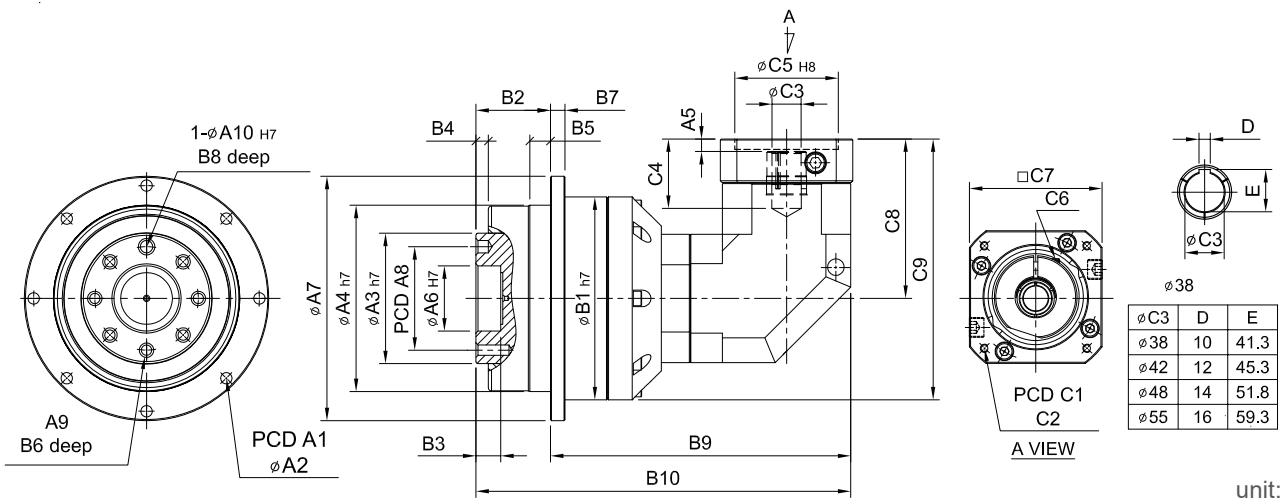
Ratio	47	64	90	110	140	200	255
4	0.09	0.36	2.28	6.85	23.5	68.1	134.8
5	0.09	0.36	2.28	6.85	23.5	68.1	134.8
7	0.09	0.36	2.28	6.85	23.5	68.1	134.8
10	0.09	0.36	2.28	6.85	23.5	68.1	134.8
14	0.03	0.08	1.88	6.2	21.8	66.5	120.2
20	0.03	0.08	1.88	6.2	21.8	66.3	118.8

# SERVOBOX Planetary Reducers

## MODEL : SDL

2-Stage

RATIO : 20, 25, 35, 40, 50, 70, 100, 140, 200



unit: mm

Model Code	47	64	90	110	140	200	255
<b>A</b> A1	67	79	109	135	168	233	280
A2	8-3.4	8-4.5	8-5.5	8-5.5	12-6.6	12-9.0	16-13.5
A3	28	40	63	80	100	160	180
A4	47	64	90	110	140	200	255
A5	6	6	9·23	9·23.5	10	12.5	12.5·14.5
A6	12	20	31.5	40	50	80	100
A7	72	86	118	146	179	248	300
A8	20	31.5	50	63	80	125	140
A9	4 - M3 x P0.5	7 - M5 x P0.8	7 - M6 x P1.0	11 - M6 x P1.0	11 - M8 x P1.25	11 - M10 x P1.5	12 - M16 x P2.0
A10	3	5	6	6	8	10	12
<b>B</b> B1	59	70	98	125	156	212	255
B2	19.5	19.5	30	29	38	50	66
B3	5	7	12	12	12	16	20
B4	3	4	6	6	6	8	12
B5	5	6	10	10	15	15	20
B6	6.5	8	12	12	16	22	32
B7	4	5	7	8	10	12	16
B8	4	6	6	7	7	10	10
B9	110.2	118.5	151	210.6	254.5	308.5	379.1
B10	129.7	138	181	239.6	292.5	358.5	445.1
<b>C</b> C1	46·60·63	46·60·63	70·75·90	90·110·115·145	115·145·165	145·165·215	200·215·265
C2	M3·M4·M5	M3·M4·M5	M4·M5·M6	M5·M6·M8·M10	M6·M8·M10	M8·M10·M12	M10·M12·M16
C3	8·9·11	8·9·11	14·16·19	16·19·22·24	24·28·32	35·38	35·38·42·48·55
C4	27	27	33.5·42	53·67.5	67·77	85	117·119
C5	30·40·50	30·40·50	50·60·70	70·80·95·110	95·110·130	110·130·180	114.3·180·230
C6	M4 x P0.7	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5
C7	46·55	46·55	64·70·80	92·110·130	122·130·150	146·150·190	182·200·250
C8	61	61	77·85	115.3·129.8	141·151	165.7	235·237
C9	90.5	96	126·134	177.8·192.3	219·229	271.7	362.5·364.5

## High Precision Planetary Reducer

Model No.		Unit	Ratio	47	64	90	110	140	200	255
Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	20	22	60	160	335	650	1,200	2,020
			25	20	50	155	333	618	1,189	2,010
			35	19	47	142	309	573	1,108	1,870
			40	22	60	160	335	650	1,200	2,020
			50	20	50	155	333	618	1,189	2,010
			70	19	47	142	309	573	1,108	1,870
			100	16	43	136	294	549	1,059	1,779
			140	19	47	142	309	573	1,108	1,870
	200	16	43	136	294	549	1,059	1,779		
Max. Acceleration Torque	$T_{2B}$	Nm	20 ~ 200	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	$T_{2NOT}$	Nm	20 ~ 200	3 Times of Rated Output Torque						
Rated Input Speed	$n_{1N}$	rpm	20 ~ 200	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Max. Input Speed	$n_{1B}$	rpm	20 ~ 200	6,000	6,000	6,000	6,000	6,000	4,000	3,000
Backlash P <sub>s</sub>		arcmin	20 ~ 200	-	-	-	≤ 4	≤ 4	≤ 4	≤ 4
Backlash P <sub>0</sub>		arcmin	20 ~ 200	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
Backlash P <sub>1</sub>		arcmin	20 ~ 200	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
Backlash P <sub>2</sub>		arcmin	20 ~ 200	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12
Torsional Rigidity		Nm/arcmin	20 ~ 200	6	14	30	86	155	450	1,126
Max. Radial Force Ball Bearing	$F_{2rB}$	N	4 ~ 10	2,040	2,520	8,460	12,720	14,070	35,200	39,600
Max. Axial Force Ball Bearing	$F_{2aB}$	N	4 ~ 10	1,020	1,260	4,230	6,360	7,035	17,600	19,800
Max. Radial Force Taper Bearing	$F_{2rB}$	N	4 ~ 10	-	-	14,660	23,000	37,200	73,600	107,200
Max. Axial Force Taper Bearing	$F_{2aB}$	N	4 ~ 10	-	-	7,330	11,500	18,600	36,800	53,600
Max. Tilting Moment Ball Bearing ※	$M_{2K}$	Nm	4 ~ 10	31	98	185	320	940	2,200	4,300
Max. Tilting Moment Taper Bearing ※	$M_{2K}$	Nm	4 ~ 10	-	-	280	480	1,400	3,300	6,480
Service Life	$L_H$	hr	20 ~ 200	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
Efficiency	$\eta$	%	20 ~ 200	≥ 92%						
Operating Temperature		°C	20 ~ 200	- 25° C ~ + 90° C						
Lubrication			20 ~ 200	Synthetic Grease						
Protection Class			20 ~ 200	IP65						
Mounting Position			20 ~ 200	Any						
Noise Level		dB	20 ~ 200	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74	≤ 76	≤ 78
Weight ±3%		Kg	20 ~ 200	1.4	2	6	11.8	22.3	48.5	97.5

※Applied to the output shaft center at 100 rpm.

### ■ Mass Moments of Inertia (kg.cm<sup>2</sup>)

Ratio	47	64	90	110	140	200	255
20	0.09	0.36	2.28	6.85	23.5	22.8	68.2
25	0.09	0.36	2.28	6.85	23.5	22.8	68.2
35	0.09	0.36	2.28	6.85	23.5	22.8	68.2
40	0.09	0.36	2.28	6.85	23.5	22.8	68.2
50	0.09	0.36	2.28	6.85	23.5	22.8	68.2
70	0.09	0.36	2.28	6.85	23.5	22.8	68.2
100	0.09	0.36	2.28	6.85	23.5	22.8	68.2
140	0.03	0.08	1.88	6.2	21.8	21.1	64.9
200	0.03	0.08	1.88	6.2	21.8	21.1	64.9