



## High Precision Planetary Gearheads for Servo motors

# SPH Series

- ▶ Helical Gear
- ▶ Compact size
- ▶ High Precision, High Durability
- ▶ High Efficiency
- ▶ Easy Mount
- ▶ Protection grade IP65

# SPIH Series

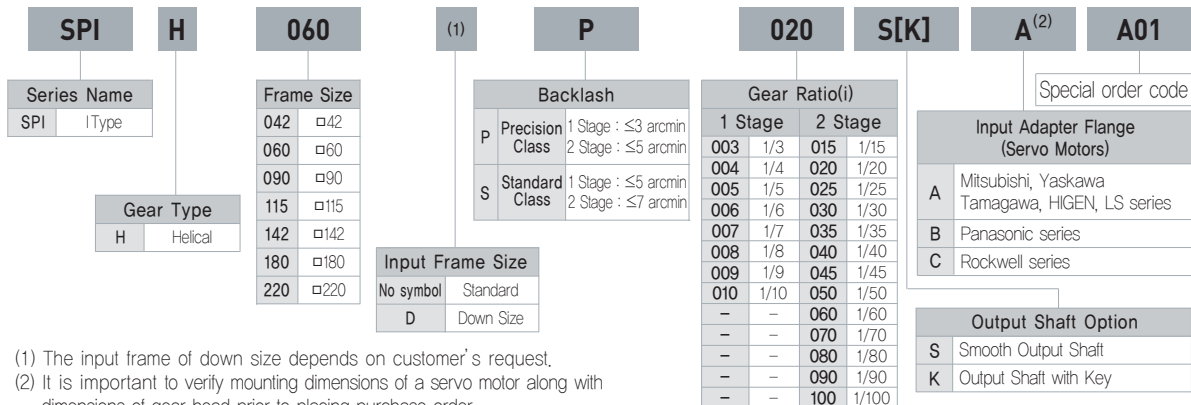
SPIH

## Specifications

Description	Unit	Stage	Ratio (1)	Model No.													
				SPIH 042	SPIH 060	SPIH 060D	SPIH 090	SPIH 090D	SPIH 115	SPIH 115D	SPIH 142	SPIH 142D	SPIH 180	SPIH 180D	SPIH 220	SPIH 220D	
Nominal Output torque $T_{2N}^{(2)}$	Nm	1	3	16	48	-	117	-	195	-	480	-	750	-	1,600	-	
			4	16	36	-	107	-	215	-	635	-	950	-	1,600	-	
			5	19	43	-	120	-	250	-	580	-	1,200	-	2,080	-	
			6	15	43	-	107	-	215	-	530	-	1,100	-	1,630	-	
			7	15	40	-	100	-	213	-	495	-	980	-	1,960	-	
			8	10	43	-	106	-	220	-	420	-	870	-	1,700	-	
			9	14	35	-	93	-	160	-	390	-	710	-	1,560	-	
			10	11	30	-	94	-	215	-	370	-	790	-	1,395	-	
		2	15	16	48	48	117	117	195	195	-	480	-	750	-	1,600	-
			20	16	36	36	107	107	215	215	-	635	-	950	-	1,600	-
			25	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			30	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			35	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			40	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			45	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			50	19	43	43	120	120	250	250	-	580	-	1,200	-	2,080	-
			60	15	43	43	107	107	215	215	-	530	-	1,100	-	1,630	-
			70	15	40	40	100	100	213	213	-	495	-	980	-	1,960	-
80	10	43	43	106	106	220	220	-	420	-	870	-	1,700	-			
90	14	35	35	93	93	160	160	-	390	-	710	-	1,560	-			
100	11	30	30	94	94	215	215	-	370	-	790	-	1,395	-			
Max Acceleration torque $T_{2B}$	Nm	1,2	3~100	3 times of Nominal Output torque													
Nominal Input speed $n_1$	rpm	1,2	3~100	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000		
Max. Input speed $N_1$	rpm	1,2	3~100	6,000	6,000	6,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000		
Backlash (Standard class)	arcmin	1	3~10	≤ 5	≤ 5	-	≤ 5	-	≤ 5	-	≤ 5	-	≤ 5	-	≤ 5		
		2	15~100	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7		
Backlash (Precision Class)	arcmin	1	3~10	≤ 3	≤ 3	-	≤ 3	-	≤ 3	-	≤ 3	-	≤ 3	-	≤ 3		
		2	15~100	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5		
Torsional Rigidity	Nm/arcmin	1,2	3~100	2	3	3	12	12	23	23	38	38	110	110	210		
Max. Radial load $F_r$ max (2)	N	1,2	3~100	400	1,100	1,100	2,400	2,400	4,000	4,000	8,000	8,000	13,000	13,000	18,600		
Max. Axial load $F_a$ max (2)	N	1,2	3~100	300	600	600	1,800	1,800	2,500	2,500	3,000	3,000	6,000	6,000	11,300		
Service life (2)	hr	1,2	3~100	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		
Noise level (3)	dB(A)	1,2	3~100	≤ 56	≤ 58	≤ 58	≤ 60	≤ 60	≤ 63	≤ 63	≤ 65	≤ 65	≤ 67	≤ 67	≤ 70		
Weight	kg	1	3~10	0.5	1.2	-	3.2	-	7.2	-	16	-	30	-	50.5		
		2	15~100	0.7	1.7	1.3	4.7	3.6	11.0	8.4	-	18.5	-	35	-	62.5	
Mass Moments of Inertia (4)	kg·cm <sup>2</sup>	1	3~10	0.04	0.15	-	0.8	-	2.8	-	11.9	-	23.5	-	54		
		2	15~100	0.03	0.07	0.07	0.5	0.5	1.5	1.5	-	5.1	-	8.03	-	23.5	
Operating Temp. (5)	°C	1,2	3~100	-10 ~ +90													
Lubrication	-	1,2	3~100	High temperature & Extreme pressure Lubricant													
Mounting position	-	1,2	3~100	All directions													
Efficiency $\eta$	%	1	3~10	≥ 97													
		2	15~100	≥ 94													
Degree of protection	-	1,2	3~100	IP 65													

(1) Ratio =  $N_{in} / N_{out}$  (2) Values were measured at the following conditions : 100 rpm at the output, Load applied to the middle of the output shaft, Load coefficient( $K_a$ ) = 1, Continuous operation( $S_1=10,000$ hrs), (3) Noise level : A measurement 1m away from the gear head, 3000 input rpm and at no load condition, (Background noise 21dB(A)) (4) Moment of inertia : A measurement at the input shaft and representatives from each ratio,( $i=1/5$ ) (5) Operating temperature : Surface temperature of gear case in  $-10^\circ\text{C} \sim 40^\circ\text{C}$  of ambient temperature, \* Specifications are subject to change without notice to improve product performances.

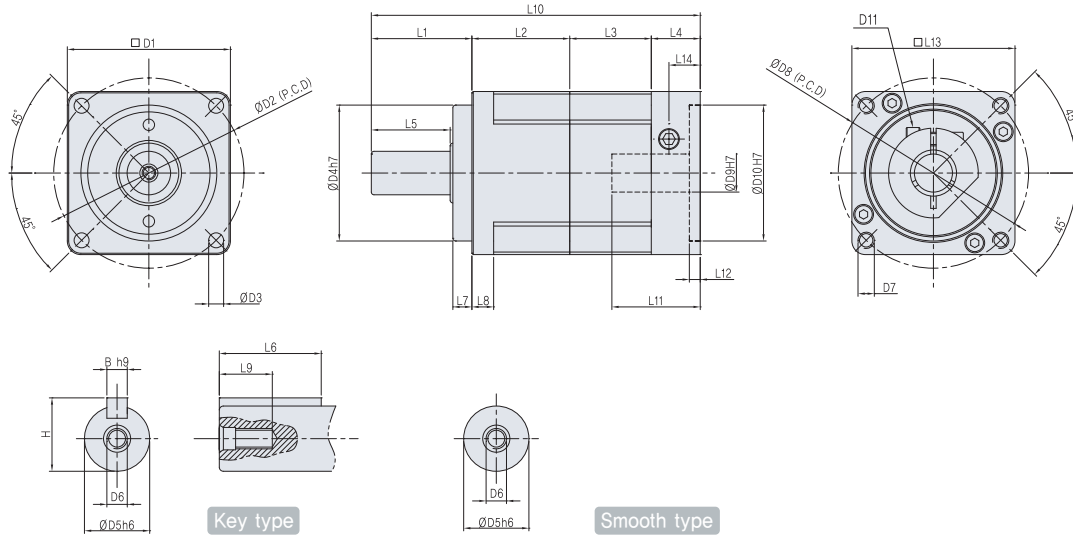
## Coding System



(1) The input frame of down size depends on customer's request.  
(2) It is important to verify mounting dimensions of a servo motor along with dimensions of gear head prior to placing purchase order.

# Planetary Gearheads

■ Dimensions (1 Stage, Ratio(i) = 1/3 ~ 1/10)



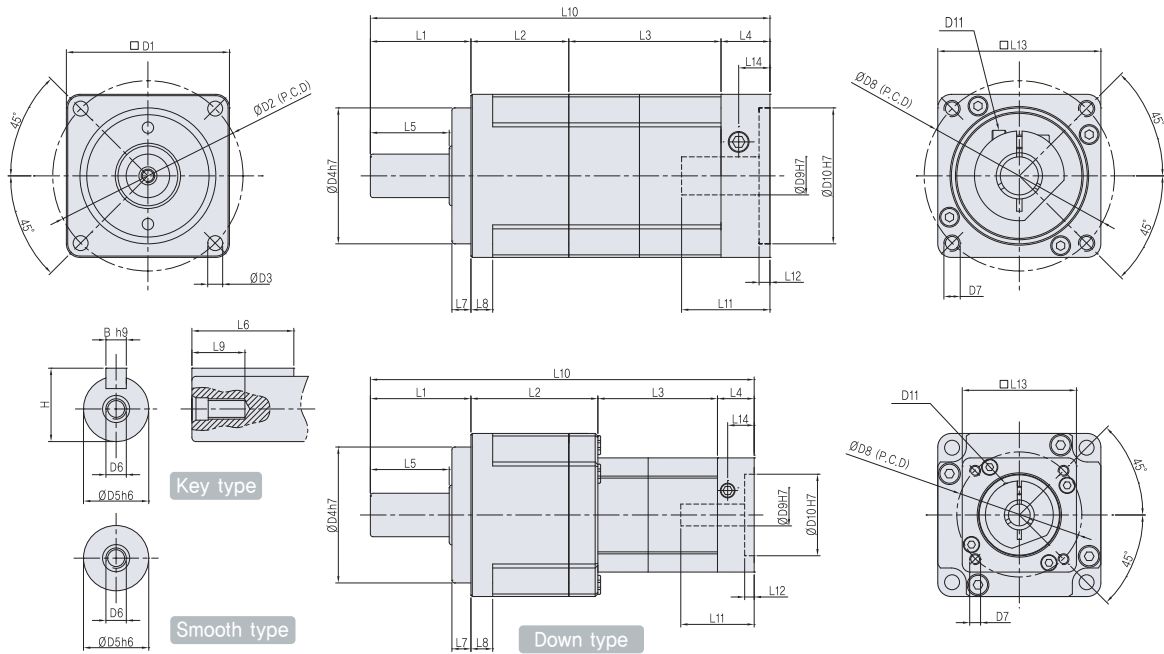
(Unit : mm)

Dimension \ Model	SPIH 042	SPIH 060	SPIH 090	SPIH 115	SPIH 142	SPIH 180	SPIH 220
D1	42	60	90	115	142	180	220
D2	50	70	100	130	165	215	250
D3	3,4	5,5	6,5	9	11	13	17
D4 h7	35	50	80	110	130	160	180
D5 h6	13	16	22	32	40	55	75
D6	M4xP0,7	M5xP0,8	M8xP1,25	M12xP1,75	M16xP2,0	M20xP2,5	M20xP2,5
D7	A	M4 DP8	M5 DP12	M6 DP12	M8 DP20	M12 DP21	M12 DP21
	B	M3 DP6	M4 DP12	M5 DP12	-	-	-
	C	M4 DP8	M5 DP12	M6 DP12	-	-	-
D8	A	46	70	90	145	200	235
	B	45	70	90	-	-	-
	C	46	70	90	-	-	-
D9 H7	≤8	≤14	≤19	≤32	≤38	≤48	≤55
D10 H7	30	50	70	110	114,3	114,3	200
D11	M3	M5	M5	M8	M8	M10	M12
L1	24,5	37	46	65	97	105	138
L2	28,5	36	49	59	103	119	136
L3	25,5	30	34	40	29,5	50,5	57
L4	A, B	13,5	18	18	42	42,5	57
	C	17	22,5	23	-	-	-
	L5	19,5	29	36,5	51	80	83
L6	16	25	32	45	68	76	97
L7	4	7	8	12	15	20	30
L8	7	8	10	14	12	15	20
L9	13	13	19	28	36	42	42
L10	A, B	92	121	147	206	272	331,5
	C	95,5	125,5	152	-	-	-
	L11	27	32,5	42,5	67	84,1	109
L11	A, B	27	32,5	42,5	67	84,1	109
	C	30,5	37	47,5	-	-	-
	L12	3,5	4	4	7	7	7
L13	42	60	90	130	180	180	220
L14	A, B	8,3	11,5	11,5	27,5	33,6	47
	C	11,8	16	16,5	-	-	-
	B h9	5	5	6	10	12	16
H	15	18	24,5	35	43	59	79,5

- Note) 1. Specifications are subject to change without notice to improve product performances.  
 2. The values of D7 through D11 and L10 through L14 on the above table may vary by servo motor.  
 3. CAD files are available to download from website([www.spg.co.kr](http://www.spg.co.kr)).

# SPIH Series

## ■ Dimensions (2 Stage, Ratio(i) = 1/15 ~ 1/100)



(Unit : mm)

Dimension \ Model	SPIH 042	SPIH 060	SPIH 060D	SPIH 090	SPIH 090D	SPIH 115	SPIH 115D	SPIH 142D	SPIH 180D	SPIH 220D
D1	42	60	60	90	90	115	115	142	180	220
D2	50	70	70	100	100	130	130	165	215	250
D3	3,4	5,5	5,5	6,5	6,5	9	9	11	13	17
D4 h7	35	50	50	80	80	110	110	130	160	180
D5 h6	13	16	16	22	22	32	32	40	55	75
D6	M4xP0,7	M5xP0,8	M5xP0,8	M8xP1,25	M8xP1,25	M12xP1,75	M12xP1,75	M16xP2,0	M20xP2,5	M20xP2,5
D7	A	M4 DP 8	M5 DP 12	M4 DP 8	M6 DP 12	M5 DP 12	M8 DP 20	M6 DP 12	M8 DP 20	M12 DP 21
	B	M3 DP 6	M4 DP 12	M3 DP 6	M5 DP 12	M4 DP 12	—	M5 DP 12	—	—
	C	M4 DP 8	M5 DP 12	M4 DP 8	M6 DP 12	M5 DP 12	—	M6 DP 12	—	—
D8	A	46	70	46	90	70	145	90	145	200
	B	45	70	45	90	70	—	90	—	—
	C	46	70	46	90	70	—	90	—	—
D9 H7	≤8	≤14	≤8	≤19	≤14	≤32	≤19	≤32	≤38	≤48
D10 H7	30	50	30	70	50	110	70	110	114,3	114,3
D11	M3	M5	M3	M5	M5	M8	M5	M8	M8	M10
L1	24,5	37	37	46	46	65	65	97	105	138
L2	28,5	36	46,7	49	65	59	80	103	119	145
L3	50,5	56	44	72	51,5	90	65,7	72	100,9	134,5
L4	A, B	13,5	18	13,5	18	18	42	18	42,5	57
	C	17	22,5	17	23	22,5	—	23	—	—
	L5	19,5	29	29	36,5	36,5	51	51	80	83
L6	16	25	25	32	32	45	45	68	76	97
L7	4	7	7	8	8	12	12	15	20	30
L8	7	8	8	10	10	14	14	12	15	20
L9	13	13	13	19	19	28	28	36	42	42
L10	A, B	117	147	141,2	185	180,5	256	228,7	314	367,4
	C	120,5	151,5	144,7	190	185	—	233,7	—	—
	L11	A, B	27	32,5	27	42,5	32,5	67	42,5	67
	C	30,5	37	30,5	47,5	37	—	47,5	—	—
L12	3,5	4	3,5	4	4	7	4	7	7	7
L13	42	60	42	90	60	130	90	130	180	180
L14	A, B	8,3	11,5	8,3	11,5	11,5	27,5	11,5	27,5	33,6
	C	11,8	16	11,8	16,5	16	—	16	—	—
	B h9	5	5	5	6	6	10	10	12	16
H	15	18	18	24,5	24,5	35	35	43	59	79,5

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