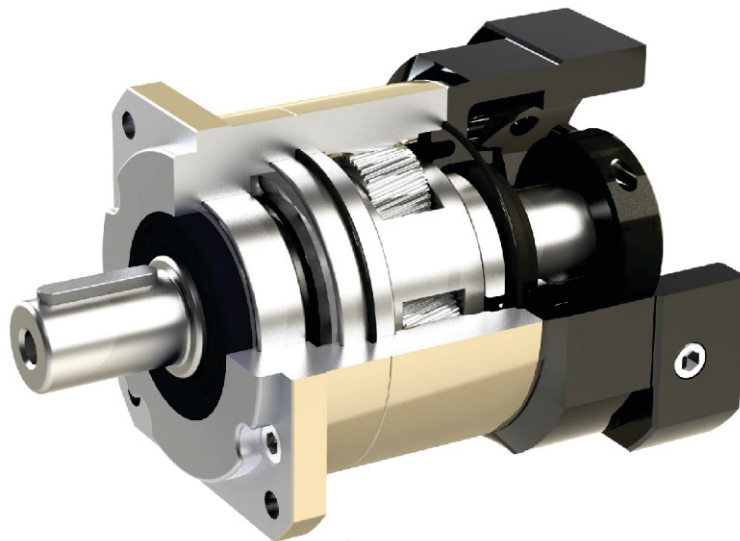


■ 1-Stage Backlash ≤ 8 arcmin

■ 2-Stage Backlash ≤ 12 arcmin



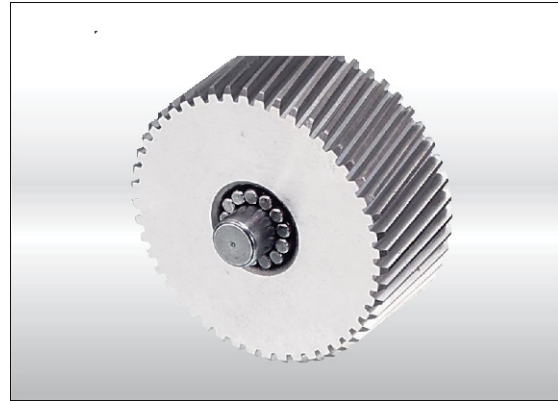
Indication of Model Numbers

FB	90	10		MOTOR
Type	Model	Ratio	Output Shaft Keyway	Motor Type
FB	50	1-Stage	☐	
FE	70	3, 4, 5, 7, 10	Standard (Keyway)	
	90	2-Stage	N:	
	120	15, 20, 25, 30,	Solid Output Shaft	
	145	35, 40, 50, 70, 100	(No Keyway)	
	180			
	220			



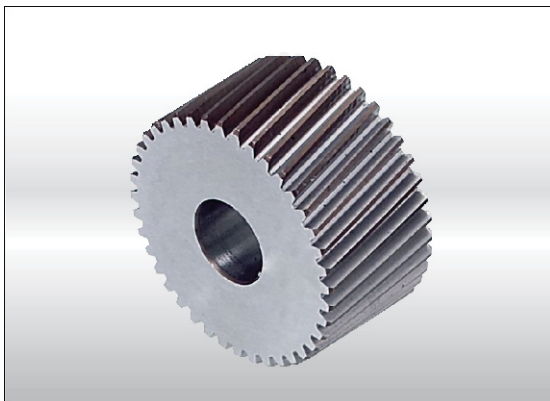
Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is integrated machined for controlling accuracy in the specified tolerance.



Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



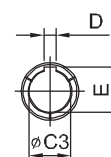
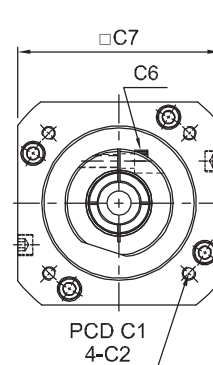
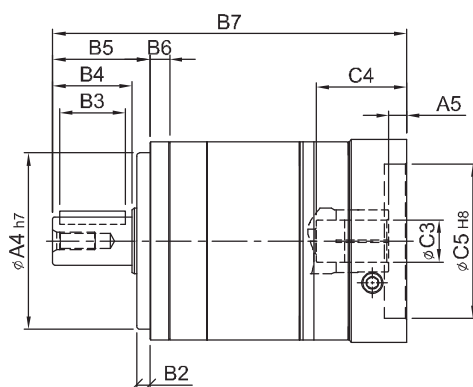
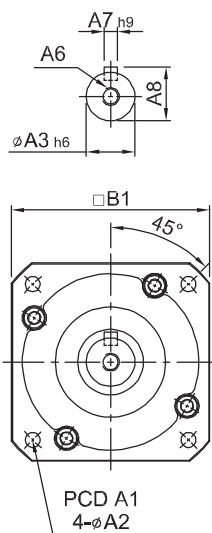
High Precision Gear Machining

The planetary gear and sun gear are manufactured from high quality Ni-Cr-Mo alloy steel (SNCM220), precision machined and carburizing heat treatment to hardness 57-60 HRC. Precision teeth grinding or skiving assures gear accuracy reaches DIN6 class.



One-piece Gearbox Housing

The gearbox and internal ring gear are one-piece constructed. High gear accuracy meets DIN6 class.



(入力孔φ38(含)以上)

φC3	D	E
φ38	10	41.3
φ42	12	45.3
φ48	14	51.8
φ55	16	59.3

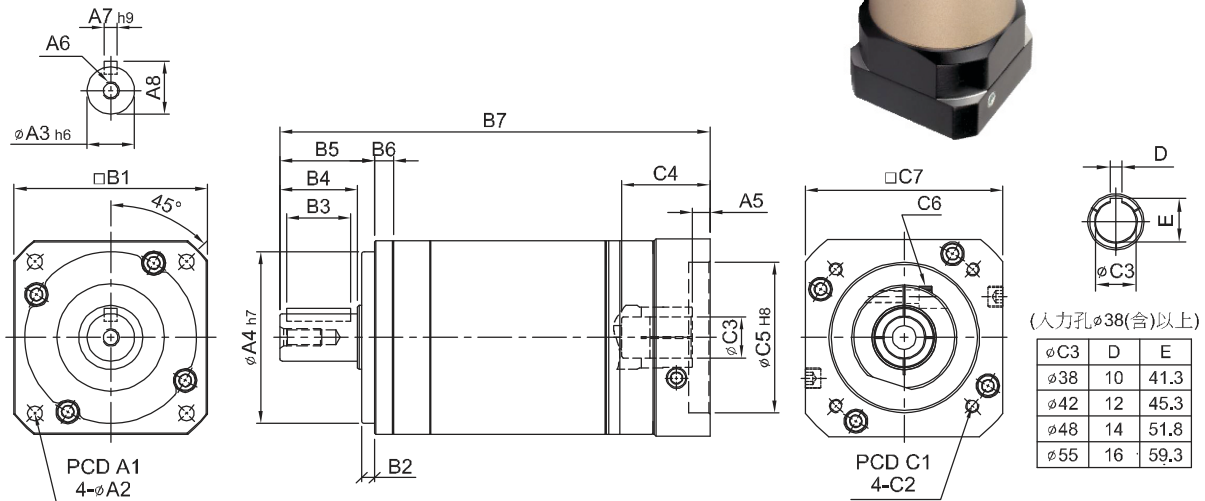
unit : mm

Code	Model	50	70	90	120	145	180	220
A	A1	50	70	100	130	165	215	250
	A2	4.5	6	6.8	9	11	13	17
	A3	13	16	22	32	40	55	75
	A4	35	50	80	110	130	160	180
	A5	5	6	9、23.5	10、20	10	13、15	13.5、15.5
	A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
	A7	5	5	6	10	12	16	20
	A8	15	18	24.5	35	43	59	81
B	B1	50	70	90	120	145	180	220
	B2	4	5	8	8	10	20	20
	B3	15	20	30	40	65	70	90
	B4	20	28	36	50	74	82	104
	B5	25	34	44	60	87	106	129
	B6	6	8	9	12	15	16	24
	B7	100.5	132.5、140.5	170.5、185	227.5	291	325、327	377、379
C	C1	46、60、63	70、75、90	90、100、115、145	115、145、165	145、165、200	200、215、265	200、265、300
	C2	M3 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
	C3	8、9、11	14	19、22、24	24、28、32	35、38	38、42、48	42、48、55
	C4	26	33.5、41.5	51、65.5	63、73	81.5	115、117	118、120
	C5	30、40、50	40、50、60	70、80、95、110	95、110、130	110、130、180	114.3、180、230	114.3、230、250
	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

Model No.		Unit	Ratio	50	70	90	120	145	180	220
Rated Output Torque (Nominal output torque)	T_{2N}	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
Max. Acceleration Torque	T_{2B}	Nm	3~10	1.8 1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	T_{2NOT}	Nm	3~10	3 3 Times of Rated Output Torque						
Rated Input Speed	n_{1N}	rpm	3~10	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Max. Input Speed	n_{1B}	rpm	3~10	5,000	5,000	5,000	5,000	5,000	3,000	3,000
Backlash		arcmin	3~10	≦ 8	≦ 8	≦ 8	≦ 8	≦ 8	≦ 8	≦ 8
Torsional Rigidity		Nm/arcmin	3~10	2.3	5	15	45	69	140	220
Max. Radial Force	F_{2rB}	N	3~10	750	1,180	3,000	6,500	9,100	11,150	35,000
Max. Axial Force	F_{2aB}	N	3~10	325	590	1,500	3,250	4,550	5,575	17,500
Service Life	L_H	hr	3~10	S5 : >30,000 (S1 : >15,000 hrs) S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
	η	%	3~10	≧ 97%						
Operating Temperature		°C	3~10	-25° C ~ +90° C						
Lubrication			3~10	Synthetic Grease						
Protection Class			3~10	IP65						
Mounting Position			3~10	Any						
Noise Level		dB	3~10	≦62	≦62	≦65	≦68	≦70	≦70	≦70
Weight 3%		Kg	3~10	0.63	1.57	3.22	8	16	33	54

Mass Moments of Inertia (kg.cm²)

Ratio	50	70	90	120	145	180	220
3	0.04	0.14	0.61	3.25	8.75	24.63	50.67
4	0.04	0.13	0.48	2.74	7.16	20.12	46.21
5	0.04	0.11	0.47	2.74	6.84	19.80	45.28
7	0.04	0.11	0.44	2.58	6.78	19.21	43.32
10	0.04	0.11	0.44	2.57	6.68	19.13	42.98



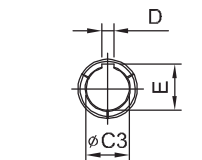
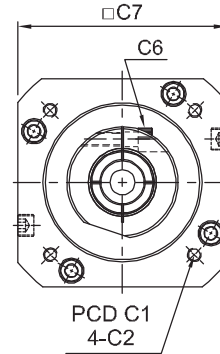
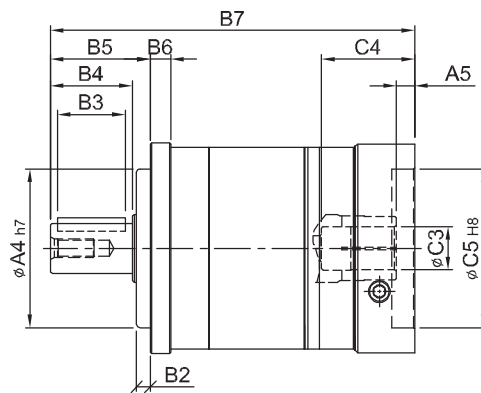
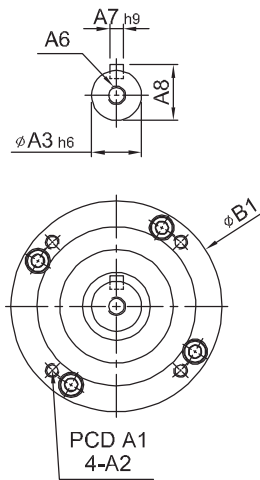
unit : mm

Code	Model	50	70	90	120	145	180	220
A	A1	50	70	100	130	165	215	250
	A2	4.5	6	6.8	9	11	13	17
	A3	13	16	22	32	40	55	75
	A4	35	50	80	110	130	160	180
	A5	5	6	9、23.5	10、20	10	13、15	13.5、15.5
	A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
	A7	5	5	6	10	12	16	20
	A8	15	18	24.5	35	43	59	81
B	B1	50	70	90	120	145	180	220
	B2	4	5	6	8	10	20	20
	B3	15	20	30	40	65	70	90
	B4	20	28	36	50	74	82	104
	B5	25	34	44	60	87	106	129
	B6	6	8	9	12	15	16	24
	B7	126.7	166.5	210.2、224.7	281.5、291.5	354.7	394.5、396.5	464
C	C1	46、60、63	70、75、90	90、100、115、145	115、145、165	145、165、200	200、215、265	200、265、300
	C2	M3 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
	C3	8、9、11	14	19、22、24	24、28、32	35、38	38、42、48	42、48、55
	C4	26	33.5	51、65.5	63、73	81.5	115、117	118、120
	C5	30、40、50	40、50、60	70、80、95、110	95、110、130	110、130、180	114.3、180、230	114.3、230、250
	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

Model No.		Unit	Ratio	50	70	90	120	145	180	220
Rated Output Torque (Nominal output torque)	T _{2N}	Nm	15	17	50	125	268	482	940	1,420
			20	15	45	111	238	426	860	1,300
			25	14	42	104	223	401	835	1,270
			30	17	50	125	268	482	940	1,420
			35	13	39	98	208	373	790	1,180
			40	15	45	111	238	427	860	1,300
			50	14	42	104	223	402	835	1,270
			70	13	40	98	208	373	790	1,180
			100	12	37	92	198	357	760	1,100
Max. Acceleration Torque	T _{2B}	Nm	15~100	1.8 1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	T _{2NOT}	Nm	15~100	3 3 Times of Rated Output Torque						
Rated Input Speed	n _{1N}	rpm	15~100	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Max. Input Speed	n _{1B}	rpm	15~100	5,000	5,000	5,000	5,000	5,000	3,000	3,000
Backlash		arcmin	15~100	≦ 12	≦ 12	≦ 12	≦ 12	≦ 12	≦ 12	≦ 12
Torsional Rigidity		Nm/arcmin	15~100	2.3	5	15	45	69	140	220
Max. Radial Force	F _{2rB}	N	15~100	750	1,180	3,000	6,500	9,100	11,150	35,000
Max. Axial Force	F _{2aB}	N	15~100	325	590	1,500	3,250	4,550	5,575	17,500
Service Life	L _H	hr	15~100	S5 : >30,000 (S1 : >15,000 hrs) S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
/ Efficiency	η	%	15~100	≧ 94%						
Operating Temperature		°C	15~100	-25° C ~ +90° C						
Lubrication			15~100	Synthetic Grease						
Protection Class			15~100	IP65						
Mounting Position			15~100	Any						
Noise Level		dB	15~100	≦ 65	≦ 65	≦ 68	≦ 70	≦ 72	≦ 72	≦ 72
Weight ±3%		Kg	15~100	0.9	2.24	4.59	11.22	22.5	46.4	75

Mass Moments of Inertia (kg.cm²)

Ratio	50	70	90	120	145	180	220
15	0.04	0.14	0.61	3.25	8.75	24.63	50.67
20	0.04	0.13	0.48	2.74	7.16	20.12	46.21
25	0.04	0.11	0.47	2.74	6.84	19.80	45.28
30	0.04	0.14	0.61	3.25	8.75	24.63	50.67
35	0.04	0.11	0.44	2.58	6.78	19.21	43.32
40	0.04	0.11	0.48	2.74	7.16	20.12	46.21
50	0.04	0.11	0.47	2.74	6.84	19.80	45.28
70	0.04	0.11	0.44	2.58	6.78	19.21	43.32
100	0.04	0.11	0.44	2.57	6.68	19.13	42.98



(入力孔φ38(含)以上)

φC3	D	E
φ38	10	41.3
φ42	12	45.3
φ48	14	51.8
φ55	16	59.3

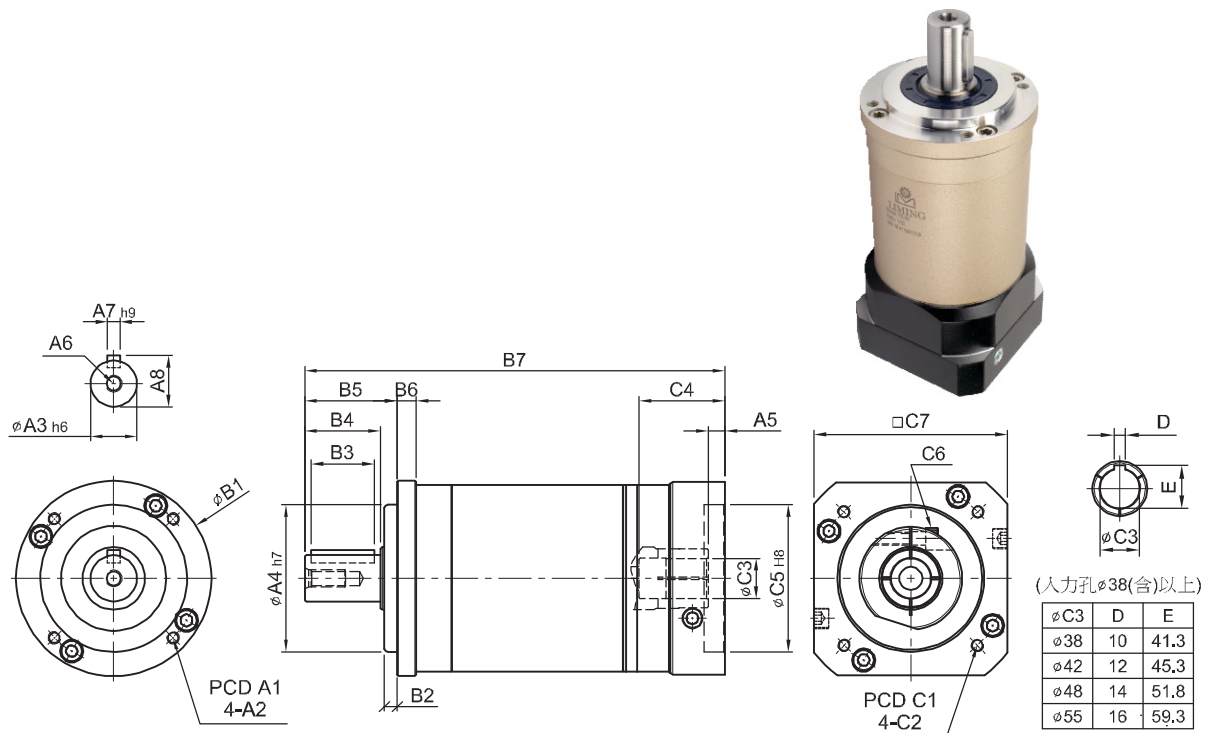
unit : mm

Model	50	70	90	120	145	180	220
Code							
A	A1	42	60	80	105	130	218
	A2	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M12 x P1.75
	A3	13	16	22	32	40	55
	A4	35	50	70	90	110	160
	A5	5	6	9、23.5	10、20	10	13、15
	A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0
	A7	5	5	6	10	12	16
	A8	15	18	24.5	35	43	59
B	B1	Ø50	Ø70	Ø93	Ø122	Ø148	Ø205
	B2	4	5	6	8	10	20
	B3	15	20	30	40	65	70
	B4	20	28	36	50	74	82
	B5	25	34	44	60	87	106
	B6	6	8	9	12	15	21.5
	B7	100.5	132.5、140.5	170.5、185	227.5、237.5	291	325、327
C	C1	46、60、63	70、75、90	90、100、115、145	115、145、165	145、165、200	200、215、265
	C2	M3 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12
	C3	8、9、11	14	19、22、24	24、28、32	35、38	38、42、48
	C4	26	33.5、41.5	51、65.5	63、73	81.5	115、117
	C5	30、40、50	40、50、60	70、80、95、110	95、110、130	110、130、180	114.3、180、230
	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
	C7	46、55	64、70、80	92、110、130	122、130、150	146、150、190	182、200、250

Model No.		Unit	Ratio	50	70	90	120	145	180	220
Rated Output Torque (Nominal output torque)	T _{2N}	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
Max. Acceleration Torque	T _{2B}	Nm	3~10	1.8 1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	T _{2NOT}	Nm	3~10	3 3 Times of Rated Output Torque						
Rated Input Speed	n _{1N}	rpm	3~10	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Max. Input Speed	n _{1B}	rpm	3~10	5,000	5,000	5,000	5,000	5,000	3,000	3,000
Backlash		arcmin	3~10	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8
Torsional Rigidity		Nm/arcmin	3~10	2.3	5	15	45	69	140	220
Max. Radial Force	F _{2rB}	N	3~10	750	1,180	3,000	6,500	9,100	11,150	35,000
Max. Axial Force	F _{2aB}	N	3~10	325	590	1,500	3,250	4,550	5,575	17,500
Service Life	L _H	hr	3~10	S5 : >30,000 (S1 : >15,000 hrs) S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
/ Efficiency	η	%	3~10	≥ 97%						
Operating Temperature		°C	3~10	-25° C ~ +90° C						
Lubrication			3~10	Synthetic Grease						
Protection Class			3~10	IP65						
Mounting Position			3~10	Any						
Noise Level		dB	3~10	≤ 62	≤ 62	≤ 65	≤ 68	≤ 70	≤ 70	≤ 70
Weight ±3%		Kg	3~10	0.63	1.57	3.22	8	16	33	54

Mass Moments of Inertia (kg.cm²)

Ratio	50	70	90	120	145	180	220
3	0.04	0.14	0.61	3.25	8.75	24.63	50.67
4	0.04	0.13	0.48	2.74	7.16	20.12	46.21
5	0.04	0.11	0.47	2.74	6.84	19.80	45.28
7	0.04	0.11	0.44	2.58	6.78	19.21	43.32
10	0.04	0.11	0.44	2.57	6.68	19.13	42.98



unit : mm

Code	Model	50	70	90	120	145	180	220
A	A1	42	60	80	105	130	184	218
	A2	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M12 x P1.75	M16 x P2.0
	A3	13	16	22	32	40	55	75
	A4	35	50	70	90	110	160	180
	A5	5	6	9 ~ 23.5	10 ~ 20	10	13 ~ 15	13.5 ~ 15.5
	A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
	A7	5	5	6	10	12	16	20
	A8	15	18	24.5	35	43	59	79.5
B	B1	Ø50	Ø70	Ø93	Ø122	Ø148	Ø205	Ø242
	B2	4	5	6	8	10	20	20
	B3	15	20	30	40	65	70	90
	B4	20	28	36	50	74	82	104
	B5	25	34	44	60	87	106	129
	B6	6	8	9	12	15	21.5	30
	B7	126.7	166.5	210.2 ~ 224.7	281.5 ~ 291.5	354.7	394.5 ~ 396.5	463.5 ~ 465.5
C	C1	46 ~ 60 ~ 63	70 ~ 75 ~ 90	90 ~ 100 ~ 115 ~ 145	115 ~ 145 ~ 165	145 ~ 165 ~ 200	200 ~ 215 ~ 265	200 ~ 265 ~ 300
	C2	M3 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
	C3	8 ~ 9 ~ 11	14	19 ~ 22 ~ 24	24 ~ 28 ~ 32	35 ~ 38	38 ~ 42 ~ 48	42 ~ 48 ~ 55
	C4	26	33.5	51 ~ 65.5	63 ~ 73	81.5	115 ~ 117	118 ~ 120
	C5	30 ~ 40 ~ 50	40 ~ 50 ~ 60	70 ~ 80 ~ 95 ~ 110	95 ~ 110 ~ 130	110 ~ 130 ~ 180	114.3 ~ 180 ~ 230	114.3 ~ 230 ~ 250
	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

Model No.		Unit	Ratio	50	70	90	120	145	180	220
Rated Output Torque (Nominal output torque)	T _{2N}	Nm	15	17	50	125	268	482	940	1,420
			20	15	45	111	238	426	860	1,300
			25	14	42	104	223	401	835	1,270
			30	17	50	125	268	482	940	1,420
			35	13	39	98	208	373	790	1,180
			40	15	45	111	238	427	860	1,300
			50	14	42	104	223	402	835	1,270
			70	13	40	98	208	373	790	1,180
			100	12	37	92	198	357	760	1,100
Max. Acceleration Torque	T _{2B}	Nm	15~100	1.8 1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	T _{2NOT}	Nm	15~100	3 3 Times of Rated Output Torque						
Rated Input Speed	n _{1N}	rpm	15~100	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Max. Input Speed	n _{1B}	rpm	15~100	5,000	5,000	5,000	5,000	5,000	3,000	3,000
Backlash		arcmin	15~100	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12	≤ 12
Torsional Rigidity		Nm/arcmin	15~100	2.3	5	15	45	69	140	220
Max. Radial Force	F _{2rB}	N	15~100	750	1,180	3,000	6,500	9,100	11,150	35,000
Max. Axial Force	F _{2aB}	N	15~100	325	590	1,500	3,250	4,550	5,575	17,500
Service Life	L _H	hr	15~100	S5 : >30,000 (S1 : >15,000 hrs) S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
Efficiency	η	%	15~100	≥ 94%						
Operating Temperature		℃	15~100	-25° C ~ +90° C						
Lubrication			15~100	Synthetic Grease						
Protection Class			15~100	IP65						
Mounting Position			15~100	Any						
Noise Level		dB	15~100	≤ 65	≤ 65	≤ 68	≤ 70	≤ 72	≤ 72	≤ 72
Weight ±3%		Kg	15~100	0.9	2.24	4.59	11.22	22.5	46.4	75

Mass Moments of Inertia (kg.cm²)

Ratio	50	70	90	120	142	180	220
15	0.04	0.14	0.61	3.25	8.75	24.63	50.67
20	0.04	0.13	0.48	2.74	7.16	20.12	46.21
25	0.04	0.11	0.47	2.74	6.84	19.80	45.28
30	0.04	0.14	0.61	3.25	8.75	24.63	50.67
35	0.04	0.11	0.44	2.58	6.78	19.21	43.32
40	0.04	0.11	0.48	2.74	7.16	20.12	46.21
50	0.04	0.11	0.47	2.74	6.84	19.80	45.28
70	0.04	0.11	0.44	2.58	6.78	19.21	43.32
100	0.04	0.11	0.44	2.57	6.68	19.13	42.98