

Low Backlash Planetary Servo Reducer **IP-series**

Low backlash
High torsional stiffness
20,000 hour lifespan
Easy motor installation
Low input inertia
Shorter start and stop
100% quality testing prior to shipping



IDM Inc. Headquarter

#297-18, Juseong-dong, Sangdang-gu,
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Low Backlash Planetary Servo Reducer **IP-series**

*Your quick and Economic Servo Reducer Solution
- Nothing beat it -*



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ACCURATE

- Low Backlash
(Standard ≤ 6 , Optional < 3)
- Low Inertia
- High Shock Load Capacity
- Exceptional Torsional Stiffness
- Rigid Bearing Construction
- Smooth & Quiet Operation
- Shorter Start & Stop
- Lubricated for lifetime

INTELLIGENT

- Slotted Interface for
Quickest, Easiest Installation
to Any Servo Motor
- Interchangeable Modules
for Flexible Ratio Adaptation
- Highest Degree of Exchange-
ability with Other Reducers
- Add a Right Angle or Belt
Stage With Four Bolts



1. Reducers are generally chosen only in point of reducing speed and increasing torque. However, It is more important for reducers to be chosen by control abilities of an application. We fully understand reducers and its control abilities. So, we can offer the right planetary servo reducer to you.
2. IDM's planetary servo reducers can be customized to meet your OEM requirements:
 - Custom housing designs
 - Various lengths of output shafts
 - Integrated servo motor design
 - Output shaft type, flange type and case rotating type
3. We offer low cost servo reducer solution.
4. We meet quick delivery and do best service.

For applications that require a smooth, quiet running gearbox with low to medium backlash, select IDM's planetary servo reducer.

Technical Specifications of IPA/IPS-series, based on 3,000 RPM input

Specification	Unit	Performance
Backlash	arc-min	Standard ≤ 6 , Optional < 3
Efficiency at Full Load	%	1-Stage > 95 , 2-Stage > 92
Noise Level (at No Load)	db	≤ 65
Lubrication		Grease (Lubricated for Lifetime)
Driving Type		Planetary Gear System
Ratio (Standard)		1-Stage 3:1, 4:1, 5:1, 9:1 2-Stage (9:1), (12:1), 15:1, (16:1), 20:1, 25:1, (36:1) 45:1, 81:1 () Optional
Direction of Rotation		Motor and Gearhead Same Direction
Installation Position		Less Dust, No Water
Ambient Temp.	$^{\circ}\text{C}$	0 to 40 (32 $^{\circ}\text{F}$ to 104 $^{\circ}\text{F}$)
Ambient Humidity	%	≤ 90 (but No Dew Condensation)
Atmosphere		Without Corrosive Gases, Explosive Gases, Steam and Dust
Orientation		Any
Max. Permissible Housing Temp.	$^{\circ}\text{C}$	90 (194 $^{\circ}\text{F}$) (It could be changed by installation environment)

Caution

- Shocking on input shaft or output shaft, it could be broken down.
- When applying Bushing, you must align the slot of Set Collar, Bushing and Input Shaft Hole to maximize the clamping power on motor shaft

For any questions, contact IDM at <http://www.idminc.co.kr>,
☎ ++82-43-241-3520 or by email at bsato@idminc.co.kr

Model and Symbols – easy to order



1	Model	IPA : Compatible with APEX IPS : Compatible with SHIMPO	
2	Size	IPA 042:□42 090:□90 120:□120 180:□180	IPS 052:□52 078:□78 098:□98 125:□125
3	Ratio	03 : 3:1 04 : 4:1 05 : 5:1 09 : 9:1 12 : 12:1 15 : 15:1 16 : 16:1 20 : 20:1 25 : 25:1 27 : 27:1 36 : 36:1 45 : 45:1 81 : 81:1	
4	Input	A : Adaptor Flange K : Dedication W/Key S : Dedication W/Clamp Hub	
5	Motor	Manufacture Model	

We insure backlash down to 1-stage 6 arc-min and 2-stage 8 arc-min,
Lower backlash than 3 arc-min or custom options / modifications available.

** IDM reference table of reducers by servo motor capacity

Reduction Ratio Motor Capacity(W)	1 Stage Reduction				2 Stage Reduction									
	3:1	4:1	5:1	9:1	(9:1)	12:1	15:1	16:1	20:1	25:1	27:1	36:1	45:1	81:1
50	42				42									80
100														90
200										80				80
400	60				60					80				100
500										90				120
750										100				142
800	80													180
1000														
1,2K														
1,5K	90													142
2,0K														220
2,5K														
3,0K														
3,5K	100													180
4,0K														
4,5K														
5,0K	120													220

The table is based on 3,000 RPM input. In case of 2,000 RPM input, one step bigger reducer recommended.
(The table is just for reference, it could be changeable by working conditions.)

Performance

(1) Based on B10 bearing lifespan of 10,000 hours and 3,000 RPM input.
(2) Permissible 1,000 times during the lifespan of gearhead.
(3) Measured at a distance of 1 meter at 3,000 RPM of ration 5:1 without load.

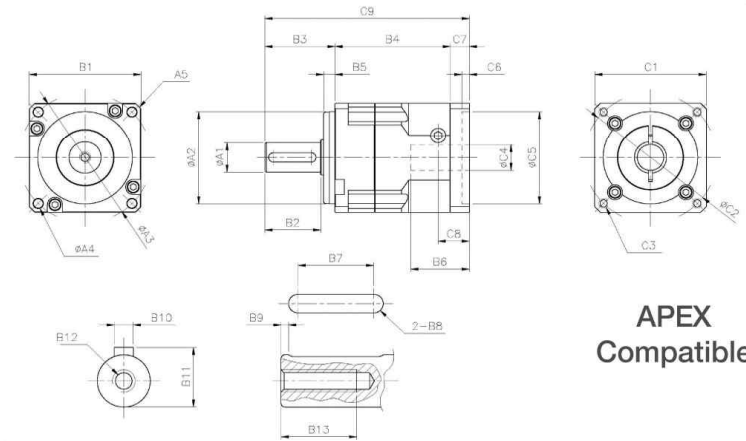
Size IP/IPS	Stage	Ratio(1)	Nominal Output Torque (1) (N·m)	Maximum Output Torque (N·m)	Emergency Stop Torque (2) (N·m)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Motor Capacity (W)	Max. Radial Load (N)	Max. Axial Load (N)	Noise Level (dB)	Moment of inertia (kg·cm²)	Efficiency at full load (%)	Weight (kg)
□42	1	3	6	15	18	3000	6000	500	305	150	72	0,231	95	0,4
		4	7	17	18	3000	6000	450	335	165	65	0,204	95	
		5	5	11	18	3000	6000	200	365	180	65	0,188	95	
		9	3	7	18	3000	6000	80	440	220	65	0,181	95	
	2	(9)	6	15	18	3000	6000	200	440	270	65	0,237	93	0,5
		15	6	15	18	3000	6000	100	540	285	65	0,191	93	
		20	7	17	18	3000	6000	100	570	310	65	0,189	93	
		25	5	11	18	3000	6000	50	620	370	65	0,189	93	
81	3	7	18	3000	6000	10	915	195	65	0,181	93			
□60	1	3	12	30	40	3000	6000	1000	395	195	72	0,796	95	0,8
		4	15	37	40	3000	6000	1000	435	215	65	0,720	95	
		5	10	23	40	3000	6000	450	470	235	65	0,689	95	
		9	6	14	40	3000	6000	200	570	285	65	0,653	95	
	2	(9)	12	30	40	3000	6000	400	570	285	65	0,249	93	1,1
		15	12	30	40	3000	6000	200	680	340	65	0,196	93	
		20	15	37	40	3000	6000	200	745	370	65	0,191	93	
		25	19	23	40	3000	6000	100	805	400	65	0,191	93	
45	10	23	40	3000	6000	50	980	490	65	0,191	93			
81	6	14	40	3000	6000	20	1190	595	65	0,181	93			
□80	1	3	26	65	80	3000	6000	2500	560	280	72	2,548	95	1,8
		4	30	75	80	3000	6000	2000	660	330	65	2,244	95	
		5	20	50	80	3000	6000	1000	710	355	65	2,080	95	
		9	12	30	80	3000	6000	350	865	430	65	1,961	95	
	2	(9)	26	65	80	3000	6000	750	865	430	65	0,858	93	2,3
		15	26	65	80	3000	6000	500	1020	510	65	0,724	93	
		20	30	75	80	3000	6000	400	1130	565	65	0,696	93	
		25	20	50	80	3000	6000	200	1220	610	65	0,197	93	
45	20	50	80	3000	6000	100	1480	740	65	0,683	93			
81	12	30	80	3000	6000	40	1785	890	65	0,181	93			
□90	1	3	38	105	135	3000	6000	4000	815	405	72	4,801	95	2,6
		4	50	125	135	3000	6000	3500	905	450	65	4,210	95	
		5	32	80	135	3000	6000	1700	970	485	65	3,892	95	
		9	19	47	135	3000	6000	600	1180	590	65	3,890	95	
	2	(9)	38	105	135	3000	6000	1300	1180	590	65	3,499	93	3,5
		15	38	105	135	3000	6000	800	1395	695	65	3,030	93	
		20	50	125	135	3000	6000	700	1540	770	65	2,988	93	
		25	32	80	135	3000	6000	350	1660	830	65	2,889	93	
45	32	80	135	3000	6000	200	2020	1010	65	0,735	93			
81	19	47	135	3000	6000	70	2445	1225	65	0,183	93			

Performance

(1) Based on B10 bearing lifespan of 10,000 hours and 3,000 RPM input.
 (2) Permissible 1,000 times during the lifespan of gearhead.
 (3) Measured at a distance of 1 meter at 3,000 RPM of ratio 5:1 without load.

Size IPA/RS	Stage	Ratio(1)	Nominal Output Torque (1) (N·m)	Maximum Output Torque (N·m)	Emergency Stop Torque (2) (N·m)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Motor Capacity (W)	Max. Input Load (kg)	Max. Output Load (kg)	Noise Level (dB)	Moment of Inertia (kg·cm ²)	Efficiency at full load (%)	Weight (kg)
□100	1	3	76	190	245	3000	6000	7000	1130	565	72	9,184	95	3.6
		4	88	220	245	3000	6000	6000	1255	625	65	7,460	95	
		5	62	155	245	3000	6000	6000	1355	675	65	6,561	95	
	2	9	34	85	245	3000	6000	1000	1650	825	65	5,283	95	
		(9)	76	190	245	3000	6000	2500	1650	825	65	4,564	93	
		15	76	190	245	3000	6000	1300	1940	970	65	3,825	93	
□120	1	3	192	480	890	2000	4000	15000	1425	710	72	23,212	95	7.1
		4	228	570	890	2000	4000	15000	1590	795	65	17,880	95	
		5	146	365	890	2000	4000	8000	1705	850	65	14,693	95	
	2	9	86	215	890	2000	4000	2500	2080	1040	65	13,825	95	
		(9)	192	480	890	2000	4000	5000	2080	1040	65	9,923	93	
		15	192	480	890	2000	4000	3500	2450	1225	65	6,957	93	
□142	1	3	300	750	970	2000	4000	25000	1560	780	72	61,518	95	9.5
		4	360	900	970	2000	4000	20000	1715	855	65	44,369	95	
		5	228	570	970	2000	4000	10000	1855	925	65	35,354	95	
	2	9	134	335	970	2000	4000	4000	2230	1115	65	31,501	95	
		(9)	300	750	970	2000	4000	8000	2230	1115	65	24,617	93	
		15	300	750	970	2000	4000	5000	2665	1330	65	15,757	93	
□180	1	3	580	1450	1900	2000	4000	50000	3140	1570	72	172,250	95	12
		4	688	1720	1900	2000	4000	45000	3430	1715	65	124,233	95	
		5	436	1090	1900	2000	4000	25000	3725	1860	65	98,991	95	
	2	9	256	640	1900	2000	4000	7500	4510	2255	65	88,203	95	
		(9)	580	1450	1900	2000	4000	15000	4510	2255	65	68,928	93	
		15	580	1450	1900	2000	4000	10000	5390	2695	65	44,120	93	
□220	1	3	904	2260	2900	2000	4000	55000	4410	2205	72	482,300	95	14
		4	1068	2670	2900	2000	4000	50000	4805	2400	65	347,852	95	
		5	680	1700	2900	2000	4000	25000	5100	2550	65	277,175	95	
	2	9	396	990	2900	2000	4000	8000	6275	3135	65	246,968	95	
		(9)	904	2260	2900	2000	4000	20000	6275	3135	65	192,998	93	
		15	904	2260	2900	2000	4000	10000	7350	3675	65	123,536	93	
□220	2	20	1068	2670	2900	2000	4000	10000	8235	4115	65	112,081	93	
		25	680	1700	2900	2000	4000	5000	8820	4410	65	53,822	93	
		45	680	1700	2900	2000	4000	3000	10780	5390	65	119,599	93	
		81	396	990	2900	2000	4000	1000	13230	6615	65	27,919	93	

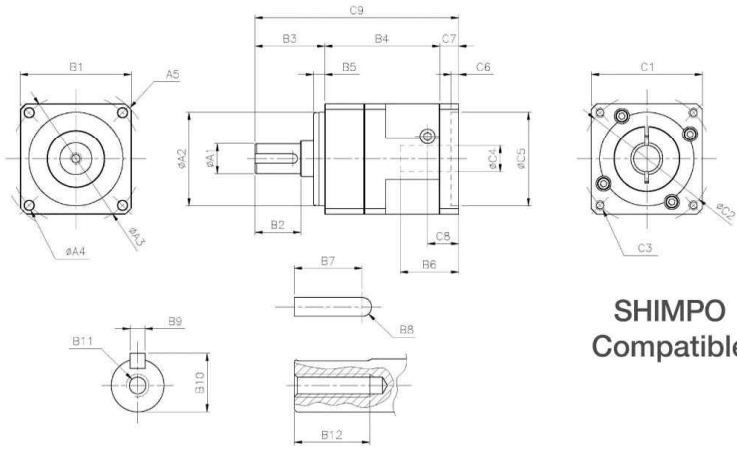
IPA Dimensions Ratio : 1-Stage (R=3~9), 2-Stage (R=9~81)



Dimension	IPA042	IPA060	IPA090	IPA100	IPA120	IPA142	IPA180
A1 h7	13	16	22	24	32	40	55
A2 h7	35	50	80	90	110	130	160
A3	50	70	100	115	130	165	215
A4	3,4	5,5	6,6	9	9	11	13
A5	C2	C3	C6	C8	C10	C12	C12
B1	42	59	89	99	119	139	179
B2	19,5	29,5	36,5	44	51	79	82
B3	26	37	48	58	65	97	105
B4(1-stage)	50,5	61(66)	84(87)	97(106)	97(107)	114,5(124,5)	159(166)
B4(2-stage)	64,5	77(82)	106(109)	123(132)	130(140)	150,5(160,5)	208(215)
B5	5,5	6	10	10	12	15	20
B6	25(24)	31	40	57	50	60	82
B7	11	20	24	28	30	51	54
B8	R2,5	R2,5	R3	R4	R5	R6	R8
B9	2	2	3	4	5	5	6
B10	5	5	6	8	10	12	16
B11	15	18	24,5	27	35	43	59
B12	M4	M6	M8	M8	M12	M16	M20
B13	15	20	25	25	28	40	45
C1	42	59	89	99	119	139	190
C2	45	70	100	115	130	165	215
C3	M3	M5	M6	M8	M8	M10	M12
C4 H7	5~11	6,35~14	12~24	14~24	16~28	24~38	28~35
C5 H7	30	50	80	95	110	130	180
C6	4	4	4	4	5	6	6
C7	10	10	12	19	25	28	37
C8	15,5	19,5	21	32	15	19	29
C9(1-stage)	86,5	108(113)	144(147)	174(183)	187(197)	239,5(249,5)	301(308)
C9(2-stage)	100,5	124(129)	166(169)	200(209)	220(230)	275,5(285,5)	350(357)

※ Dimension(C1 to C9) of adapter depends on motor specification.
 ※ Dimension () is the ratio 9 : 1.
 ※ C of A5 dimension is chamfer value.

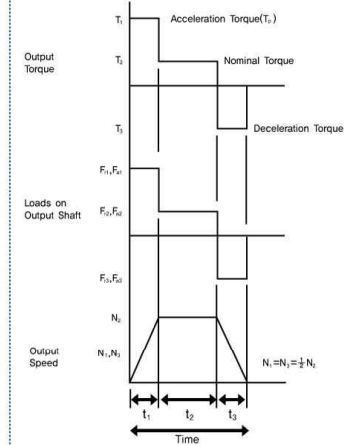
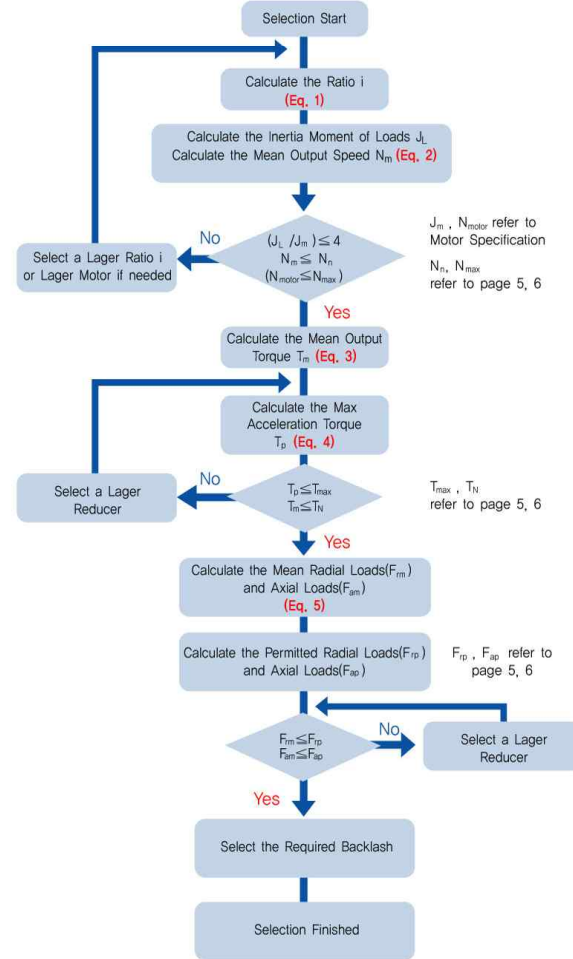
IPS Dimensions Ratio : 1-Stage (R=3~9), 2-Stage (R=9~81)



Dimension	IPS052	IPS078	IPS098	IPS125
A1 h7	12	19	24	32
A2 h7	50	70	90	110
A3	60	90	115	135
A4	M5	M6	M8	M10
A5	C3	C4	C8	C10
B1	59	78	98	119
B2	20	30	40	55
B3	32	50	61	75
B4(1-stage)	68	84.5	97(106)	113
B4(2-stage)	84	105.5	123(132)	146
B5	6	6	10	12
B6	27	42	57	55
B7	16	23	24.5	47
B8	R2	R3	R4	R5
B9	4	6	8	10
B10	13.5	21.5	27	35
B11	M6	M6	M8	M12
B12	20	20	25	28
C1	60	78	98	120
C2	60	90	115	130
C3	M4	M5	M8	M8
C4 H7	6.35~14	10~19	14~24	16~28
C5 H7	50	70	95	110
C6	4	4	4	4
C7	10	14	19	25
C8	19.5	24.5	32	15
C9(1-stage)	110	148.5	177(186)	233
C9(2-stage)	126	169.5	203(212)	266

※ Dimension(C1 to C9) of adapter depends on motor specification.
 ※ Dimension in () is the ratio 9 : 1.
 ※ C of A5 dimension is chamfer value.

Selection of the Optimum Reducers



$$i = \frac{n_m}{n_{work}} \quad (\text{Eq. 1})$$

n_m Output Speed of the Motor
 n_{work} Working Speed

$$N_m = \frac{t_1 N_1 + t_2 N_2 + t_3 N_3 + \dots + t_n N_n}{t_1 + t_2 + t_3 + \dots + t_n} \quad (\text{Eq. 2})$$

$$T_m = \sqrt{\frac{t_1 N_1 T_1^3 + t_2 N_2 T_2^3 + t_3 N_3 T_3^3 + \dots + t_n N_n T_n^3}{t_1 N_1 + t_2 N_2 + t_3 N_3 + \dots + t_n N_n}} \quad (\text{Eq. 3})$$

$$T_p = \frac{GD^2}{375} \times \frac{N_2}{t_1} + T_2 \text{ (kgf} \cdot \text{m)} \quad (\text{Eq. 4})$$

(GD² : Flywheel Effect)

- i : Ratio
- J_m : Motor Inertia
- J_L : Load Inertia
- N₁ : Nominal Input Speed
- N_n : Mean Output Speed (of motor)
- N_{max} : Max Input Speed
- N_{motor} : Max Motor Speed
- T_p : Max Acceleration Torque
- T_m : Mean Output Torque
- T_{max} : Maximum Output Torque
- T_N : Nominal Output Torque
- F_{am} : Mean Axial Load
- F_{ap} : Max Radial Load
- F_{rm} : Mean Radial Load
- F_{rp} : Max Axial Load

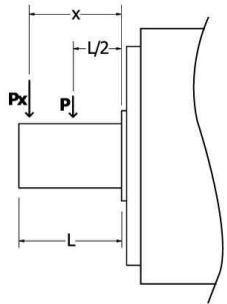
$$F_{rm} = \sqrt{\frac{t_1 N_1 F_{r1}^3 + t_2 N_2 F_{r2}^3 + t_3 N_3 F_{r3}^3 + \dots + t_n N_n F_{rn}^3}{t_1 N_1 + t_2 N_2 + t_3 N_3 + \dots + t_n N_n}} \quad (\text{Eq. 5})$$

$$F_{am} = \sqrt{\frac{t_1 N_1 F_{a1}^3 + t_2 N_2 F_{a2}^3 + t_3 N_3 F_{a3}^3 + \dots + t_n N_n F_{an}^3}{t_1 N_1 + t_2 N_2 + t_3 N_3 + \dots + t_n N_n}}$$

Overhung Load and Servo Motor Assembly Installation

Overhung Load

When a radial load is being applied to the shaft in a position other than the center, calculate the overhung load using the following equation:



P : Allowable radial load
 Px : Actual overhung load
 L : Output shaft length
 K : Constant

$$Px = P \times \frac{K}{K + (X - L/2)} \leq \text{Allowable radial load}$$

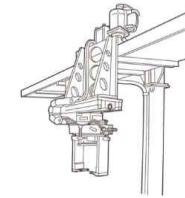
Size	K	L
□42	32	20
□60	42	28
□80	47	32
□90	58	42
□100	63	55
□120	97	82
□142	107	82
□180	121	90
□220	132	110

Servo Motor Assembly Installation

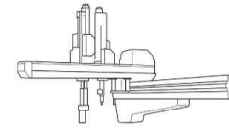
1. Remove the set screw and turn the Input shaft until the cap screw is seen.
2. Carefully insert servo motor shaft into the Input shaft. Make sure to insert motor straight
3. Install the servo motor to the reducer and tighten the motor fixing bolts to the proper torque. Refer to the table below.
4. Reinstall the cap screw and the set screw.

Size	Bolt Size	The Number	N · m	kgf · cm
42	M3	4	1,2	12
60	M4	4	2,9	29
80	M5	4	5,0	50
90	M6	4	9,2	92
100	M8	4	22	220
120	M10	4	45	450
142	M12	4	90	800
180	M14	4	122	1220
220	M16	4	200	2000

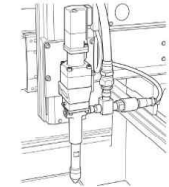
Applications



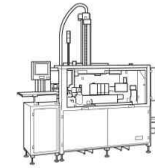
Automatic labor saving machine



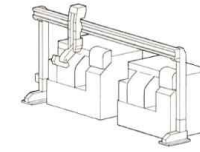
Gentry robot



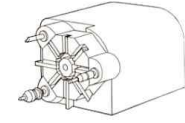
Dispenser robot



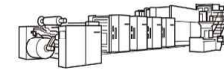
Auto packing sealing machine



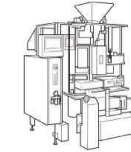
Loader robot



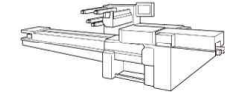
Turret head



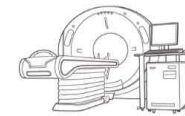
Printer



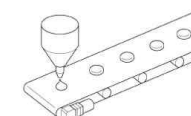
Packing machine (vertical pillow)



Packing machine (horizontal pillow)



Medical machinery



Belt conveyor

Attachable and applicable to range of applications and devices

Possible to install on almost any servo motor of company below.

- PANASONIC
- YASKAWA ELECTRIC
- MITSUBISHI ELECTRIC
- OMRON
- YAMAGAWA SEIKI
- FANUC
- SHINKO ELECTRIC
- TOEI ELECTRIC
- SANYO DENKKI
- FUJI ELECTRIC
- NIKIKI DENSO
- MIKKI PULLY
- HITACHI SANKI SYSTEM
- KEYENCE
- NIDEC CORP
- SANMEI COMPANY

	MSM	MSMA	MSMD	MUMA	MBMK
PANASONIC	SGM	SGMAH	SGMAS	SJME	
YASKAWA ELECTRIC	HC-KF	HC-MFS	HC-MF	HC-ME	HC-PQ HC-KQ HC-KP HC-MP
MITSUBISHI ELECTRIC	R88M-U	R88M-W	R7M-A		
OMRON	GYS				
FUJI ELECTRIC	P30B	Q1			
SANYO DENKKI	TAL-I	TBL-I			
TAMAGAWA SEIKI	SA3				
MIKKI PULLY	NA50	NA70	NA80		
NIKIKI DENSO	NY				
KEYENCE	ADMA				
HITACHI SANKI	TS	SS			
SANMEI COMPANY					